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MODERN BUILDING SERVICES

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NOVEMBER 2023

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DECARBONISING LIGHTING


12 How efficient HVAC systems can help data centres reduce running costs


26 Approaches to tackling the net zero challenge in schools

28 CSA Awards finalists chosen from record-breaking entry total

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WELCOME TO THE NOVEMBER ISSUE OF **MODERN BUILDING SERVICES**

The CSA (Commissioning Specialists Association) Awards, which was held in London last month, was a huge success! It was a new venue and the food, organisation and evening as a whole were spot on.

I thoroughly enjoyed being able to judge so many well thought-out and interesting entries. Modern Building Services is long-standing sponsors of this event and we are looking forward to 2024 already. Visit page 21 for a full list of winners.

The sixth BESA Annual Conference and Awards were held not long after the CSA event at the Novotel Hammersmith. The conference was extremely well run, with some very interesting seminars throughout the day. In particular, I really enjoyed the ones about skills shortages and fire dampers. The December issue will carry some articles which will go into more detail on these topics.

The BESA Awards evening welcomed nearly 500 guests. It was a fun night and we carry full details, along with a list of winners, on page 30 of this issue. MBS (Modern Building Services) magazine is always keen to support both events as a media partner and again, I'm looking forward to next year's event.

Next issue:
- Commissioning
- Net Zero
- Indoor Air Quality

If you'd like to discuss contributing, please contact me on **julietl@warnersgroup.co.uk**

Juliet Loiselle

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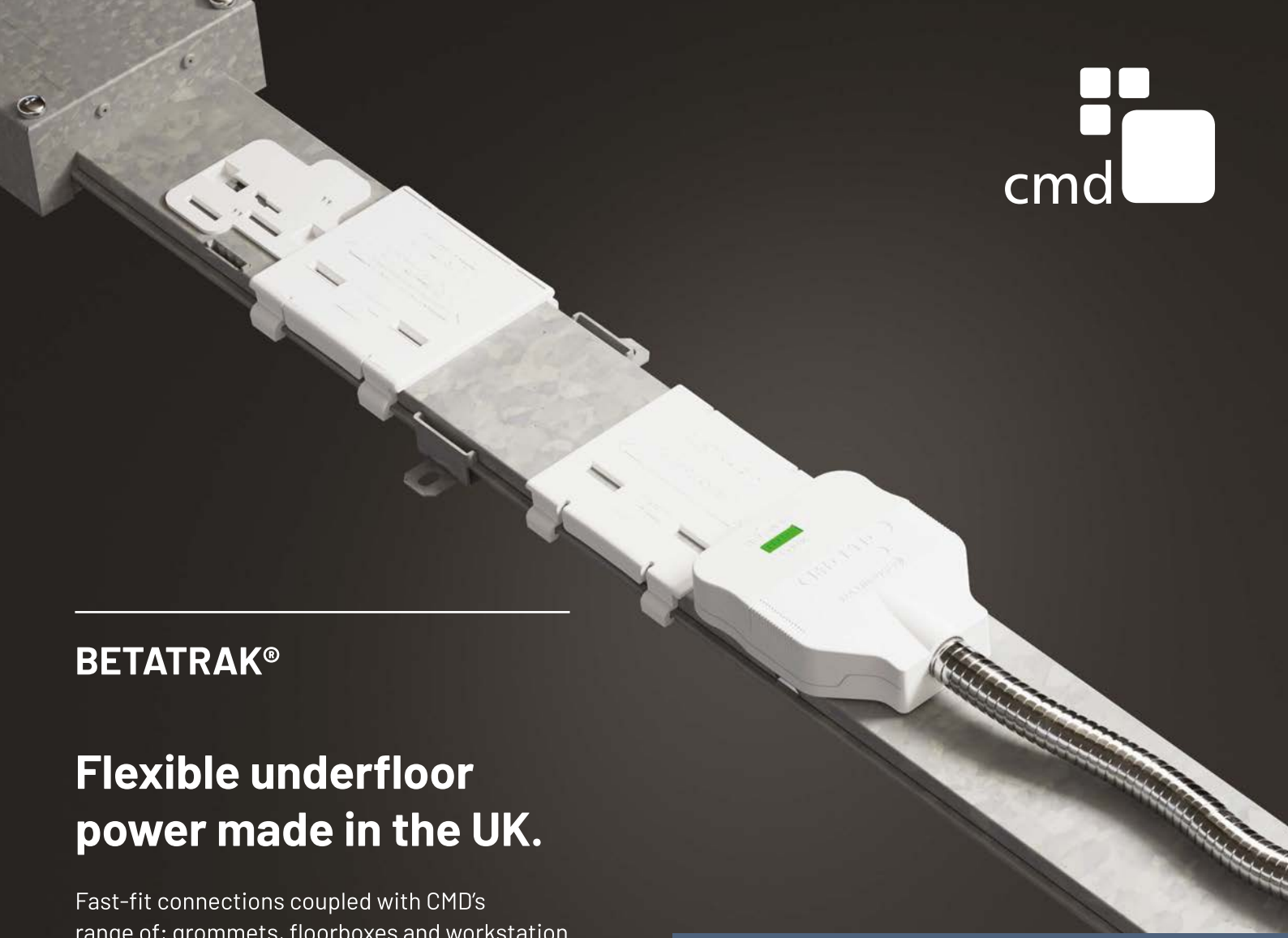

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See **www.modbs.co.uk** for our digital issues and to search all of our news, features and product updates.

PEOPLE

Artium Group announces appointment of new Directors to lead strategic growth

Martin Watson, Joe McDermott and Garry Shaw have all recently joined Artium Construction.

Martin Watson and Joe McDermott have joined the construction subsidiary of fast-growing Harrogate-based Artium Group from GMI Construction Group.

Martin will become Managing Director and shareholder while Joe becomes Director and shareholder.

The pair join Garry Shaw, who was appointed Director and shareholder of Artium Construction last year, with the trio having 60 years' collective senior construction industry experience. They will work with the board of directors across the group to build a £50m turnover construction business over the next five years.

Artium Construction projects include new build and refurbishment projects within the Yorkshire and Humber regions, spanning public and private sectors. These range from £2m to £10m in various domains, including residential, student, healthcare, industrial, and office spaces.

Martin will oversee all company operations, strategic planning, project management, financial stewardship, and team leadership. His customer-focussed approach to delivering quality, safely and on time has previously earned him a number of industry-recognised awards.

Joe's responsibilities will include tendering, pre-construction negotiating and commercial governance.

www.artiumgroup.com

New Director of Sustainability and Energy at Pick Everard

Multi-disciplinary consultancy Pick Everard has appointed Tim Danson as its new Director of Sustainability and Energy, taking the firm's total number of directors within the discipline to three.

Tim, who will join Pick Everard's team in Bristol, brings with him more than 23 years' experience, including almost 17 years at WSP.

He has been brought in to bolster Pick Everard's capabilities in a number of key areas, including an enhanced portfolio of infrastructure projects to complement the existing focus on buildings. He will also be instrumental in enhancing the growing range of corporate and other sustainability advisory services available to clients.

www.pickeverard.co.uk

Lee is the automatic choice

GEZE UK, manufacturer of door and window control systems, has appointed Lee Jodka as Area Sales Manager for supply and fit of automatic doors covering London and the South East.

Lee will support customers with technical advice and product guidance, with a focus on developing relationships with key contacts at main contractors, façade and specialist contractors as well as end-users. He will propose technical solutions from the company's range of automatic operators as well as carry out site visits and surveys.

Having amassed 19 years in the construction industry, Lee began his career in the architectural ironmongery sector and has held roles in technical sales and specification as well as account management.

www.geze.co.uk

New Managing Director for building product specialist

UK manufacturer Building Product Design Ltd has promoted Ben Gerry to the role of Managing Director following his successful tenure leading the company's commercial operations.

With more than 15 years' manufacturing and construction industry experience, Ben joined the company in November 2020 as Commercial Director. He has gone on to play a key role in the development of the company's subsidiary brands which include Glidevale Protect, Passivent and Kingfisher Louvres, as well as Building Product Design's bespoke manufacturing solutions.

Ben has held leadership roles within SMEs and service-focused businesses.

www.glidevaleprotect.com

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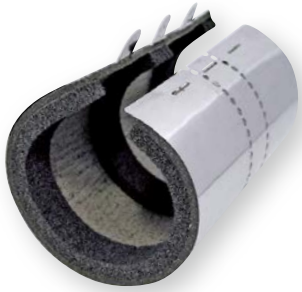

