



STRIPPING BACK CABLE ENERGY WASTAGE

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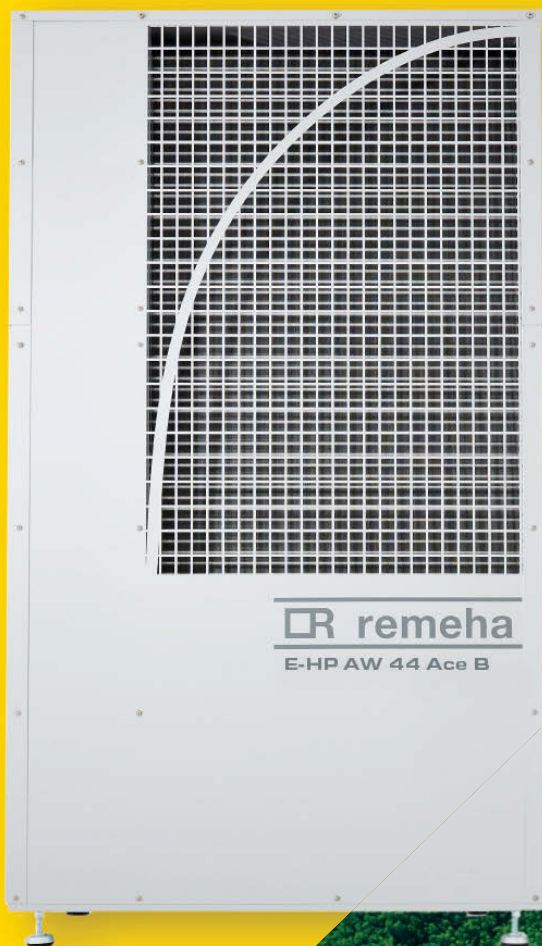


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WELCOME TO THE JULY/AUGUST ISSUE OF MODERN BUILDING SERVICES

After an extremely successful National ACR & Heat Pump Awards, which MBS sponsors, and exhibiting at the very well attended Installer Show, held back in June, it's great to be back at my desk, delving into the ever-evolving building services sector.

I trust you will have an enjoyable read through all the technical pieces which have been kindly and thoughtfully provided by our many knowledgeable contributors.

This jam-packed issue looks heavily into Net Zero, Heating, Working Buildings and Indoor Air Quality.

Stuart Smith, Commercial Director at Zehnder Group UK looks at the invisible threat of indoor air pollution on page 9. On page 14, Neil Parry, Global Head of District Energy for Armstrong Fluid Technology, shares his thoughts on sector coupling.

With decarbonised electricity set to power the industry towards net zero, Alex Bradley, Commercial Director at Modutherm, explains why heat pumps will be integral parts of commercial heating systems utilising this green energy source on page 16.

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- Packaged Plant
- Electrical Services
- Zero Carbon Buildings

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

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Following the huge success of past CSA Awards Ceremonies, 2023 will again see the sector come together in celebrating the wonderful achievements of commissioning businesses, large and small. Retaining its London location, the gala dinner will this year be held on 5th October at Leonardo Royal Hotel, London City, Cooper's Row, London EC3N 2BQ.

If you or your company have something to shout about, these awards provide the perfect platform to get your accomplishments noticed. Check out the categories opposite and see which ones you will be entering! Entry is easy, completely free of charge and you can submit as many nominations as you like. Just visit www.csa-awards.co.uk to complete an online entry form... and if selected as a Finalist, enjoy some fantastic publicity as we count down to the Gala Awards Ceremony.

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- STUDENT OF THE YEAR
- COMMISSIONING ENGINEER OF THE YEAR
- LIFETIME CONTRIBUTION AWARD

EVENT CALENDAR

NOMINATIONS OPEN - 16th January 2023

NOMINATIONS CLOSE - 28th July 2023

JUDGING SESSION - Late August 2023

FINALISTS ANNOUNCED - 6th September 2023

WINNERS ANNOUNCED - 5th October 2023

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Refrigerant driving licence 'will save many lives'

The Building Engineering Services Association (BESA) has welcomed the long-awaited launch of the United Nations Refrigerant Driving Licence (RDL) scheme to help improve worldwide safety standards in the air conditioning and refrigeration industries.

More than a decade in the making, the scheme was launched at a conference for signatories to the Montreal Protocol hosted by the UN Environment Programme (UNEP) in Bangkok. It seeks to help developing nations achieve higher competence standards in safe refrigerant handling through training and accreditation of operatives.

The Association's Technical Director Graeme Fox was one of the founders of the RDL scheme and hailed its launch as a "significant development for the worldwide refrigerant industry that will save many lives".

"A lot of countries do not enjoy the training and technical infrastructure we take for granted in Europe and the rest of the developed world," he said. "Many of those countries still want to progress and adopt more environmentally friendly refrigerants.

However, the speed of the transition to new gases is causing some very serious safety issues and there have already been several deaths caused by the mishandling of these substances."

Flammable

The European Union is currently debating a further strengthening of its F-Gas regulations, which would lead to an even faster pace of change away from higher global warming potential (GWP) gases to flammable alternatives. Changes in large developed markets are quickly reflected in other parts of the world as manufacturers adapt their production strategies.

The African industry is concerned that it is being used as a 'guinea pig' to test refrigerant transition, and the U-3ARC, which represents companies in all 54 African states, called for a halt to their introduction until technicians were properly trained.



All-female panel gathers to discuss sustainability at CPW

The panel gathered for international M&E consultancy CPW's 'INWED 2023: Sustainability in the Second City' roundtable to discuss the



importance of retrofitting to tackle net zero and why sustainability is a significant opportunity to attract more women to the engineering industry.

Held at CPW's city centre office on Colmore Row, the event saw a ten-strong panel of local experts discuss a wide range of topics for International Women in Engineering Day. This included where Birmingham is on its journey to becoming net zero by 2030 and how far funding will stretch, through to the pros and cons of well recognised sustainability accreditations and how engaging with educators will help increase industry diversity.

The professionals in attendance explored the processes of value engineering and design, asking questions of each other about how the gap between vision and reality can be bridged. However, factors such as cost and assurance were understandably noted as potential barriers to success. Despite this, an optimistic tone was maintained throughout the event due to the shared recognition of the quality young minds that are on the cusp of bringing new ideas into the industry.

ADVERTORIAL - CASE STUDY

KNX Sensors light the way for new £300m hospital to become 'greenest' in Switzerland

A new £300million hospital in Switzerland has become the first in the country to be certified with the highest energy accreditation thanks to integrating a range of KNX occupancy sensors from B.E.G. as part of the project.