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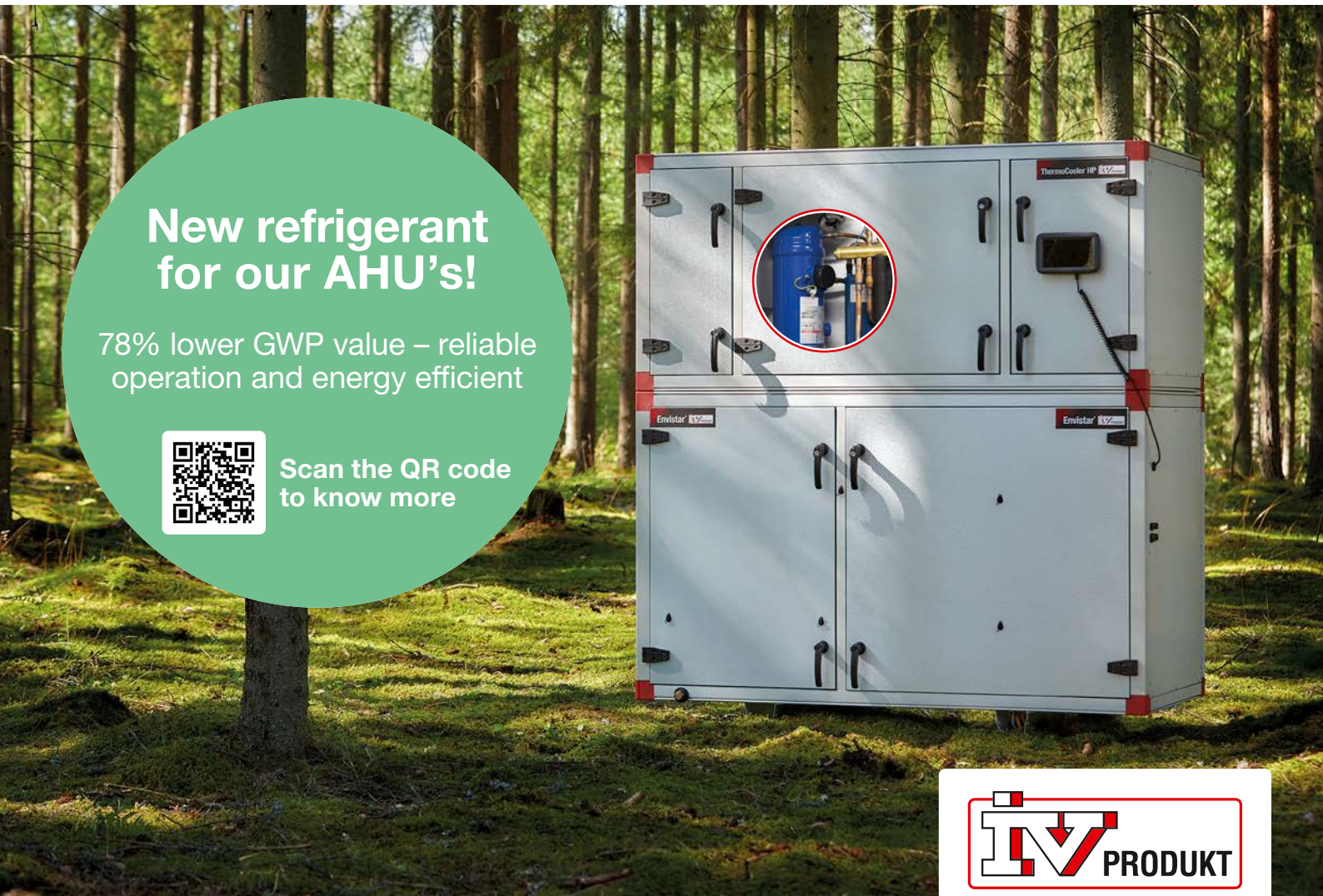


New range of ECS cards launched for building controls sector

The Building Controls Industry Association (BCIA) has welcomed the introduction of a new suite of ECS cards for the building controls sector.

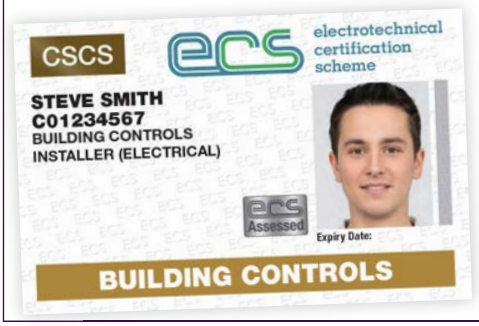
The Electrotechnical Certification Scheme (ECS) is the sole ID and competence card scheme for electrotechnical operatives in the UK. It has worked closely with the BCIA for a number of years to ensure that a range of cards exists which reflect the skills and competencies required in the building controls industry.

During the development and launch of the new Building Energy Management Systems (BEMS) Controls Engineer apprenticeship standard, an occupational qualification structure was developed by the building controls industry which included members of the BCIA, employers and training providers to define and align the skills needed by the industry now and in the future.

This structure has been in place for a number of years but was recently reviewed and updated by industry employers and stakeholders to ensure it is fit for purpose, while maintaining the standard set for building controls engineers in the BEMS apprenticeship.

The new card types include: Building Controls Apprentice, Building Controls Associate, Building Controls Installer (Electrical), Building Controls Technician (Commissioning) and Building Controls Engineer.

www.bcia.co.uk



Speakers confirmed for Extreme Heat Business Briefing

The Institute of Refrigeration (IOR) has lined up a host of expert speakers for its International Refrigeration Committee's Business Briefing on the theme of the impact of extreme heat in the cooling sector.

Taking place on November 14th in Birmingham, the event will look at experiences of designing for greater variance in temperature and balancing environmental objectives with higher load demands. It will also review some of the approaches and solutions already adopted by countries that have developed a solid cooling strategy to tackle rising temperatures.

Laura Kent from the Institution of Mechanical Engineers (IMechE) will give a keynote presentation looking at adapting industry to withstand rising temperatures and future heatwaves, while Leyla Sayin from the University of Birmingham's Centre for Sustainable Cooling will discuss the economic impact of extreme heat and the importance of the cold economy.

Two sessions will consider the lessons the UK can learn from countries with hotter climates. These include the Royal Scientific Society's Sawan Baaresh's presentation on the development of Jordan's national cooling strategy, and Yosr Allouche from the International Institute of Refrigeration discussing the impacts of designing refrigeration equipment for warmer climates.

Four sessions will look at practical measures businesses can take to mitigate extreme heat, including utilising energy demand management to achieve Net Zero, improving design, the role of maintenance and servicing, and academic support. These sessions will be presented by Connor Eaton-Smith of K2 Engineering Cooling, John Bonner of City Facilities Management and Catarina Marques of London South Bank University.

The final three speakers will then look at potentials for the future. Koura Global will discuss new blend refrigerants for higher ambient temperatures. Kashif Nawaz, of Oak Ridge National Laboratory, will discuss how refrigeration, air-conditioning and heat pump equipment design will need to adapt to cope with climate change and Owen Gow of the Arsht-Rockefeller Foundation Resilience Centre will talk about reducing the human and economic impacts of extreme heat.

There will be an opportunity for delegates to participate in a post-conference site tour of the Mondelez-Cadbury UK factory in Bourneville.

Book a place at www.ior.org.uk/extreme-heat-2023

Prince of Wales learns about climate tech innovation during visit

HRH The Prince of Wales recently visited technology hub Sustainable Ventures, which is based in London's County Hall and is the largest of its type in Europe.

Managing Partner of Sustainable Ventures, Andrew Wordsworth, introduced the prince to member company chiefs working on innovations to tackle climate change and resource scarcity. These included Gunnlaugur Erlendsson, founder of ENSO, a company that makes tyres designed to reduce air pollution. ENSO is a 2023 finalist of The Prince's Earthshot Prize in the 'Clean Our Air' category.

As well as touring the workspace, the prince took part in a discussion with other startups who aim to grow rapidly (known as 'scaling' in tech industry terminology) and maximise impact on the problems they are trying to solve.

Notpla, also part of the Sustainable Ventures community, won last year's prize in the "Build a Waste-free World" category for its packaging made from seaweed. Winners receive a £1 million grant to help grow their business.

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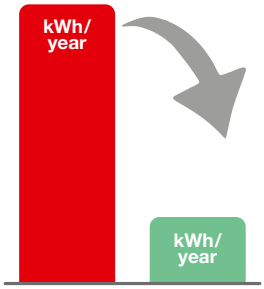

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Lighting installations must be designed with energy efficiency in mind, in proportion to the energy consumption of other building services.

Decarbonising Lighting

Sophie Parry, Head of TRILUX Lighting's UK Akademie, discusses the road to Net Zero Carbon and what to be aware of.

In a typical office building, lighting accounts for around 30% of the building's annual energy consumption which presents a significant opportunity for energy savings and progress towards decarbonisation.

Net Zero Carbon (NZC) is a term currently being defined, along with the tools to measure it, by a consortium of stakeholders working with the UK Green Building Council. The goal is to determine if a building is truly NZC in line with the UK government's Climate Change Act, which aims for the country to be Net Zero Carbon by 2050.

So how can you determine whether a lighting system installed today will be compatible with the NZC regulations in 2050?

Modern buildings being constructed or refurbished are still likely to be in operation in 27 years' time. However, it can be difficult to predict how lighting installed today will support NZC legislation in 2050. Case studies show that the power density limit in W/m², as calculated in 2022, should put investment in low energy lighting on a trajectory to contribute to a NZC outcome. One example recently highlighted by the CIBSE Journal demonstrated that a realistic maximum energy density for office lighting is 4 W/m².

This means that lighting installations must be designed with energy efficiency in mind, in proportion to the energy consumption of other building services. They can then contribute to a NZC outcome while providing immediate savings in operational energy and lower maintenance costs.

Redressing the balance

When designing lighting for a new building or renovation, it is important to consider both energy efficiency and lighting quality. There are two project scenarios to consider for internal lighting.

The first scenario is where new lighting installations are part of a new build or whole-building renovation. In this scenario, the lighting design will likely be carried out to the client's performance specification and be designed to meet or exceed all applicable legislation or standards. The minimum is to comply with the requirements of Building Regulation (England) Part L volume 2, Non-Domestic buildings, and use UK Eco design compliant products.

Realistically, the Building Regulations are pretty easy to achieve and are often behind the technology curve of what's available. This 'beyond the curve' area will provide the best decarbonised solutions. A professional design team should be employed to ensure the completed project meets the client's whole-building performance specifications.

The second scenario is where lighting refurbishment is a stand-alone project. This scenario is a little more extensive, and the client needs to choose suppliers with care as often it is just the lighting manufacturer designing and supplying the lighting in conjunction with an installer.

Tips prior to installation

Take the following approach:

1. Benchmark the existing lighting installation regarding operational energy use, maintenance costs per annum, and carbon footprint.
2. Carry out a condition survey to determine if the existing lighting installation meets current applicable legislation and standards, such as Building Regulation Part L for lighting-operational energy and the recommendations found in the 'BS EN 12464-1:2021 Light & Lighting, Lighting of Workplaces, Indoor workplaces' standard

   For emergency lighting, work to Building Regulation Part B in conjunction with BS 5266-1 and in particular, the building's current Fire Risk Assessment for any requirements for emergency lighting and escape route signage.
3. If re-using the existing electrical installation, conduct a condition survey to check the installation complies with the 'BS 7671:2018 Requirements for Electrical Installations' standard.

The outcome of the surveys will form the basis of a business case to justify and fund the project.

Specify and agree scope of works

The next stage of the project is to specify and agree on the scope of works and performance for the new lighting installation in terms of lighting quality, product compliances, and the maximum permitted or targeted operational energy and carbon.

The following steps should be followed:

1. Produce a detailed design and specification for installation.
2. A Programme of Works should be prepared that includes the project impact on the day-to-day use of the building if occupied, removal of the existing lighting, installation of the new lighting, set-up and commissioning, as-built O&M documentation, hand-over/demonstrations to the client and their FM team and disposal of any waste lighting materials via the WEEE scheme.
3. Sub-meters for lighting energy will also be required to comply with Part L, allowing the client or their FM team to check, after 12 months of using the new installation, if the operational energy use is as predicted. If there is a noticeable over-spend, then the lighting control settings and how the building is used should be a consideration to reduce energy use.

Lighting installations that deliver good quality light and use minimal power to contribute towards a NZC building are possible. However, success relies on carefully choosing your lighting design team and supplier.

More information is available at **www.trilux.com/gb**

Good Lighting installations should deliver good quality light and use minimal power to contribute towards a Net Zero Carbon building.

PUE-fecting data centres

Bradley Stone, Data Centre Vertical Manager (UK and Ireland) at Carrier, highlights how efficient HVAC systems can help this energy-hungry sector reduce running costs and carbon footprints.

Rising energy costs and the need to meet sustainability goals means that data centres are under constant pressure to improve efficiency.

Data centres play a significant role in an increasingly digital world but with approximately 3.5 quintillion bytes (3.5 million terabytes) of data created daily, the energy needed to consume this information is huge.

The energy consumption required by data centres is driven by the need to power and cool servers and other infrastructure required to store, process and transmit data. Data centres account for 1% of the world's electricity consumption and 0.5% of carbon dioxide emissions.

Calculating PUE

A key metric used by the data centre industry to understand how efficiently data centres use energy is Power Usage Effectiveness (PUE). It can identify opportunities where efficiency can be improved over time.

The formula used to calculate power usage is Total Facility Energy divided by IT Equipment Energy.

IT Equipment Energy covers the energy consumed by the core IT equipment within the data centre, including servers, switches, storage devices and networking infrastructure. It encompasses the energy required for data processing, computation, and transmission.

Total Facility Energy is a combination of everything else that requires power in the data centre, such as non-IT equipment, lighting and cooling systems.

Non-IT equipment can include security, backup power devices during utility outages and power distribution infrastructure such as transformers, switchgear, power distribution units (PDUs), and cabling. These elements are all susceptible to electrical resistance and inefficiencies.

Energy consumed by lighting may seem minimal, but cumulative energy consumption can impact on the overall PUE significantly.

Data centres also generate substantial heat because of the operational intensity of IT equipment. Maintaining stable temperatures and ensuring equipment doesn't overheat is

crucial to a data centre's smooth and safe running. This is where HVAC systems play their part. However, heating and cooling systems consume around 30% to 40% of the overall energy in a data centre facility.

The ideal PUE ratio is 1.0, as it signifies that every unit of power consumed is utilised solely by the IT equipment. In reality, however, most data centres fall within the range of 1.2 to 1.4 as a result of factors such as suboptimal equipment efficiency or inefficient cooling systems.

Although HVAC systems consume a considerable amount of energy, it is possible for data centre operators to optimise their PUE ratio by enhancing their energy efficiency, maximising free cooling and using systems operating on low Global Warming Potential (GWP) refrigerants.

Enhancing energy efficiency

One approach to enhancing energy efficiency is the use of hot aisle/cold aisle containment systems. By segregating hot and cold airflows and preventing mixing, these systems enable more precise cooling, reducing the workload on HVAC systems.

Advanced monitoring and control systems can also be employed to fine-tune operations. Machine learning algorithms and artificial intelligence can analyse vast amounts of data from devices and sensors then adjust cooling based on workload and environmental conditions.

These intelligent systems optimise energy usage and maximise efficiency without compromising performance.

Free cooling

Free cooling in HVAC systems involves using the cooler outside air to directly cool the water or other heat transfer fluid. This can be achieved through various methods, such as air-side economisers, evaporative cooling or heat exchangers.

Free cooling can provide cooling capacities that exceed the requirements of the design, allowing for optimisation of multiple chillers. Multiple chillers can be operated in parallel or independently, depending on the cooling load, to further enhance efficiency and flexibility.

As an example, Carrier's AquaForce® 30XF air-cooled screw chiller, designed specifically for data centres, operates between 100% hydronic free cooling, hybrid (free/mechanical) cooling and 100% mechanical cooling to maximise the efficiency of the system.

Data centres situated in cold climates or even underwater can reduce the amount of mechanical cooling needed to dissipate the heat generated by servers, increasing energy savings further.

Low GWP refrigerants

Many modern chiller and heat pump systems operate on lower GWP refrigerants. With the emergence of F-gas regulations in 2020, refrigerant blends such as R-1234ze are now being utilised. These refrigerants provide a sustainable solution and are compliant with regulations.

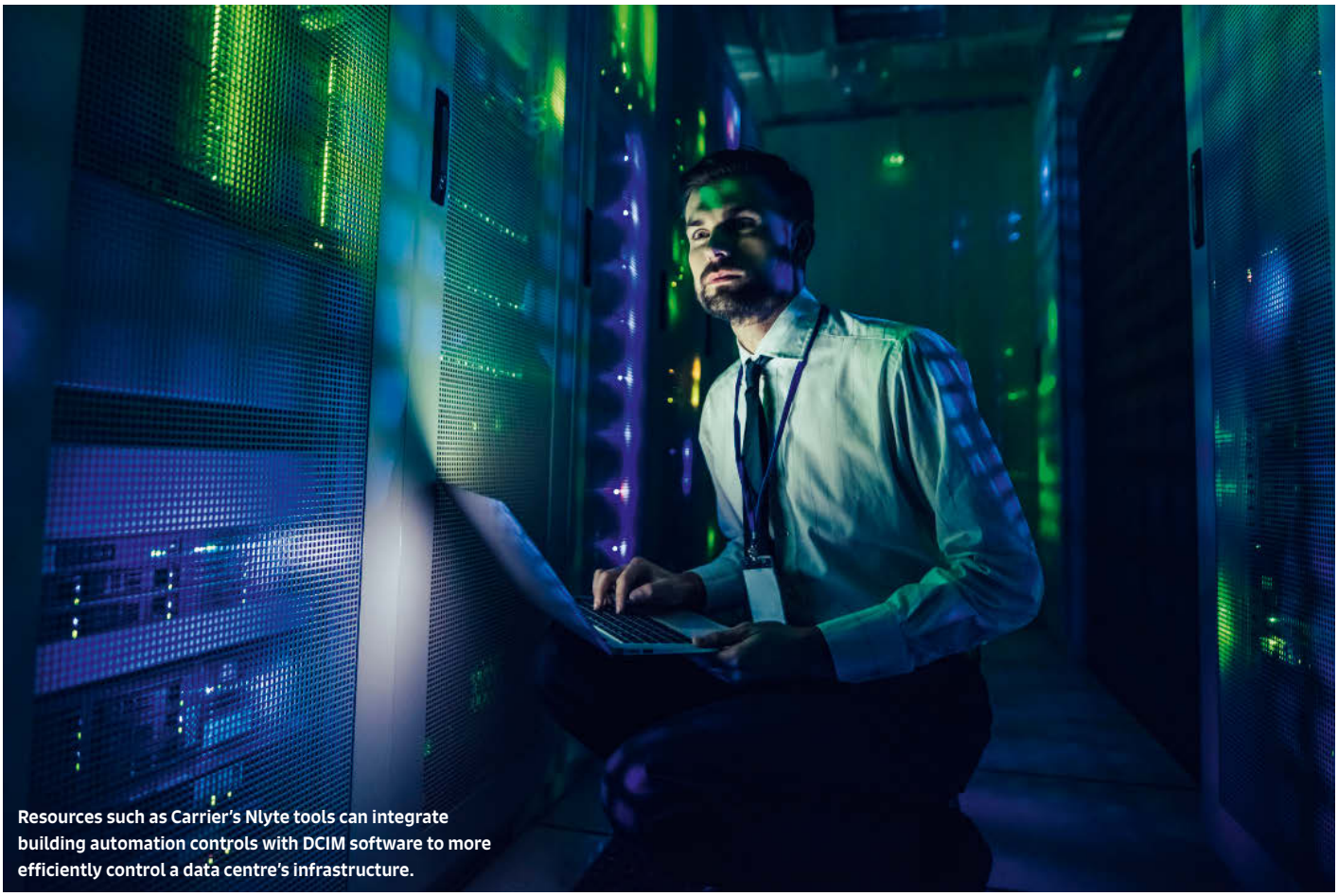
The full lifecycle solution

As well as the comprehensive range of chillers and heat pumps to improve PUE ratios, data centre operators can integrate smart and connected solutions to deliver upstream data from their data centre ecosystem. This information can be used to cool, monitor, maintain, analyse and protect the facility to refine efficiencies and achieve a PUE ratio closer to 1.0.

Benefits of Integrated Data Centre Management (IDCM) tools integrated with the building automation system include increased efficiency of power and cooling by matching capacity with actual and forecasted demand while safeguarding against disruption from planned maintenance or unforeseen failures of power. This helps to maintain uptime and keep servers running cool and around the clock.