The Bürgerspital Solothurn in Solothurn, has been awarded the Minergie-Eco standard. It's a Swiss construction standard for new and refurbished low-energy-consumption buildings and combines high energy requirements with ecological construction and operation.

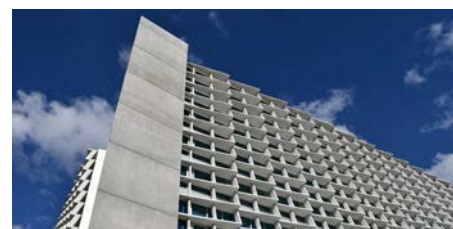
The new building is 62,800 sqm and it was vital that it was built in an energy-efficient manner. In order to achieve the Minergie-Eco standard, proof of energy efficiency had to be provided for the lighting so it was essential an effective lighting control strategy was implemented.



The hospital is equipped with a building management system, to which the lighting control was connected via KNX. They had been relying on high-quality occupancy and motion detectors from lighting controls manufacturer B.E.G. and advice from Swisslux AG for many years. Both were quickly selected as partners to work on the new refurbishment project which would incorporate KNX occupancy detectors as part of the energy-efficient building automation.

Measurements in hospitals showed that the lighting in the traffic zones (staircases, corridors, etc.) accounted for the largest share of energy consumption for lighting so emphasis was placed on an intelligent design of the lighting automation for these areas.

In the new hospital, demand-oriented lighting is ensured by suitable KNX occupancy detectors. The corridors are equipped with occupancy detectors which had a particularly large detection range of up to 24m. This meant that large areas can be covered cost-effectively with just a few detectors. In the staircases, indoor 180-KNX wall occupancy detectors were installed on each floor. The wall detectors were



simply inserted into the selected switch range.

For safety reasons, the lights in the traffic zones are set to never switch off completely, even if they are little used at night. To minimise energy consumption, the lighting is reduced to an orientation light value of 30 per cent at night when no movement is detected. This maintains the necessary safety in the traffic areas with efficient energy utilisation.

The staircases and corridors are operated in full-automatic mode, which means that the lighting is activated immediately when movement is detected. The side rooms, which are equipped with occupancy detectors, are also programmed in full-automatic mode.

Naturally light plays a central role in the hospital's treatment rooms and offices which are equipped with large windows were all fitted with the most suitable and energy-efficient occupancy sensors.

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 **PYLONTECH**

The invisible threat of indoor air pollution

By **Stuart Smith**, Commercial Director at Zehnder Group UK



Air pollution, both outdoor and indoor, is the most significant environmental health risk around today. According to the World Health Organisation it is responsible for about one in every nine deaths annually and this will only get worse unless we take action to mitigate the risks.

Although air quality has gradually improved in recent times, air pollutant concentrations "still exceed the 2005 WHO air

quality guideline levels in many areas*" – meaning they are over the air quality guideline levels that are associated with important risks to public health.

Indoor air pollution is often overshadowed by its outdoor counterpart, with well-known figureheads leading the charge on climate change and environmental concerns, but it demands equal attention. It is widely known that indoor air can contain concentrations of pollutants up to five times higher than those found outdoors, so with almost 90% of our time spent inside, we need to highlight the risks and educate harder on how we protect ourselves from this invisible threat.

In a recent Zehnder study, which explored people's attitudes towards air pollution both inside and out as well as assumptions about hidden air pollutants inside,

we found that four in ten people living in the UK are still unaware that indoor air pollution could be harming their health.

A quarter of people polled say they have always assumed that the air inside is safe, with 41 percent disagreeing that outdoor air pollution affects indoor air quality. Yet the majority questioned (83 percent) wish they knew more about air pollution, opening the door for us to provide better signposting and information about levels of indoor air quality (IAQ).

Modern methods of construction aren't helping either. In our efforts to reach net zero targets and build more sustainably, buildings are becoming more airtight. This is a great thing for energy efficiency - using triple glazing, insulation and providing a more robust, sealed up building envelope to conserve energy - but without effective

ventilation, buildings lock in polluted air and put occupants at severe risk. Yet adequate ventilation is still being considered as a secondary priority in the construction process.

Tiny particles, big problems

When it comes to air quality, we predominantly focus on measuring particulate matter (microscopic particles of solid matter suspended in the air) of PM 10 and PM 2.5 in size. These particulates are known as Fine Particulate Matter (FPM) and, even at this diameter, can get into the lungs and cause health problems.

While the larger particles, PM 10 and PM 2.5, are well-researched within the industry and levels within 'safe' guidelines are benchmarked by WHO, by only looking at FPM we aren't seeing the bigger - and more frightening - picture. →

More recent studies have found that Ultra-Fine Particulate Matter (UFP), like PM1, are considered even more dangerous due to its extremely small size. A typical PM1 particle has a larger physical surface area, despite its smaller diameter, than other fine particulates and this makes PM1 more likely to carry heavy metals, chemicals, and volatile organic compounds (airborne chemicals) on its surface and cause even greater harm when inhaled.

Once in the lungs, PM1 can get into the bloodstream and travel through the body and cause serious health problems with regular exposure. Chronic exposure has been associated with respiratory diseases and aggravating existing conditions like asthma - and these pollutants can also lead to cardiovascular diseases. Prolonged exposure to PM1 can affect the heart and blood vessels too, causing inflammation and oxidative stress, which could potentially lead to heart disease, stroke, and high blood pressure.

The majority of airborne PM1 originates from human activity like emissions from factories and other industrial activity, vehicle exhaust, tire particles from vehicles and types of smoke. It's because of this that densely populated urban areas, especially those with busy roadways or industrial facilities, are especially prone to PM1 pollution as well as other types of particle pollution.

While there are less studies and knowledge around the harm UFP cause, the very make-up of the particles underscores the latent risks to public health and the urgent need for comprehensive mitigation strategies.

Industry's Role in Improving Air Quality

Whatever their size, airborne pollutants are dangerous to human health and are present inside our buildings, often in built up concentrations. Businesses and industries have a significant role to play in removing them through effective ventilation and as a result improving the IAQ for occupants inside.

Commercial ventilation is a crucial part of managing indoor air quality in mass-occupied spaces and helps reduce the concentration of VOCs and particulate matter, including PM1, in the air.



But hitting the minimum requirements isn't enough. Part F of the UK Building Regulations mandates the performance of ventilation systems to achieve the desired inflow of fresh air and outflow of pollutants within buildings. At present, however, Part F only sets minimum requirements for the rate of fresh airflow into a building - to ensure there is a sufficient supply of fresh air to push out pollutants. It does not stipulate requirements for how that fresh air is circulated once it is within the building envelope.

Although this is not a major issue for smaller buildings, it becomes more problematic the more extensive the internal space and the greater the area supplied by a given ventilation system. Imagine, for example, a spacious office where individuals seated close to a ventilation terminal enjoy an optimal flow of fresh air, precisely as per system design. But, in contrast, those located at the far end of the office may encounter a diminished circulation of fresh air, as it must traverse through their colleagues before reaching them.

This complexity is further compounded when alterations are made to a building's layout, be it through expansion or refurbishment. What may have

once constituted an effective method of air circulation during the initial construction may no longer prove suitable. For example, when an internal structure of an office is modified due to a change of use or increase in personnel.

Adjusting the ventilation system to address these modifications isn't always a feasible option and, in these cases, systems will need renewed consultation to assess the requirement and maintenance going forward.

A ventilation system must also be serviced properly to ensure it functions as intended. Regular maintenance of these systems is crucial - such as changing filters annually and ensuring extract fans are in operation.

Furthermore, businesses should consider investing in air quality monitoring devices. These tools provide real-time data on air quality, allowing for immediate responses when pollutant levels exceed safe thresholds.

The Future of Indoor Air Quality Management

IAQ deserves to be a top priority for businesses and individuals alike. Though the challenge is considerable, proactive steps, such as improving ventilation, monitoring air quality, and reducing pollutant sources, can

lead to safer and healthier indoor environments. As we strive to understand and mitigate these invisible threats, our efforts will contribute to a healthier and more sustainable future for everyone.

The future of IAQ management is expected to be more dynamic and integrated. Advancements in technology, like more smart devices capable of detecting and responding to changes in indoor air quality in real time, will be key to further education.

Added development in AI and IoT could also revolutionise indoor air quality management by automating responses, like adjusting ventilation rates or air filtration based on real-time pollutant levels. This blend of advanced technology and a proactive approach to indoor air quality will usher in a new era of healthier, safer indoor environments.

***World Health Organisation European Health Report 2021**



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There's more to installing drives outdoors than IP ratings

Variable speed drives (VSDs) are not generally designed to be exposed to the elements of nature and so for a drive operating outdoors we frequently see the highest rated drives specified. However, protection against ingress of dust and water alone is not enough to keep a drive running optimally in all weather, as ABB's Oliver Woolley explains.

Drives for HVAC applications are routinely installed outside, and as such can be exposed to the outdoor elements. It can be tempting to specify a drive with a high ingress protection (IP) rating on the basis that this will protect it against the weather.

However, IP ratings won't protect a drive against direct sunlight. UV rays will over time damage the drive's plastic casing and keypad displays, and sunlight can also cause the drive's operating temperature to significantly increase. This can cause issues with heat dissipation, reducing the drive's efficiency and potentially shortening the lifespan of components. UV can also damage any exposed cabling. For this reason, we recommend that outdoor drives are mounted north-facing where possible and installed in a suitable protective enclosure to limit the amount of direct sunlight they receive.

Extreme cold can also cause problems. IP does not, for instance, combat frost and snow resting on auxiliary fan blades. Internal components can be at risk of water damage caused by water condensing out of the air once temperatures reach "dew point". In general, this situation can be avoided simply by installing the drive(s) in a suitable protective and weatherproof enclosure and keeping the drive powered on at all times, as the heat generated by the drive's electronics will prevent it from freezing. If maintenance must be carried out, then take care to ensure that frost and condensation do not form while the drive is powered off.

Drives need a regular supply of air for cooling. Installing outdoors runs a higher risk of insects, debris and, as mentioned above, even snow or frost blocking the drive's incoming and outgoing airflow. To prevent this, again consider installing the drive in a protective enclosure, and inspect it regularly to ensure that air channels are not blocked.

To sum up, ingress protection is not the same as weatherproofing, and the best way to protect a drive outdoors is to install it within an appropriate protective enclosure. Specifying and installing the correct solution at the earliest opportunity during the project design stage will prolong the drive's lifetime and improve its sustainability, while still providing full protection against the famously unpredictable British weather.

If you have any questions about using drives in outdoor environments or wish to find out more about ABB's weatherproof cover for ACx580 drives, contact me on oliver.woolley@gb.abb.com.

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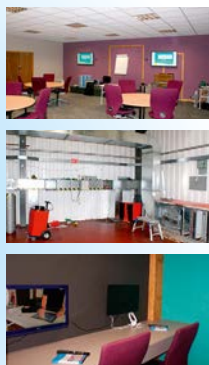
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Ensuring long term ventilation efficiency



David Frimpong, Head of Specification - New Build (South) at EnviroVent, looks at why correct system design, specification and installation is so important when it comes to long term ventilation success.

increased levels of air tightness and enhanced ventilation rates. This has led to a need to review the ventilation systems specified to ensure they are meeting increased airflow rates.

Approved Document F introduced a significant increase in the whole dwelling ventilation rate, which has seen the minimum ventilation rate for a two-bedroom property shift from 17l/s to 25l/s. The updated regulations have increased the compulsory use of background ventilation (trickle

vents) when utilising Continuous MEV (Mechanical Extract Ventilation) to 4,000mm² in each habitable room from the previous requirement of 2,500mm².

The updates to Building Regulations mean continuous MEV and MVHR are becoming the norm, as the industry moves further towards 2050 and the Net Zero target. providing sustainable methods of ventilating for both new and existing dwellings is important to ensure good indoor air quality through adequate

means of ventilation.

Natural ventilation with background ventilators and intermittent extract fans is now only suitable for dwellings where the air permeability is greater than (>)5m³/(h.m²) @ 50Pa

Increased energy efficiency requirements

The new Regulations also mean that all new buildings, both dwellings and non-dwellings (such as hospitals, offices, hotels) need to be future-proofed with low

Building Regulations updates to Approved Document L (Conservation of fuel and power) and F (Means of Ventilation) introduced in 2022 meant that new dwellings require



carbon heating and world-leading levels of energy efficiency. They set out the ambitious target of a 30% reduction in carbon emissions for new dwellings as an interim target up to the commencing of the Future Homes Standard in 2025 and finally, net zero for 2050.