When integrated together in a data centre, HVAC equipment, data centre infrastructure management tools, and building management systems consume less energy, which results in lower operational expenses and cost savings in the long run and reduces its carbon footprint.

More information can be found at **www.carrier.com**



Resources such as Carrier's Nlyte tools can integrate building automation controls with DCIM software to more efficiently control a data centre's infrastructure.

'Tis the season to be **commissioning**

Stewart McGillivray, Seasonal Commissioning Manager for Guardian Water Treatment, explains the steps maintenance teams need to take to ensure buildings work as they were intended.

During the winter months, an essential heating and ventilating plant has to work hard to keep occupants warm. Comfort is a priority, balanced with ensuring energy efficiency to combat rising fuel bills.

Despite it still being very mild at the end of September, that was the time that maintenance teams and financial managers needed to begin preparing for the essential seasonal commissioning tasks that ensure buildings in their care are ready for the increased demand on heating. These activities contribute to 'soft landings': the process of maintaining the design brief of a building and ensuring it performs as it was intended, with a focus on optimal comfort and functionality for occupants.

Seasonal commissioning should take place throughout the year with thermal comfort, ventilation and lighting all checked using measurement and occupant feedback. Where buildings have changed their heating or air conditioning technology (such as switching boilers and chillers for heat pumps) seasonal commissioning is particularly important to prove the new capital plant performance.

During the winter, the focus obviously moves away from cooling to heating, checking optimal space temperatures, heating plant flow and return, energy consumption and BMS trends. The design values of the scheme are used as a benchmark. Any works that have been carried out in between seasonal commissioning periods should have been logged so their impact can be checked.

FMs are often contractually obliged to maintain climate conditions and prevent downtime, so seasonal commissioning is crucial to preventing liability cases. Buildings that are too hot or too cold can lead to commercial spaces becoming unfit for occupation, especially in multi tenanted offices.

Let's not forget that heating and cooling is not just for people. Many commercial sites require very specific temperature control for their operations, for example data centres, pharmaceutical environments, manufacturing facilities and food storage locations. In these examples, faulty HVAC and/or control strategy can lead to very expensive issues.

Seasonal commissioning shortcomings

A 'soft landings' clause is often written into contracts but because of the shortcomings of seasonal commissioning, it is sometimes hard to achieve.

Common challenges include:

- **Hidden mechanical issues:** Problems within closed-circuit water systems often go unnoticed until it is too late.
- **Corrosion:** One of the biggest threats to HVAC systems, corrosion silently erodes pipework, leading to costly repairs and downtime. Corrosion can occur at any phase of a building's lifecycle, from pre-commission to ongoing operation.
- **Extreme weather conditions:** These can lead to malfunctioning temperature control systems, causing disruption and downtime.
- **Accurate measurement:** The objectives of 'soft landings' can be difficult to quantify.
- **Loss of building knowledge:** High staff turnover can result in a deterioration of building knowledge and failures within the 'soft landings' process. Ongoing training and support for FM teams should be a central part of the strategy.

Closed systems in particular suffer from the first two challenges. At the point where a problem (usually caused by corrosion) reveals itself, it is likely to be very costly and disruptive to rectify. Leaks in the pipework, for example, mean corrosion has been there for some time.

Monitoring = transparency

Thankfully, in our now data-driven world, there are tools available that can remove the guesswork from building services. A building management system (BMS) is part of this jigsaw puzzle and keeping a good handle on trends, while tweaking functionality to meet seasonal demands, plays an important role in winning the 'soft landings' battle.

There is also monitoring technology specifically designed for closed systems, checking a range of parameters indicative of corrosive conditions and providing early warning of potential problems. The word 'potential' is key here, as by jumping on changes well before the visible issue appears corrosion and its symptoms can be stopped in their tracks.

Oxygen levels, pressure fluctuations, pH, inhibitor levels and galvanic currents, for example, all provide clues as to what is going on behind the scenes. These indicators are essential weapons in the seasonal commissioning arsenal and show that microbiologically-influenced corrosion (MIC) is not active. Technology delivers readings every 15 minutes, 24/7, which means that when seasonal commissioning comes around, there is less intervention required as those responsible can be certain of closed-system condition.

Where disruption has occurred, as demonstrated by reviewing the monitored data, or where changes have taken place as a result of adjustments in usage, ongoing monitoring can show the success (or failure) of these activities, accurately pinpointing cause and effect. Where liability cases do arise, this accuracy can prevent false accusation of responsible parties.

Overall, where a closed-system is only tampered with when there is a problem, more sustainable and cost-effective maintenance practices ensue. Knee-jerk reactions, such as flushing and dosing, can be avoided, reducing water wastage and preventing the overuse of chemicals. Less time is spent on site and the use of off-plan external contractors is limited. In general, monitored HVAC works better and lasts longer, improving whole-life costings.

In addition to monitoring, there are other factors that will improve the effectiveness of seasonal commissioning:

Strategy: To enhance desired outcomes, a clear strategy should be in place, involving close collaboration between all key stakeholders, including designers, contractors, and facilities managers.

The strategy should focus on the key areas which soft landings should be measured against, as detailed in BSRIA guide BG74/2019:

- Energy consumption
- Economic or financial need
- Social and well-being need
- Sustainability and environmental aspect
- Functionality

Training: Everyone involved in the usage and maintenance of temperature control equipment must have training, including maintenance teams and end-users. Filming training is a great way to pass on knowledge to new staff. Loss of building knowledge is one of the most common reasons that the 'soft landings' process breaks down.

No more hidden surprises

Building services and the people responsible for them are under a lot of pressure, juggling end-user comfort, rising fuel prices, operational certainty and in some cases, supporting conditions that allow extremely valuable technology to operate or safeguard essential products. The stakes are high.

Real-time monitoring of hydraulic closed-systems, alongside clear strategy and knowledge sharing, is essential for successful seasonal commissioning, dramatically reducing the risk of major issues and subsequent liability.

More information can be found at **www.gwtltd.com**

Heat pumps alone are no magic bullets for schools

Rob Smelt, of low carbon consultancy BREng, discusses the complexity of sustainability requirements in education establishments and why each will need a different approach.

The scale of energy consumption across the education sector is 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 national education estate amounts to a substantial and diverse network of multi-use buildings, with complex HVAC requirements. There are 32,226 schools in the UK, including around 4,000 secondary schools, 142 universities (in themselves effectively small towns) and around 400 further education colleges.

The requirement to decarbonise school buildings poses a major challenge for the sector and 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 while Manchester has a target of 2038.

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

Unfortunately, the diversity of school building types, usage patterns and existing energy systems make it impossible to apply a single template to deliver net zero. No single model could possibly cover the complex reality on the ground.

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.

'Fundamental efficiency'

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.

A phased decarbonisation approach was adopted at Kepier School in North East England.

Schools are now working with consultants 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.

"Unfortunately, the diversity of school building types, usage patterns and existing energy systems make it impossible to apply a single template to deliver net zero."

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 that 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.

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.

Mix of solutions

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, the high-density occupancy, particularly in classrooms and high-use corridors, means heating demand can fall rapidly as a result of 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.

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.

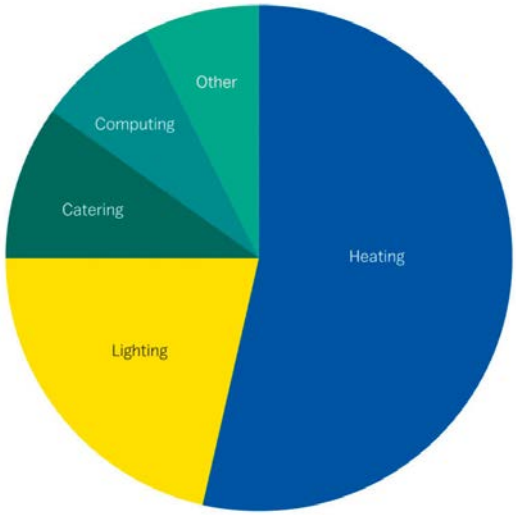
Having carried out detailed HVAC and energy surveys of scores of schools, for the reasons outlined above, it is clear that the precise solution will be different in almost every case. It is likely to involve a mix of heat pumps, solar PV, LED lighting, upgraded heat emitters, insulation and high efficiency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

Additional source of energy

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. ➜

"With 30,000 plus schools requiring decarbonisation, this is going to require a huge national effort."



Breakdown of Energy Use in the Average School

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.

Gains through lighting

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 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.

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. Experience shows that there are often significant additional gains that can be made by optimising the system in the light of how it operates in practice.

Fine tuning

Following the completion of a number of school decarbonisation projects over the past couple of years, schools are now working with consultants 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 a truly 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.

Learning by example

BREng has identified key lessons from recent pioneering school projects, to help education estate managers plan their path to net zero, the findings of it recently presented in a webinar entitled 'Meeting Heat Demand in Schools', part of a series on Decarbonising Education Buildings organised by elemental.

The key findings drew on BREng's experience with decarbonisation projects in schools and academies, funded by the UK government's Public Sector Decarbonisation Scheme (PSDS) and Condition Improvement Fund (CIF).

One example is a phased approach at Kepier School in North East England, which installed seven new gas boilers four years ago. Project partners BReng Hull, CIAT UK, consultant AA Projects, installer Quora Group and equipment supplier Cool Designs, helped develop a long-term decarbonisation plan for the school, with funding under the Condition Improvement Fund (CIF).

The project sought to upgrade heat-emitting systems, so the move to low-carbon heat pumps could be made seamlessly when the time came to replace end-of-life gas-boilers.

The project included removal of conventional radiators and replacement with 31 CIAT COADIS and seven MajorLine FCUs.

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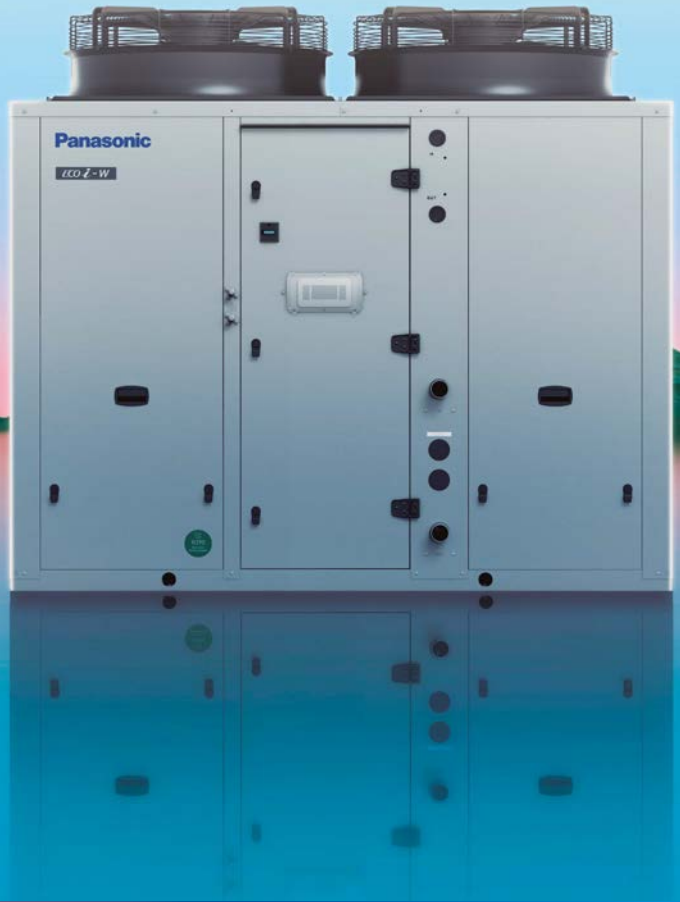

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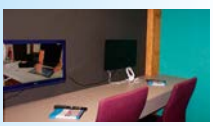

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Refurbishing schools and colleges for Net Zero – and the people who work and learn in them.

Upgrading school and college buildings to meet challenging Net Zero goals can go hand-in-hand with making these buildings better places to work and learn. **Mike Egan**, Business Development Manager, Corporate Solutions for Mitsubishi Electric LES looks at the options.

In the UK's pursuit of Net Zero greenhouse gas emissions by 2050, all aspects of government and the public sector must take a role, including the Department for Education (DfE), which aims to achieve Net Zero across the UK's educational estate.

The DfE has established two science-based milestone targets for reducing emissions against a 2017 baseline:

* 50% reduction by the end of Carbon Budget 5 (2032)
* 75% reduction by the end of Carbon Budget 6 (2037)

These are worthy objectives but pose a tough challenge for school governors, heads and facilities teams. It's possible to deliver a new, low-carbon and highly energy-efficient school building, but bringing existing buildings up to these expectations requires careful thinking and planning.

The DfE's Good Estate Management for Schools (GEMS) guide points out that good energy management can save 10% to 30% of a school's energy costs and benefit the environment. A critical area for consideration in these refurbishment projects is building services, including heating, hot water, ventilation and cooling. These also support the health and comfort of teachers and students.

There is also a growing impetus from the government to reduce the use of fossil fuels across the public sector estate, which includes school and college buildings, meaning divesting the estate of its old gas boilers. Most schools and colleges do not have on-site facilities and expert engineering teams, so refurbishing equipment for heating, hot water and cooling must be easy to operate, with robust performance and low maintenance requirements.

For most school and college management teams, there are four main goals to hit when tackling these issues:

Source funding for refurbishments

There are several government grants and schemes to make school and college upgrades more achievable, including School Condition Allocations (SCA), Condition Improvement Fund (CIF) and the Public Sector Decarbonisation Scheme (PSDS), which provide grants for schools and colleges to switch to alternatives such as heat pumps, as well as for energy efficiency improvements.

Decarbonise school and college buildings

Developments in heat pump technology are making this more straightforward. Heat pumps can now deliver heating, hot water, and even cooling. PSDS has helped many schools update their gas boiler by making heat pumps affordable.

Improve indoor air quality

Ventilation is now an essential consideration to support the health and wellbeing of teachers and students while future-proofing buildings against the effects of climate change as the UK experiences more extreme summers. Mechanical ventilation with heat recovery (MVHR) is a good option for balancing ventilation needs with energy efficiency. MVHR systems capture heat energy from the outgoing air and apply it to the incoming air, reducing the need to pre-heat air, particularly when the weather is cooler.

Deal with requirements for 'specialist' areas, such as ICT suites

Cooling is another comfort and safety factor to consider when refurbishing older buildings. We see growing requirements for ICT suites for computing and digital skills courses. Equipment such as PCs, laptops and screens all create a lot of heat, making these spaces uncomfortable for teachers and students and the equipment.

Plan for long-term management and maintenance for efficiency and cost-effectiveness

It's not only these specialist areas where cooling must be considered. While there is no official maximum temperature for classrooms, 26oC is recommended for the health and safety of teachers and students. Maintaining this level indoors while outdoor temperatures rise can be challenging. While air conditioning may not have been considered important for schools and college buildings, it is increasingly affordable. Variable refrigerant flow (VRF) air conditioning systems can provide heating and cooling, making it a practical option for decarbonising buildings where using a heat pump to replace a gas boiler is impossible.

Building services such as heating, hot water and cooling are crucial for modern school and college buildings. They contribute to healthy, optimised spaces for teachers and students. Refurbishment of schools and colleges should include these systems because updates pay back in terms of reduced carbon, lower energy use and better indoor conditions for teachers and students.

A fitting reminder on **heat pumps**

There is a compelling environmental case for switching from fossil fuel-based heating to heat pumps in commercial premises but **Tim Mitchell**, Sales Director of Klima-Therm, says there are many factors to consider in order to do this successfully.

Despite recent indications from Prime Minister Rishi Sunak that he plans to soften the UK's environmental objectives, the country has set a legally-binding target to reach net zero greenhouse gas emissions by 2050.

Achieving this will require almost all heat in buildings to be decarbonised, as well as heating-related carbon emissions in industry to be reduced to virtually zero.

The electrification of heat in the form of heat pumps has smoothed the path towards 'cleaner' temperature control. Indeed, it is widely acknowledged that heat pumps should be the primary technology choice for decarbonising heat in existing buildings.

The reasons are simple. An efficiently-designed, installed and operated heat pump system can deliver immediate CO2 emissions savings of up to 70% compared to conventional electric heating and between 55% and 65% compared to an efficient gas boiler.

The Carbon Trust has stated that as the grid decarbonises further in coming decades, the carbon savings delivered by heat pumps are expected to increase further, towards 90% or 100% CO2 emissions reductions by 2050.

Integrating heat pumps into new commercial buildings is more straightforward than installing them in refurbishment projects.

However, switching efficiently from fossil-fuelled heating (generally gas-fi red boilers) to heat pumps in larger buildings (typically those with a thermal output of more than 45kW) does present significant challenges. Heat pumps are not a like-for-like replacement for gas boilers or conventional electric heating, and that's why effective system design is essential.

The Carbon Trust has stated that a key difference between heat pumps and traditional forms of heating is that heat pumps operate most effi ciently at lower flow temperatures.

It went on to say that some energy-efficient buildings can already accommodate lower temperature heat and many heat pumps can deliver higher temperature heat. However, optimising performance will often require upgrading the heat emitters (such as radiators) and reducing heat loss through the thermal fabric of the building.

"In this sense, heat pumps require a greater focus on the holistic energy performance of the building and best practice design involves minimising heat losses as well as optimising supply," the organisation says..

Important differences

Another important differentiator between heat pumps and traditional forms of heating is that heat pump efficiency and effectiveness is more directly affected by the need to be accurately and appropriately sized in relation to the heating and cooling requirements of the building.

More information is available at **www.klima-therm.co.uk**

CHECKLIST

Here is a checklist of eight factors to consider as you choose how and when to switch from fossil fuel heating to heat pumps in a commercial application:

Application:
Is the installation going to have to cater for direct hot water, space heating, or both? This will influence the design, the electrical load and the size of power supply the system will require.

Location and heat source:
On the roof/outdoors, installing air source heat pumps (ASHPs) is probably more appropriate whereas, in a basement/plantroom, high temperature water source heat pumps might be better, depending on available space and application. In the latter case you will still need a primary heat source (such as the buildingcooling or condensing system), a local heat network, a ground loop or local water course heat sink, or ASHPs as the first stage in a cascade system.
Any plant installed outdoors will be subject to the noise pollution regulations. It's also worth remembering that an ASHP can generate melt water which, if the outside temperature drops, can present a slip hazard.
If you opt for basement/plantroom installation, consider the toxicity, flammability and risk of asphyxiation that can be presented by refrigerants in enclosed spaces. Further guidance can be found in BS EN 378 – Refrigerating systems and heat pumps - Safety and environmental requirements, which specifies the requirements for the safety of persons and property, provides guidance for the protection of the environment, and establishes procedures for the operation, maintenance, as well as repair of refrigerating systems, and the recovery of refrigerants.

Pipe sizing:
If pipe sizes cannot be changed to accommodate the ASHP's potentially lower direct temperature, likely smaller temperature difference and higher fl ow rate, then consideration needs to be given to hot water tanks or plate heat exchangers being used as hydraulic decouplers.

Defrost cycles:
ASHPs should be sized to allow for around 15% overall reduction in heating capacity and hot water storage is recommended to absorb the defrost 'coolth'. You should otherwise consider a heat pump system with no defrost. For example, Klima-Therm's zero defrost fully-packaged heat pump air handling unit (AHU) range is ideal for displacement ventilation and other air conditioning applications.