This has seen the introduction of a minimum performance tolerance for elements of a dwelling, such as walls, doors and windows, which will increase energy efficiency and prevent poor standards of construction.

Approved Document L: Conservation of fuel and power needs to be taken into consideration as ventilation systems consume electricity and remove heat from the building (and in the case of MVHR systems, recover heat into the home). The main ventilation-relevant change to Document L is that heat recovery systems are now required to be 73% efficient - an increase of 3% on the previous specification. As our heat recovery systems provide an efficiency well in excess of 85%, this change raises no cause for concern.

In addition, the new Approved Document O Regulations provide guidance for mitigating overheating. The document concentrates on two main methodologies, the Simplified Method and Dynamic Thermal Modelling which look at many variables to determine whether further action is required to reduce the risk of overheating. The key point from Approved Document O is that any potential overheating issues should be identified at the design and pre-construction stage, rather than via mechanical ventilation and cooling focused options once the property is built.

A further change is the addition of Section 2 and Appendix B to Approved Document F Volume 1 which relate to indoor air quality and volatile organic compounds (VOCs). This includes a list of harmful contaminants, exposure limits, time and advice on action to be taken should the property exceed safe levels. While Approved Document F, Volume 2 also introduces a new 'Indoor Air Quality monitoring section' for buildings other than dwellings.

Many within the new build sector are therefore increasingly looking to specify heat recovery ventilation systems, even for smaller properties, as they can be a more efficient way to meet the regulations.



Whilst huge advances have been made in MVHR system design over the years, ensuring the correct sizing of the unit for the property is essential to its long-term efficiency.

For anyone working to Passivhaus standards, a certified Passivhaus MVHR system is the key to ensuring that buildings can breathe effectively.

Correct sizing is essential

For dwellings, sizing the unit is calculated based on a minimum high rate for the wet areas and a minimum low rate, over the number of bedrooms or with a minimum trickle ventilation rate which should not be less than 0.3l/s per m² of internal floor area.

All floors need to be taken into account. Correct sizing is based on Approved Document F calculations and system ductwork resistance, with the resistance calculated using specialist software.

Developers should refer to Approved Document F of Building Regulations for more details. If the airflow rate calculations are incorrect, the fan will not be optimized to push and pull air through the property, resulting in inefficient ventilation.

If the unit is undersized, it could lead to the under performance of the system, with an air flow rate that is too low, which can result in high humidity levels in dwellings. It can also mean a unit has to work extra hard in an attempt to achieve airflow rates, resulting in excessive noise and increased energy usage. This is the reason why ventilation manufacturers work closely with specifiers from the design stage

to ensure that new homes can meet the requirements for both ventilation and air tightness.

Often the reason for the under sizing is due to space restrictions for accommodating a whole house system in new properties, but this can cause serious problems over the long term. Careful consideration should be given to the location of the MVHR unit as it should be accessible for maintenance.

Non-dwellings

For non-dwellings, air handling systems should be capable of achieving a specific fan power (SFP) at 25% of design flow rate no greater than the SFP achieved at 100% design flow rate. (For further information on non-dwellings see Approved Document L Volume 2).

Installation

Good installation is an essential part of ensuring the effectiveness of this type of ventilation system. A ventilation system that has issues with the ducting, which can range from 'slump' of flexible types in the loft/roof space, through to inadequate jointing mechanisms, is always going to underperform. Poorly installed ductwork can potentially damage the ventilation unit and the fabric of the building.

To prevent slump, contractors should ensure that any flexible ducting is only used for final connections and should be minimised and adequately supported. However, some flexible ducting is needed to run from the MVHR unit to isolate ducting and prevent vibration from

the unit. Acoustic flex is often recommended to be used here.

It is essential for installers to follow manufacturer guidelines on installation. Correct installation will ensure that there is minimal noise and vibration from a unit. For example, anti-vibrational mounts may be required to help reduce noise transfer from wall or floor mounted units, often in multi-occupancy dwellings.

Poor installation can affect a ventilation unit's efficiency, power consumption and noise levels. The result could be increased running costs and a negative impact on indoor air quality if the unit is not installed correctly.

Commissioning

Supply and extract airflows should be balanced in accordance with the design requirements and individual room flow rates of the property. Many developers choose to work with the ventilation manufacturer from the early stage of design to agree the correct system design, specification and installation as part of ensuring the long-term efficiency of ventilation systems.

For a summary of all the key changes to ventilation Regulations, take a look at EnviroVent's series of webinars 'Building Regs Bitesize'



More information can be found at www.envirovent.com/help-and-advice/building-regulations



Sector coupling: Moving from good idea to roadmap



By **Neil Parry**, Global Head of District Energy for Armstrong Fluid Technology

Sector coupling combines domestic, commercial and industrial buildings together. These sectors can give and take energy from the network in various forms. This has many benefits, and also allows the capture and subsequent use of waste energy. District Energy networks are an empirically proven roadmap to decarbonisation.

They facilitate a greater utilisation of renewable energy sources for heating and cooling applications. It's no coincidence that the top six EU countries (Sweden, Estonia, Finland, Latvia, Denmark and Lithuania) are also the countries with the highest share of district energy in their heat markets. It's no surprise, then, that these countries are already starting

to reap the benefits of sector coupling, combining various aspects of their energy grid to create further savings.

Around 40% of our building energy requirements could be met from the energy that we waste. This could be from data-centre cooling, but also from industry processes, power generation, waste water and numerous



Heating. These four networks are divided into four areas where the energy is 'obtained', stored, converted or used. The source and the use are straightforward. The storage and conversion however, are the two key areas that create flexibility and allow for energy to flow across the four different power grids. The four grids and the four stages are connected. Even end users can be consumers or prosumers, taking or giving energy into the system. Sector coupling therefore, can be thought of as a spider's web with energy travelling in all directions across every strand.

Let's look more closely at the four stages:

- Energy source
- Energy storage
- Energy conversion
- Energy end use
- Energy of all types can move from, or to, the storage, conversion and end use sectors.

Energy sources

These could include biogas, hydro-electric, nuclear, geothermal, wind, solar, large-scale CHP etc. Some sources such as nuclear will be available 24 hours a day, every day, whilst the availability of some sources could fluctuate wildly, for example solar or wind. Geothermal, solar and heat pumps could supply energy directly into the district heating network. If renewable energy is in abundance at a particular time, then this excess energy can be stored.