Power supply:
To handle the greater electrical load of heat pumps, the installation may require a new, more robust electrical connection to the building. As well as the requirements in terms of electrical current of the system when it is operating, it is important to consider the impact on the electrical supply of how the heat pumps will be started. This could include direct-on-line, part wind or soft-start, to help keep maximum demand charges and limits in check.

Refrigerant:
Consider whether this will be a natural or synthetic HFC. You will need to take into account the F-Gas considerations that go along with this decision.

Configuration:
Decide whether to opt for multiple heat pump units (cascade) to allow for greater capacity and redundancy (through service or defrost), or a single unit.

Servicing and maintenance:
Adequate space must be allowed to safely service the equipment and attention must be paid to F-Gas requirements. Heat pumps use a refrigeration system to extract energy from a waste heat source and deliver useful heat, and many of these systems contain traditional F-gases, although more installations are now opting for natural refrigerants like propane and CO2, and ultra-low GWP refrigerants like HFO R-1234ze.

CIBSE AM17:
Heat pumps for large non-domestic buildings, available from the Chartered Institution of Building Services Engineers (CIBSE) and primarily aimed at building services designers, provide and consolidate best practice guidance to support high quality design, installation, commissioning, operation and maintenance of large heat pump systems.

The document provides information on how to use controls and thermal storage to mitigate these issues, including an example calculation of how to size a thermal store to offset the impact of a defrost cycle.

It also features case studies of existing heat pump installations, which offer an insight into specific elements of designing and operating large heat pump systems. These include sizing a cascade heat pump system, minimum turndown of heat pumps, using annual building-load analysis to optimise heat pump sizing, and temperature stability using thermal stores.

Furthermore, document AM17: Heat pump installations for large non-domestic buildings (2022) offers guidance on less obvious impacts of installing heat pumps in large buildings so it is well worth investing in.

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Sustainability in schools

Baxi's Commercial Sales and Specification Director **Rob Erwood** discusses some of the approaches to tackling the net zero challenge.

Faced with ambitious government decarbonisation targets and inflated energy prices, sustainability has become an increasingly hot topic for schools, with the heating system a frequent target for improvement, especially in older school buildings.

It is well recognised that decarbonising heat in schools and other public sector buildings is critical if the UK is to achieve its net zero ambition. Ultimately, the goal is to transition to low-carbon heating and hot water technologies such as heat pumps and electric water heaters.

But while new buildings will be optimised for net zero, refurbishing the ageing heating systems that older school estate typically relies on can be a more complex task. A whole range of factors, from the variety of building type and heating systems to available funding and time constraints, will all influence how quickly and easily this can be achieved.

That said, while there may be challenges there are also plenty of opportunities for school managers to drive a more sustainable operation. It's worth considering some of the different options available to schools at varying phases of the decarbonisation journey.

All-electric approach

Where possible, consider an all-electric approach. Air source heat pumps can provide a highly efficient, sustainable method of supplying low carbon heating or hot water requirements. Air source heat pumps (ASHP) are frequently regarded as the most popular and cost-effective choice of heat pump.

With an exceptionally high seasonal co-efficient of performance (SCOP) of up to 400%, they can deliver up to 4kW of heat output for every 1kWh of electricity used to run the heat pump.

Plot a Net Zero pathway

The merits of heat pumps are well established but they are not a panacea. Spending the entire budget on a heat pump to decarbonise a draughty old building without any other preparation will not necessarily guarantee success.

As a poorly-performing heat pump will result in high running costs, an inadequately heated building and unreliable heating and hot water, it's clearly a scenario to be avoided at all costs. Similarly, it is not best practice to default to recommending high temperature heat pumps without first considering how to reduce energy usage and heat losses within the building.

The starting point should be to work with the school to identify the immediate, medium and long-term goals, as well as the available time to complete the work, the budget and any funding opportunities. This will make it possible to plan out and design the phased stages of refurbishment.

Plotting a pathway to net zero also has the advantage of enabling forward budgeting while ensuring good practice design for maximum energy, carbon and cost reductions at each stage.

Reduce energy demand

The immediate consideration when addressing existing buildings should always be to reduce operational energy usage and energy losses. Understanding where and how energy is being used will help determine any opportunities for improvement and how and where ASHPs can best be used.

Implementing passive measures such as roof and wall insulation, draught proofing and improving the thermal performance of windows and doors, will reduce heat losses and result in an immediate drop in energy usage.

Energy efficiency

Energy efficiency is absolutely critical to reducing emissions, especially when dealing with existing buildings.

Where energy consumption in buildings is higher than expected, it is often because of issues with building management systems and controls, so this is an area where quick-win energy and emissions savings can often be made.

One practical means of maintaining efficient building operation at an early stage of the decarbonisation process might be to replace ageing plant with reliable, low NOx condensing boilers or water heaters which are up to 20% more efficient than non-condensing models.

Take the opportunity to address the system's distribution pipework

and heat emitters to allow the system to operate more efficiently at a maximum flow temperature of 55°C or lower, in line with Building Regulations. This will also prepare the heating system for the successful integration of heat pumps which operate most efficiently at low temperature outputs.

Using electric point-of-use water heaters or cylinders to avoid large scale energy use for hot water in areas like washrooms and kitchens could be another option. As point-of-use equipment only uses energy when hot water is required, this ensures any hot water pipework runs to an absolute minimum to avoid heat transfer losses. It also makes it much easier to monitor, measure and control hot water usage.

Primary school hot water aid

Heatrae Sadia point-of-use electric water heaters are helping deliver energy-efficiency standards at Riverside Primary, Scotland's first Passivhaus-certified Primary School.

A selection of water heaters was identified to meet the hot water demand efficiently across the building.

Associate Engineer and Certified Passivhaus Designer at BakerHicks Motherwell,David Coulter, said: "The hot water strategy was one of the main challenges when designing the system as we needed to avoid large-scale energy usage. We wanted to explore using all-electric point-of-use solutions that would only generate energy when required, for example during break or lunch times."

The exterior of Riverside Primary School.

Retrofitting heat pumps

Once the heat pump design is locked in, a number of considerations need to be addressed.

Firstly, you'll need to allocate external space for the heat pump. Where possible, make sure that the specification is flexible enough to accommodate various models or cascading ASHPs.

You'll then need to consider electrical connections and whether there is sufficient capacity. It's likely that additional power requirements will need to be brought to site, so ensure you have a clear understanding of what is and isn't possible.

Finally, it's worth considering additional renewable technologies such as solar panels, which may be able to produce all the energy you need to run your heat pump.

Hybrid solutions

Where an all-electric solution is not an option, a hybrid system that integrates heat pumps with condensing boilers or water heaters can provide an effective means of overcoming retrofit challenges.

Whether using hybrid heat pump solutions for space heating or domestic hot water generation, a well-designed system will reduce both greenhouse gas emissions and energy consumption, meeting heat demand more sustainably.

The aim should be to maximise heat pump contribution performance where possible, while taking all project limitations into account. Experienced manufacturers will be able to provide guidance on these aspects so that the system is designed to maximise the efficiency of both technologies.

Technical advice and support

With no silver bullet in the journey to more sustainable operation, each school building is likely to require a bespoke solution to achieve the best possible outcome at every stage of the process. Your chosen manufacturer should be able to help identify the available opportunities alongside the challenges and ask the right questions to gain a clear understanding of the immediate and long-term goals.

More information can be found at **www.baxi.co.uk**

Sports centres decarbonisation

Oakes Energy Services and Baxi recently collaborated to assist the Priory Federation of Academies Trust in decarbonising the sports centres at a series of academies in Lincoln.

The proposals developed by Oakes, which illustrated the expected carbon savings, were used to secure funding from the Public Sector Decarbonisation Scheme operated by Salix. In total, the design of the entire scheme is expected to save 227.5 tonnes of CO_2 a year, equivalent to planting 7,000 trees.

The proposal for each of the three academies featured bespoke designs for each building, but all involved retrofitting Remeha ASHPs.

Remeha ASHPs at Lincoln academies.

Awards entry total breaks new record

Judges assess more than 50 finalists before announcing 2023 CSA Award winners.

The Commissioning Specialists Association (CSA) 2023 Awards attracted a record number of submissions across the seven main categories, with Roger Carlin of Ashford Environmental Services receiving the Lifetime Contribution Award.

The 8th annual awards ceremony took place in October at the Leonardo Royal Hotel City, overlooking the Tower of London and the River Thames. During the presentation dinner, professional endeavour, product innovation, skills development, engineering prowess and service delivery were all acknowledged and celebrated.

Organised by the CSA in conjunction with Touchwave Media, the awards recognised the skill, effort and sheer dedication of the people and businesses serving today's complex built environment.

Modern Building Services was amongst the event's sponsors, supporting the Commissioning Provider of the Year category. Other sponsors included BSRIA Instrument Solutions, Media Control Management, HDR, VEXO, RED Engineering, Ashford Environmental Services and CSA.

The judging process combined remote assessment and scoring of each entry, with a virtual gathering of the judging panel in which 50 finalists were assessed across the seven award categories.

Winners

Project of the Year - Sponsored by BSRIA Instrument Solutions
Winner - Banyards - The Christie Patterson Cancer Research Centre

Product/Service Innovation of the Year - Sponsored by Media Control Management
Winner - VEXO - S-BMS

Commissioning Provider of the Year - Sponsored by Modern Building Services
Winner - Ashford Environmental Services

Commissioning Manager of the Year - Sponsored by HDR
Winner - Matthew Ward – Crosscount

Investment in Training Award - Sponsored by VEXO
Winner - HDR - The Careers Plus Programme

Student of the Year - Sponsored by RED Engineering
Winner - Liam Drake – End Systems

Commissioning Engineer of the Year - Sponsored by Ashford Environmental Services
Winner - Adam Murray - HDR

MBS sponsored the Commissioning Provider of the Year category which was won by Ashford Environmental Services.