Energy storage

Storage is extremely important as it increases the flexibility of the supply. Wind energy could be stored as electrical energy in batteries, can be used to pump water up to high reservoirs and stored as potential energy, ready to be released to produce hydro-electricity via turbines, or the electricity can be used by heat pumps to create heating or cooling. Gas, biogas and hydrogen can be stored using traditional methods, whilst thermal storage allows energy to be stored as LTHW, for example.

In a similar way, chilled water can be stored for cooling networks, possibly even in the same vessels, or in aquifers, switching from heating to cooling seasonally. However, 'smart' sector coupling will also be able to predict peaks in the requirement for certain

types of energy. Heating and DHW demand in domestic homes normally peaks early morning and again later in the evening. Knowing this allows the smart network to increase thermal storage ahead of this known peak in demand.

Energy conversion

Energy from either the source or from storage can be converted into different types of energy depending on what is required at any particular time. Electrical energy directly from solar or wind, or indirectly from storage batteries in the storage phase, can be used to produce hydrogen or used by heat pumps to create LTHW or chilled water, for example. Consumer waste can be incinerated and turned into LTHW or electricity at waste-to-energy plants. Electrical energy (be that directly from source, such as solar or wind, or energy from storage, from batteries or gas-powered CHP from the conversion sector) can all be used to pre-charge LTHW thermal stores in the storage sector ready to meet the predicted district heating peak. The CHP, of course, also produces electricity. Why not use this electrical output to also power heat pumps that can further augment the LTHW store?

End users

The first question to ask is "Are these all consumers?" The answer is no. Depending on the time of day, they could be either consumers or prosumers. Industry end users often have energy intensive processes that produce heat as a by-product of that process. Very often this heat is wasted. A better approach would be to direct this waste energy back into the district heating system, or to LTHW stores for use at a later time. Typically, electrical power plants send their heat to atmosphere, but why not send it to a district heating network instead? Why don't we capture the heat from wastewater processes for use in the storage, conversion or end use phases? How about a business with a large fleet of electric powered vehicles? Why not use the electricity stored in their batteries and send it back into the storage or conversion sectors for use elsewhere? Very often these vehicles are not required from 6pm to 6am, plenty of time to use their stored electricity and re-charge them again prior to 6am.

How do we get there?

The obvious answer is investment, but that in itself isn't much of an answer. The real kicker in this discussion is that the risks associated with the initial expenditure aren't exactly what they seem. District Energy networks are being built in the UK and will continue to be built as part of the UK's carbon targets, with around 20% of British buildings targeted for District Energy service for 2050 (although this number is arguably far too low). When the time comes around for the design and commissioning process there are tools available now, including Digital Twinning, which can map out exactly how efficient the new facilities will be, aiding the commissioning process and calculating exactly what should be done. Digital twinning involves the creation of virtual buildings, networks and systems. These can function as test cases to see what effect changes in design or operation would have in the real world. Practical application of this technology was pioneered by NASA to improve spacecraft design, and the first physical-model simulation was announced in 2010. Since then digital twinning has been introduced in a number of other technology sectors to continually improve product design and development. Armstrong Fluid Technology, for example, has a partnership with Hysopt and is now able to offer customers advanced digital twinning simulations of potential HVAC systems designs.

So, the call must go out for a period of creativity and brave thinking in HVAC engineering, where every avenue is explored for any opportunity for sector coupling in a virtual setting, with the reassurance that technology is readily available to measure its potential effectiveness during the design and consultation stages.

other sources. Sector coupling has enormous potential in this regard, linking energy streams and allowing energy to be stored in various forms to match changing demands as well as changing outputs during a typical 24-hour period. This article will take you through the various ways sector coupling is already being harnessed and explain opportunities for implementing it. I will also be making a case for wider uptake of sector coupling schemes in the UK, with a brief overview of what needs to be done to get us there.

Designing for sector coupling

Sector coupling splits energy supply into 4 key power grids: Electricity, Gas (this can be a mix of natural, hydrogen, biogas etc.), District Cooling and District





Heat pumps pave the way to a **low carbon future**



With decarbonised electricity set to power the industry towards net zero, **Alex Bradley**, Commercial Director at Modutherm, explains why heat pumps will be integral parts of commercial heating systems utilising this green energy source.

Approximately 19% of the UK's total emissions come from heating buildings; commercial buildings account for 14% of this segment and public buildings 10% (with the remainder attributed to homes)*. Now, in order to meet net zero targets, this building stock needs to be decarbonised by 2050. This has resulted in specifiers,

contractors, facilities managers and building owners identifying electric heating systems as the most sustainable option as the industry aims for a greener future.

Indeed, according to the Climate Change Committee (CCC), emissions from electricity generation have fallen 69% since 2010**. The organisation states: "Decarbonised electricity by 2035 will fully open the path to the full decarbonisation of other sectors, like transport, industry and heat, through the adoption of key technologies like electric vehicles and heat pumps. Achievement of the UK's emissions targets rests on this key goal."

There are already regulations in force that are driving the commercial sector towards reducing its carbon emissions, such as 2022's updates to Part L of the Building Regulations, which lifted minimum building performance standards. Putting greater focus on ensuring heating systems use less fossil fuels and utilise renewable energy, Part L stipulates that, in a retrofit situation, any new fuel must not produce more CO₂ than that currently in use. In addition, any new system will need to be designed for the lower temperatures associated with heat pumps and other low carbon heat sources. As a result, the maximum

flow temperature of the design must not exceed 55°C. Given these changes in legislation, what are the options available for the commercial sector?

Heat networks

One type of system contractors and specifiers will already be familiar with is a district heating network, which supplies multiple dwellings or buildings from a centralised heat source. The Energy Saving Trust has a positive opinion of district heating, stating it "offers the promise of a simple solution for the supply of low carbon heat to homes, businesses and public buildings across the UK."

So, how does this link back to electric-based systems? Well, the latest heat networks (also known as “fourth generation heat networks”) have been designed to work at lower temperatures (i.e; flow temperatures of 50-60°C) and provide a more cost-effective transition away from fossil fuels via the use of air source heat pumps. Our industry has already seen an increase in the number of heat networks utilising commercial heat pumps on the primary system; the heat pumps are often fitted on the outside of a building then connected via the heat network to next generation heat interface units (HIUs) inside the property. This configuration is frequently used in applications such as apartments and offices.

As heat networks have grown in prominence, there have been significant changes to the regulatory framework under which they are classified. Indeed, fourth generation systems are supported by the latest CIBSE CP1 2020 heat networks Code of Practice for the UK. Not only does this set the minimum system requirements, it also offers guidance on improving energy efficiency overall. By drawing attention to the low temperatures at which heat pumps operate, the document has also resulted in recommending heat networks be specified and developed with these technologies at their core.