Lifetime Contribution Award - Sponsored by CSA
Winner - Roger Carlin - Ashford Environmental Services

Newly-appointed Vice Chairman of the CSA, Keith Barker, said: "This year's awards programme proved to be another remarkable success and once again provided an excellent forum through which to celebrate business and professional excellence."

The call for nominations for the 2024 CSA Awards will open early in the new year, so those who have not yet attended the well-respected event, or submitted an entry, are advised to visit the website and consider the options. Entries will be welcomed across the seven categories, which cover the achievements of both companies and the individuals working within them.

www.csa-awards.co.uk

Compressor technology offers up to 50% savings

Aermec has launched Aersave, a groundbreaking technology for scroll compressors that can protect customers from rising energy costs by improving the energy efficiency of their chillers and deliver up to 50% energy savings.

Compressors on chillers are large energy users so replacing them with more energy-efficient systems was previously seen as the only solution to bring costs down. Aersave, the latest addition to Aermec's portfolio of chiller technologies, offers an alternative solution.

Aermec's Aersave is a major leap forward in chiller technology. It can help mitigate against rising energy costs whilst increasing performance levels, longevity of existing chillers and help customers transition towards the government's net zero target.

The Aersave smart compressor controller converts any three-phase fixed speed compressor to a variable speed compressor. Aersave can be used on any manufacturers' chillers, operates with any refrigerant and is compatible with all brands of BMS systems.

By enabling compressors to work smarter, Aersave eases reliance on the electrical grid, increases reliability, offers compressor protection and can easily be retrofitted by any air conditioning or refrigerant engineer.

The benefits are decreased noise levels, precise room temperature and humidity control, compressor protection from short cycling and no interference with existing controls.

Operation

Aersave comprises two sensors instead of pressure transducers. One connects onto the suction line of the compressor, the other to the discharge line.

Its compressor control gathers the temperature from the two sensors' points, together with gathering data via Modbus from the device via the compressor, which are then input to an algorithm, which calculates what speed and compressor capacity is required for the complete system to achieve its demand capacity.

While working on lower frequency for prolonged periods of time, an oil return sequence brings the oil back to the compressor to protect it.

Aersave also has multiple dip switch settings that can be switched dependent on the compressor type whether it is a reciprocating or scroll. It also controls the fan motor whether it is a condenser or evaporator fan motor.

As the technology can work with any type of refrigerant, there is no need to cut into the refrigerant line.

The compressor technology was successfully trialled by one of the largest fresh food manufacturers in Ireland where the chiller delivered a reduction in electrical consumption of 41%.

www.aermec.co.uk

NEW CPD: "INCORPORATING HEAT PUMPS INTO LOW TEMPERATURE HEAT NETWORKS"

Commercial heating specialist Modutherm has launched a new CIBSE-approved CPD, 'Incorporating heat pumps into low temperature heat networks (LTHN)' which provides an overview of the development and evolution of heat networks.

It looks at current regulations and documentation as well as heat network zoning regulations scheduled for 2024. It highlights how heat networks can be made more efficient and how to successfully integrate heat pumps into the energy supply, giving details on the extra efficiency, performance and reliability gains to be had from smart, heat pump-ready HIUs.

The presentation showcases designs for heat pump-only and heat pump-led hybrid systems, as well as how to overcome different delta T requirements. Thermal store sizing is also addressed.

The hour-long CPD can be delivered online or in person at a customers' premises or at Modutherm's headquarters in Essex. Please email **enquiries@modutherm.co.uk** for further details.

www.modutherm.co.uk

Expanded range with SAP 10 & building regulations-compliant ventilation units

Ventilation manufacturers EnviroVent has released two new and improved Decentralised Mechanical Extract Ventilation (dMEV) units, which are SAP 10 compliant and meet the latest Building Regulation requirements.

The ECO dMEV+ range, includes the ECO dMEV+ and ECO dMEV+LC. Both are SAP 10 listed, which means they meet the requirements of Approved Document L, Conservation of fuel and power, Volume 1: Dwellings, 2021 edition incorporating 2023 amendments.

The two fan ranges offer housebuilders and developers a constant volume, continuously running fans with an intermittent control option for the LC version. These decentralised extract fan solutions have been designed to achieve the lowest power, noise, running costs and installed performance

www.envirovent.com

BESA conference and annual awards

Buildings should be made to work better for social and economic reasons, delegates told.

BESA's Future Leaders group of young engineers played a key role at the conference.

The government's 'flip-flopping' on net zero and infrastructure should not be used as an excuse to delay investment that will improve the functionality of buildings, according to President of the Building Engineering Services (BESA), Claire Curran.

Speaking at BESA's annual conference and awards 2023 in London, which **Modern Building Services** attended as a media sponsor, Claire made the announcement in her opening speech, where more than 300 delegates gathered.

"It makes no difference that the government has got cold feet over its net zero timetable and the cost of vital infrastructure," she said. "We still have a built environment that is desperate for an upgrade.

"We need look no further than the 'crumbly concrete' scandal in schools and hospitals for proof that our existing building stock is not being properly maintained. Vital investment in refurbishment and retrofit has fallen so far behind the curve that many of our built assets are no longer fit for purpose."

'Be more courageous and honest'

Dr Jo Jolly, Head of Project Futures at the Infrastructure and Projects Authority (IPA), called for delivery teams to be more "courageous and honest" to achieve sustainability goals and avoid the continual "race to the bottom" on quality and cost.

In her keynote presentation, she said too many members of project teams felt afraid to call out poor working practices because of the "toxic culture" that affected many projects.

Future Leaders

Creating a more diverse, skilled workforce was another theme for the conference, with BESA's Future Leaders group of young engineers taking a leading role. They also gathered information for the post-conference feedback.

Claire Curran said: "They are the ones who will benefit the most if we get things right and deliver a built environment fit for their future but by the same token they have the most to lose if we fail."

New industry guide

A new industry guide to mould and condensation in buildings was launched at the conference. The guide is the result of a collaboration between BESA's Indoor Air Quality (IAQ) Group and Mitsubishi Electric.

Rebuilding the NHS

The conference concluded with a keynote presentation from Lord Markham, the Minister in charge of delivering the government's programme to rebuild the NHS estate by 2030. He urged the industry to work with his department to introduce greater levels of product and design standardisation that would improve efficiency and speed up project delivery.

Industry Awards

Many of the movers & shakers of industry then attended the BESA Industry Awards after the Conference.

President's Award for Outstanding Achievement went to Rab Fletcher, BESA's Immediate Past President. With more than 30 years' experience in construction and building services engineering, including holding senior positions and managing multi-million-pound local authority contracts, he still modestly describes himself as "a time served plumber".

Rab is a passionate advocate of training and apprenticeships and continues to give freely and generously of his time and expertise for the benefit of all BESA members. As well as being a former BESA President, his other titles have included Chairman of BESA Scotland and founder and Chair of the Association's Local Authority Forum.


Rab Fletcher, BESA's Immediate Past President.

Other category winners 2023 included:

1. **BSE Technician / Project Engineer Apprentice of the Year:** Aidan Whetham, Vital Energi Ltd
2. **Electro Technical Apprentice of the Year:** Gary Hall Dalkia
3. **H&V Industrial & Commercial Level 2/BSE Installer Apprentice of the Year:** Liam Cowell, Dalkia
4. **H&V Industrial & Commercial Level 3/BSE Craftsperson Apprentice of the Year:** William Favill, Derry Building Services
5. **RACHP Apprentice of the Year sponsored by Mitsubishi Electric:** Jack Newton, Crowther & Shaw
6. **Service and Maintenance Apprentice of the Year:** Matt Morrison, BGIS Global Integrated Solutions
7. **RACHP World Skills:** Adam Donges, Cosham Refrigeration
8. **National Apprentice of the Year sponsored by Wolseley:** Aidan Whetham, Vital Energi
9. **Specialist Groups Award of Excellence:** Mark Snell, Dalkia UK
10. **Technical Innovation of the Year:** Dalkia
11. **Net Zero Initiative of the Year:** RI Cruden
12. **Indoor Air Quality of the Year, sponsored by Nuaire:** Arup
13. **Diversity and Inclusion Initiative of the Year:** ISS
14. **Distributor of of the Year:** Cool Designs
15. **Building Safety Act of the Year, sponsored by BMTFA:** HE Simm and Son
16. **Contractor of the Year, sponsored by Smith Brothers Stores:** Geoffrey Robinson
17. **Small Budget Project of the Year under £500,00:** Accor Hotels, Aether Compliance
18. **Big Budget Project of the Year over £500,00:** DSA6 Wakefield Distribution Hub, Dalkia
19. **Outstanding Service of the Year:** Steve Marsh, BES
20. **Training Initiative of the Year, sponsored by Zehnder:** FP Hurley & Sons

A new generation of butterfly valve

Anti-pollution brand Watts Industries UK has launched its latest butterfly valve innovation, the Xylia 2.

Built on more than 70 years' experience, Xylia 2 has been designed and built by the company's world-class SOCLA division and offers precision, efficiency, and reliability for a wide range of industries and applications.

The Xylia 2 valve boasts a compact construction that maximises space in commercial buildings with limited plant room space. With sizes available from DN50 to DN300, the valve allows system design flexibility while delivering smooth and efficient fluid handling across various applications.

UK Sales Director Kerry Harris said: "We are excited to introduce this compact and durable valve to the UK market. More than six million of our butterfly valves are already installed worldwide and Xylia 2 reflects our commitment to providing innovative and reliable valve products to our customers that are low maintenance and deliver a long service life."

For more information about Xylia 2 or the company's other butterfly valve products, please call 01480 407074 or email **wattsuk@wattswater.com**

New Testo 883-2 thermal Imaging Camera

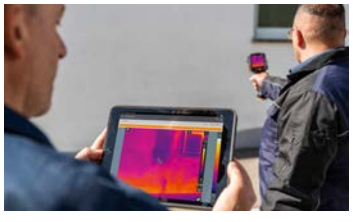
The best image quality, high-level image analysis, easy creation of professional reports and the wide-angle lens makes the newly-launched testo 883-2 thermal imaging camera the perfect partner for maintenance staff, facility managers and building consultants.

How it benefits Facility Maintenance

A key advantage of the Testo 883-2 is its wide-angle lens of 42° x 32°, offering a better overview of the entire area of interest. This is paired with an improved IFOVgeo: 2,3mrad (for 320x240 pixel), meaning one singular pixel can recognise even smaller dimensions, which enables workers to detect even the slightest of thermal anomalies. Users can swiftly analyse and prioritise areas that require attention, allowing focused and efficient maintenance operations.

One of the standout features of the testo 883-2 is its seamless integration with the Testo Thermography App. Users can easily connect their smartphone to the thermal imaging camera, enabling them to mirror a second display. This provides a larger viewing area and enables multiple team members to simultaneously analyse thermal images.

The app can function as a remote control for the thermal imaging camera. The camera's advanced technology and intuitive controls enable users to navigate effortlessly through menus, adjust settings, capture images, and perform measurements from their smartphone. This is particularly advantageous in situations where the camera needs to be placed in challenging locations.



Creating comprehensive reports is an essential aspect of thermal analysis, especially in industries where safety is paramount. The testo 883-2 simplifies this process with its compatibility with the Testo IRSoft software which provides a user-friendly platform to manage, analyse, and report thermal images efficiently. A key feature of the software is its ability to generate reports quickly and easily, allowing users to compile findings into professional reports with just a few clicks.

The camera is now available for purchase at Testo-authorised distributors and through the official website.

www.testo.com/en-UK/applications/facilities-maintenance

Lighting and sun protection for optimal indoor environment

Zehnder has unveiled its Centre of Climate at its German headquarters in Lahr.

Spanning 5,000 square metres, the state-of-the-art facility serves as a hub for innovation, learning, and collaboration, catering to employees, customers, and visitors alike.

The centre consists of open office spaces, meeting and conference rooms, a new restaurant with a café serving as a communal gathering place, and a brand experience room. Its paramount objective is occupants' well-being.

Central to the building's holistic design is the WELLUMIC system, a collaborative creation of TRILUX and WAREMA. The solution is a coordinated light management system. The algorithm-based control system optimally harnesses available daylight, simultaneously preventing indoor spaces from overheating, especially during summer when excessive sunlight exposure would necessitate energy-intensive cooling. Sensors continuously gauge indoor and outdoor lighting conditions, automatically adjusting external blinds and lighting accordingly.

A notable feature is the precise control of external blinds through SMI motors. The motors finely adjust the angle of individual slats in real-time, down to the nearest degree. To minimise glare and maximise sunlight penetration, the intricate algorithm factors variables such as the sun's angle relative to each window throughout the day and seasons, expertly adjusting slat angles accordingly.

Zehnder has embraced HUMAN CENTRIC LIGHTING solutions from TRILUX across various areas of the building. These luminaires, featuring Active technology, mimic the spectral composition of daylight, delivering a "natural" artificial light that users find especially pleasing. Simultaneously, this lighting supports various physiological processes, including the sleep-wake cycle. The luminaires blend into the architectural design and enhance overall room aesthetics.

In line with this philosophy, the large office areas feature award-winning luminaires such as the PARELIA LED, LUCEO SLIM, and LATERALO RING LED pendant luminaires, accompanied by thoughtful lighting design. Complementing these are the FINEA LED light channel solutions, serving as suspended and surface-mounted fixtures to accentuate the atmosphere and provide wall illumination in the offices and think tanks.

www.wellumic.com

New commercial heat pump resources from Ideal Heating include CIBSE-accredited CPD

Ideal Heating – Commercial Products has released a range of new resources to assist people and organisations in their quest to transition to low carbon heat pumps.

These include the new CIBSE accredited Heat Pumps – Technology and Principles CPD, the 'Roadmap to Decarbonisation – Planning Your Journey' white paper and a brochure on Ideal Heating's own ECOMOD range of commercial heat pumps.

The new CIBSE-accredited CPD introduces the technology and principles underpinning the mechanics and operation of heat pumps in commercial applications, such as thermodynamics, refrigerants, and efficiency. It looks at the different types of heat pumps available, along with their strengths and weaknesses, comparing to traditional gas boilers and hybrid systems.

It helps installers and specifiers understand the importance of sizing heat pumps through correct specification, sizing and heat loss calculations. Market drivers, such as industry bodies and regulations, are also addressed.

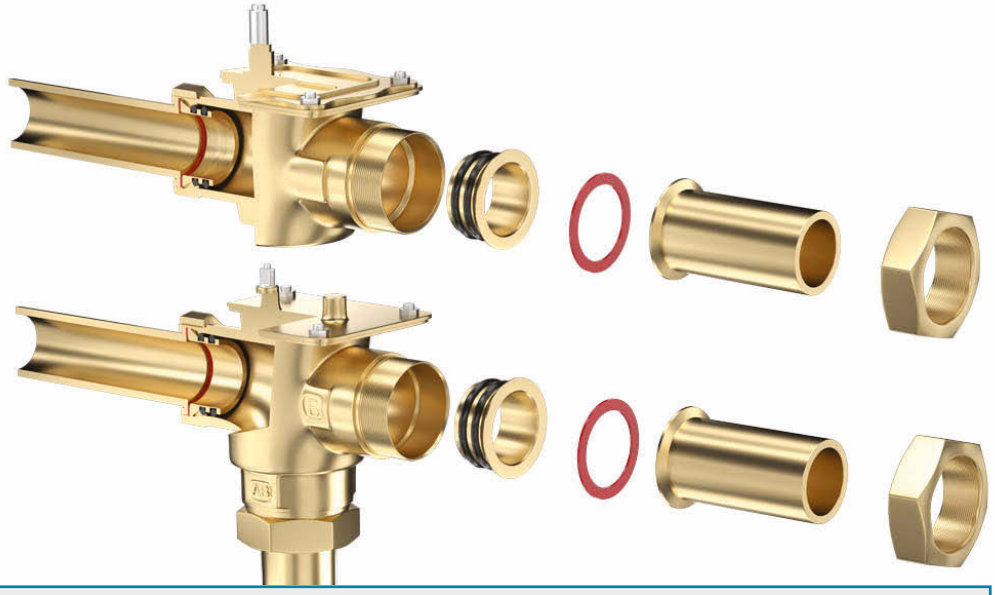
The hour-long Heat Pumps – Technology and Principles CPD can be delivered online or in person, either at a customer's premises or at one of Ideal Heating's Centres of Excellence in Hull and Leeds. Visit www.idealcommercialboilers.com/cpd-courses to book.

'Roadmap to Decarbonisation – Planning Your Journey' is Ideal Heating's latest white paper and provides readers with an overview of the Government's current net zero strategy in relation to heating and why heat pumps are fundamental to this. It addresses the challenges faced in the journey to decarbonising heating, from public mistrust in heat pumps and the lack of trained installers, to comparatively high costs when compared to gas boilers. It is available to download from

www.idealcommercialboilers.com/net-zero

CLEVER COUPLER is the smarter joint

Clever Coupler is a patent-protected system for use with 22mm and 28mm compression valves and equipment of all types within the HVAC sector. It is being echoed as a game changer.



Very popular with two port and three port motorised valves of all makes, the Clever Coupler will overcome the common issue when equipment needs removing but there is no pipe movement or the risk of promoting stress to nearby joints.

Clever Coupler further prevents draining the system when failures arise, preventing minimal disruption to the asset owner and exponentially improving the work flow efficiency for the engineer onsite.

Tested to 18 BAR with WRAS approval, Clever Coupler DZR brass future proofs all systems from leaks which can be commonly experienced from compression joints.

The website has 3D video animation in action **www.clevercoupler.com** and for any enquiries or further service, please contact Ty Harnett on **07918 487132**

HOW DOES THE CLEVER COUPLER BENEFIT INSTALLERS?

- **Prevents flux contamination when typically cutting out faulty equipment (soldered sockets upstream and downstream).**
- **Minimal loss of corrosion inhibitor when replacing equipment and limiting further problems thereafter. ***
- **Limits time and system disruption on site for engineer. ***
- **Removes all the associated problems with compression joints – over tightening, micro leaks, the inability to move pipes or equipment after installation.**
- **Prevents drain downs, risk of air locks or loss of system water.***
- **Allows the removal and servicing of the integrated strainer within combination valves remotely, preventing leaks from stressing out factory fitted compression joints in situ.***
- **5 seals over 2 compared to a typical compression joint**
- **Designed to use in conjunction with the new 22mm & 28mm faster flush kits.**
- **Improves workflow efficiency to complete more jobs**

HOW DOES THE CLEVER COUPLER BENEFIT CUSTOMERS?

- **Minimal loss of corrosion inhibitor when replacing equipment and limiting further problems thereafter. ***
- **Limits time and system disruption on site for asset owner. ***
- **Protects asset owners investment from costly repairs**

***When fitting lever valves directly onto stubs provided.**

COOLING | HEATING | VENTILATION | CONTROLS

Ask ME* about decarbonising heating

*Graham Jones, Customer Service Manager

Ecodan CAHV-R

As we near the end of gas, contractors are already installing renewable heating in buildings across the UK. With the heat pump market doubling year on year, more and more installers are helping make the switch from traditional gas boilers.

It's now time to join them. Improving energy efficiency and reducing carbon emissions, our heat pumps are at the forefront of this decarbonising transition.

The award-winning **Ecodan CAHV-R Air Source Heat Pump** is your ideal low carbon system for sanitary hot water and space heating. Find out more about the UK's widest range of commercial heat pumps at: **heatpumps.me.uk**

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