Savvy manufacturers have seen how heat pump technologies can be successfully used in heat networks, leading to the development of HIUs specifically designed for use with renewables. These units comply with CP1’s stipulation for the maximum return water temperature from the domestic hot water (DHW) heat exchanger to the district not to exceed 25°C. While most HIUs on the market can operate and sufficiently provide DHW or space heating at lower operating temperatures, not every model will have low enough return temperatures to meet CP1 2020. As a result, it is important to look for models specially designed for use with heat pumps, such as Modutherm’s own MTA Plus Twin – which has the lowest return temperatures on the market.

Electric hybrid systems

Given the rise of electric systems, the days of the humble gas boiler are somewhat numbered (they

will no longer be allowed to be installed from 2035, after all). However, it is not the end of boiler technology per se, as there are now electric models on the market proven to be efficient and effective alternatives to their gas counterparts. After all, electric boilers can modulate – providing efficiencies of up to 99% – while the fact they do not need a flue or annual servicing provides amazing flexibility in terms of siting. Boasting silent operation and the ability to be fitted in cascade, they are perfect for commercial buildings, especially in terms of reducing capital investment and space requirements.

However, electric boilers can offer even more when used in conjunction with heat pumps to form a hybrid (bivalent) system. The addition of the boiler proves particularly beneficial during the colder months of the year; while the heat pump remains the primary source of heat, the boiler can provide additional load during peak demand. These electric hybrid systems can then be used to form low temperature heat networks for a wealth of applications, including factories, offices and social housing.

GLA planning regulations

Again, legislation is weighted in favour of low temperature heat networks and renewables-based options such as electric hybrid

systems. Already, the current GLA (Greater London Authority) planning regulations require heat pumps to deliver at least 80% of a development’s annual heat demand (also known as ‘annual heat fraction’), with the remainder coming from another heat source, such as peaking boilers.

The Future Homes Standard (FHS) takes things a step further. It aims to decarbonise properties by replacing current technologies with renewable alternatives and, in 2025, compliance with the Standard will be mandatory. The criteria of the FHS, which coincides with the updates to Part L discussed earlier, is likely to push the annual heat demand towards 90-95% when it comes into effect.

However, heat pumps boast the ability to provide 95% of annual heat demand, with trials revealing units sized to 30-40% of peak load can successfully deliver the majority of annual demand, particularly if augmented by additional thermal storage. The electric boiler can then be called upon to provide the remaining 5% of annual demand when required. Plus, as all components of the hybrid system are electric, they will be powered by a decarbonised source, thereby resulting in a 100% renewable heat network – it doesn’t get any greener than that!

Furthermore, using a system comprising products and controls

from the same manufacturer enables the key components to communicate with one another using the same digital protocols. The added advantage of this is that all the parts were specifically designed to work together to maximise the reliability, efficiency and performance of the whole system.

Heat Pumps at the forefront

So, air source heat pumps remain at the forefront of renewable technology, with a wide range of products now available for specification into new and existing commercial projects. Heat pumps help reduce carbon emissions, lower energy bills, offer long-term reliability and are easy to maintain. Plus, they can be incorporated into heat networks and used alongside electric boilers to create zero carbon systems. With legislation now encouraging the uptake of these renewable technologies, the heat pump revolution is truly underway.

*Source: Parliament.uk / Committee on Climate Change, Reducing UK emissions 2018 Progress Report to Parliament:

**Source: Climate Change Committee:



More information can be found at www.modutherm.co.uk





Clean water, healthy heat networks



Steve Dawson from Guardian Water Treatment explains the critical role of water quality in ensuring the energy efficiency, reliability and longevity of heat networks and the steps FMs and operators can take to protect their systems.

District heating is growing in popularity in the UK and currently provides 2-3% of our overall heat demand, with great potential for expansion. In Denmark, for example, which adopted this technology in the early 1900's, district heating warms around 64% of homes.

A clear success for Denmark, district heating could play an important role in decarbonising heating right across the built environment. However, these systems are vulnerable to corrosion and poor water quality – a leading cause of operational issues and system failures.

District heating systems, or heat networks, are a relatively new approach to delivering heat to a wide variety of buildings across the UK. Expected to play a significant role in Net Zero 2050, district heating offers great potential to incorporate

low temperature systems, such as heat pumps, as well as energy from waste facilities and industrial processes, geothermal sources and renewables. According to government research, heat networks could meet 18-20% of overall heat demand by 2050.

Currently, there are around 17,000 heat networks in the UK serving half a million end-users; mostly in the domestic and residential sector, particularly social housing, but heat networks are also used in public buildings, commercial property and industrial applications.

Right first time

As with any emerging low carbon technology, getting it right in the early stages is key to the reaching long-term potential. Heat networks offer a quick route to decarbonisation if heat is generated from renewable sources. Additionally, district heating systems are often designed to recover waste heat from industrial processes, which would otherwise be released into the atmosphere, reducing greenhouse gas emissions and improving energy efficiency.

Research indicates, however, that one-in-six district heating systems

could be suffering with issues stemming from poor water quality. Planned preventative maintenance (PPM) and corrosion monitoring are key mitigation strategies, leading to sustainable return-on-investment and continued growth of new low-carbon network, together with reliability of supply and low-costs for end users.

Poor water quality – the hidden risks

The research published in CIBSE Journal in 2019 by Jon Greaves, Managing Director of Hydro X Water Treatment and WCS Water Division, revealed that 15% of heat networks had suffered failures because of water quality issues. The study looked at 185 heat networks over a 2-year period and identified specific issues leading to system failures, including:

- Poor system water quality at handover – 12 incidents
- Systems handed over with disused plant still connected to system – 6 incidents
- Loss of system water (non-corrosion related) – 4 incidents
- Full loss of system water (corrosion/scaling related) – 4 incidents
- Full loss of system water (bacteria related) – 2 incidents

Before total failure, poor water quality can cause severe operational issues, including regular leaks and poor efficiency, increased replacement/remedial costs, reduced overall lifetime of

valuable plant and equipment and high costs for service users.

Continuity of water treatment and remote monitoring technology during the pre-commission and design phase, as well as for ongoing management, would have prevented many of the failures highlighted in the study.

In conclusion, Greaves recommends that “continuous monitoring and automatic dosing should be installed on all district heating networks to minimise the risk of corrosion and associated water treatment issues.”

The oxygen – corrosion connection

Dissolved oxygen (DO) is the primary cause of corrosion in closed circuit water systems, leading to operational issues in heat networks. As observed in the Greaves’ research, the addition of makeup water to compensate for losses leads to increased oxygen levels and risk of corrosion. Fouling of the heat exchanger reduces heat transfer and build-up of debris and scale degrades pipework and components, that will eventually lead to air ingress – and the vicious cycle continues.

Low pressure is another common cause of air ingress; positive (but not excessive) pressures must be maintained to prevent air being drawn in. Pressure sensors measure flow rates and pressures, but a more effective approach is remote monitoring technology, that tracks system pressure and other

precursors to corrosion in real-time and provides instant notification when water conditions change.

Take control of corrosion

Real-time HVAC monitoring is the only way to detect the early signs of corrosion, allowing system providers and FMs to make informed service interventions that reduce the risk of downtime and protect valuable plant and equipment.

Monitoring technology can be installed short or long-term, during the pre-commission stage or as an ongoing management tool. It remotely monitors water condition and corrosion rates, alerting users immediately if readings are out of specification, including:

- Dissolved oxygen: Levels of DO indicate whether the system is air-tight, or how quickly it has recovered following the introduction of fresh aerated water.
- Pressure: A closed system must maintain a positive relative pressure at all times to avoid air being sucked into the system.
- pH: Changes in pH indicate potential problems with the water chemistry and biology.
- Galvanic currents: To determine if inhibitors are behaving effectively under operating conditions.
- Crevice corrosion: A particularly insidious form of corrosion leading to rapid pitting attack and pinholing, crevice corrosion occurs in localised regions such as weld seams and under debris where a micro-environment can be formed.

- Leaks (water make-up volume): By measuring water make-up volume, leaks in the system can be identified and planned flushing activities can be monitored.
- Temperature: To ensure the system is operating as intended.
- Inhibitor/glycol concentration: Both under-dosing and over-dosing can adversely affect corrosion and performance.

With real-time data to hand and alarms sent direct, heat network operators can improve water quality outcomes, minimise the risk of downtime and unexpected costs, and ensure that this important technology is meeting its potential to deliver low-carbon, low-cost heat on a mass scale.





Stripping back cable energy wastage:

The hidden cost of inefficient cable calculations.



By **Jake Hardcastle**, Electrical Engineer at Thornley & Lumb

the clients' needs, is cost effective and is compliant with BS7671, but also one that is energy efficient. This will commonly be considered through selected luminaires, lighting control, selection of energy efficient appliances etc. However, one often overlooked source of energy wastage is inefficient cable sizing, and in a bid to reduce energy costs as much as practically possible, it is crucial to consider this.

While the idea of sizing a cable to reduce energy loss is nothing new, the continuous search for cost reductions, competitive tendering and the rising price of copper mean selecting a larger conductor size doesn't seem economically attractive and the benefits are failed to be noticed.

This article delves into the impact of cable sizing on energy

consumption and highlights the advantages gained from selecting a larger conductor size than what is strictly necessary, something that is often not a thought. By intentionally selecting a larger conductor size, we can effectively reduce wasted energy. We will examine the potential savings and long-term benefits of using a larger cable size.

Limiting the voltage drop

Section 17.4 (Design Considerations) within Appendix 17 of BS7671 states that "consideration should be given to limiting the voltage drop within an installation to a level below of that required". These values can be found in section 6.4 of Appendix 4. By reducing the voltage drop further than what is required, we can reduce the power wasted in the form of heat through a conductor.

Selecting a cable size larger than the minimum required in order to satisfy BS7671 can minimize energy wastage, providing a more energy efficient installation, and furthermore, can reduce the client's electricity costs.

Increasing the cross-sectional area will reduce energy wastage but will of course increase initial installation costs. The designer should determine whether the savings over a certain time period outweigh the initial higher cost. There are of course practical restrictions to this such as the size of terminations and the ability of being able to actually terminate the conductor within accessories.

Additional recommendations on the energy efficiency of electrical installation design can be found in appendix 17 of BS7671:2018, Amendment 2:2022.

Designing an energy-efficient electrical installation involves thoughtful consideration of various factors in order to minimize energy consumption and maximize sustainability.

When designing electrical installations, designers should not only design a system that meets

Calculating energy wastage

To calculate the energy wastage in a cable, two things need to be known: The current in the cable and the resistance of that cable. The resistance values of cables can be found in the IET On-site Guide (Appendix I) and IET Guidance Note 3: Inspection and Testing.

Using an example of a 32A Electric Vehicle Charging Point, supplied from a consumer unit 10m away, we can look at 3 different cable sizes and the comparisons on energy wastage.

In order to calculate this, two of the basic principles of electrical engineering are to be used. We can use the two following formulas to calculate the power wasted within a cable. These are $V=IR$ (Ohm's Law) and $P=IV$ (Power Formula). As resistance is directly proportional to voltage, i.e., if resistance is increased, voltage will increase and therefore the higher the resistance of the cable, the greater the voltage drop will be. As voltage and power are also directly proportional, the greater the voltage drop in the cable, the greater the power wasted will be. As voltage drop increases, the voltage available for the connected appliance decreases, resulting in reduced efficiency and wasted energy. Therefore, the voltage drop should be aimed to be as low as practically possible while striking a balance between energy-savings and economic considerations.

As the current of the circuit and resistance of the cable will be known but not the voltage drop within the cable, we can substitute V in the formula $P=IV$ for $I \times R$ in the ohms law formula. This leaves us with $P=I^2R$. This will give the power wasted within the conductor.

The following spreadsheet shows an example of 3 cable sizes used in this scenario. Assuming the minimum conductor size permitted is 4mm², in this example we can look at two additional larger conductors to be considered in this design.

Looking at the spreadsheet it can be seen that 4mm², 6mm² and 10mm² are the three cable sizes considered. Using a Steel Wire



Armoured cable in this example and therefore the Circuit Protective Conductors being the same size as the Live conductors, the resistance values (mΩ/m) can then be selected from the On-Site Guide or GN3 as seen in column 2. In order to calculate the total cable resistance, this value must be multiplied by the length of the circuit and divided by 1000 to convert from mΩ's to Ohms. Using the formula I^2R , the current demand and resistance can be inputted to give the power wasted in the cable. This figure can be divided by 1000 and multiplied by the hours used per year to give Kwh per year. This example is based on the usage of an EV Charging Point 4.5 hours per day, 5 days per week over 50 weeks of the year.

This figure can then be multiplied by the Kwh per unit charge which will vary depending on the energy provider and the time of day. In the below example a figure of 35p per Kwh is used.

It can be seen from the below table that using a 6mm² cable opposed to a 4mm² cable would give an annual saving of £12.34. Using pricing found at the time of writing this article, 3 core 4mm² Steel Wire Armoured Cable can be purchased for £2.93 a meter

and 6mm² for £4.08 meaning 10m would cost £29.30 and £40.80 respectively. This means the payback period for using 6mm² compared to 4mm² would be a little under 1 year and you would see a saving in subsequent years.

Using 10mm² cable gives a further saving of £10.08 compared to 6mm² cable and a total saving per year of £22.42 compared with 4mm² cable. The cost of 10mm² 3 core Steel Wire Armoured is £6.52 per meter, totaling £66.20 for 10m, £25.40 more than 6mm² or £36.90 more than 4mm².

The payback period for the 10mm² cable compared to using 4mm² cable would be approximately 1.64 years:

$$\text{Payback Period} = \frac{\text{Initial Cost}}{\text{Annual Savings}} = \frac{£36.90}{£22.42} = 1.64 \text{ years}$$

Relatively short payback

It can be concluded that the payback period, even for the 10mm² option is relatively short considering how long something such as an EV charger will be in service for. If the client was to have ownership of this installation for a long period of time it would be worth paying the additional

installation costs for the savings that will follow each year, as well as the reduced power wasted and subsequently being a more environmentally friendly, energy-efficient installation.

By selecting a larger cable with a lower resistance, energy efficiency can be significantly improved. As well as increasing cost-effectiveness and homeowners and businesses receiving energy savings resulting in reduced electricity bills, this contributes to a greener more sustainable planet.

In pursuit of the most energy efficient electrical design, the importance of cable sizing should not be underestimated. This example shows the impact of cable selection on energy consumption and while this shows the potential savings of only one circuit, consider very large homes with a hot tub, sauna, multiple EV chargers etc. the savings could be extremely large. In industrial settings the benefits to be had could be much larger also.



More information can be found at www.thornleylumb.co.uk

Potential cable size	Resistance per meter (milli Ω/m) taken from OSG	Circuit length (m)	Resistance total Ω - milli Ω per m x length / 1000	Current demand (A)	Power = I ² R	Hours used per day	Days per week used	Days used per year	KWh usage per year	KWh unit charge	Cost per year in lost energy
4mm	9.22	10	0.0922	32	94.4128	4.5	5	1125	106.2144	£0.35	£37.18
6mm	6.16	10	0.0616	32	63.0784	4.5	5	1125	70.9632	£0.35	£24.84
10mm	3.66	10	0.0366	32	37.4784	4.5	5	1125	42.1632	£0.35	£14.76





HVAC: Preventing gas leaks is imperative



By Shaun Evers Managing Director of Stonegate Instruments

Unfortunately, HVAC systems are also one of the largest, if not the single largest consumer of electricity, accounting for up to 40% of a building's energy usage. Additionally, these systems pose a threat to people, profits, and the planet. Should they develop a leak, it could result in the release of toxic gases which can endanger building occupants, drive operational costs higher, and impact the environment.

Harmful effects of refrigerant gas leaks

Refrigerant gas leaks often go undetected because people cannot always smell, taste, or otherwise discern its presence. In fact, it is estimated that 60% of gas escapes before anyone notices, with many toxic gas leaks going unnoticed until workers start to experience symptoms of distress.

If refrigerant leaks from an HVAC system, it can rapidly evaporate into a lethal gas which can cause frostbite, chemical burns, brain damage, and even asphyxiation.

While such serious scenarios are thankfully rare, people are at risk of these and other symptoms, including eye, throat, and skin irritation, if refrigerant gases escape.

While the effect on people can range from mild to extremely serious, an undetected gas leak could also increase energy consumption, driving operational costs higher. In fact, refrigerant gas leaks are the foremost contributor to energy loss in modern HVAC stores. When a leak occurs, the system becomes inefficient and needs to work harder to maintain capacity. This in turn will increase electricity consumption and accordingly, monthly energy bills.

The reality is that most systems leak refrigerant gases; according to the Carbon Trust the average leakage rate in UK systems is around 20% per year. This equates to a reduction in efficiency of around 11%, which directly translates into increased energy costs. According to several studies, a leaking air conditioning unit consumes almost 20% more electricity than a fully

functioning one and it has been suggested that a small continuous leak, left unrepaired for three months, could use an extra 10kW in electricity once the leak becomes critical. Considering the rapid rise in energy prices, this can quickly add up to several thousand pounds.

Smart solutions ensure safety

Because refrigerant gas is both odourless and colourless detecting a leak can be challenging. While there are a several things that can be done in the case of a suspected leak, nothing can replace the accuracy and efficiency of using specially designed technology for this task. In fact, designers and manufacturers of electronic equipment for the refrigeration and HVAC industries have worked diligently over the past few years to improve the effectiveness of refrigerant, toxic and combustible gas sensors, with modern sensors boasting greater intelligence and capabilities to combat risks posed by toxic and non-toxic gases.

Heating, ventilation and air conditioning (HVAC) systems are an integral part of modern commercial buildings and play a vital role in creating safe and healthy environments – they control temperature, reduce humidity, and eliminate airborne pathogens and allergens, thus improving indoor air quality. The latter is vital in modern buildings as the NHS estimates that poor indoor air quality costs the UK up to £20 billion a year.

Because of rapid advances in technology, the latest generation of sensors and systems are smart, self-contained single fixed gas sensors which are particularly suited to detecting gases associated with HVAC units. Many of these sensors have a proven return on investment of just two years, and that is without taking into consideration the cost of repairs to an existing faulty system.

Smart sensor equipment with signalling alarms, LED lights that indicate the presence and status of each sensor, as well as audio/visual alarms to alert staff, is also available. These systems help ensure that leaks are quickly identified and repaired at the first opportunity, minimising the risk to the health and safety of building occupants and preventing breaches in regulatory compliance.

Factoring in F-gas regulations

While advancements in gas detection technology can help keep sites and workers safe, there is also an environmental aspect that cannot be ignored – hydrofluorocarbons (HFCs) have a global warming potential over 3,000 times that of CO₂ and as it

gets released into the atmosphere, it causes ozone depletion and contributes to global warming.

As such, an understanding of fluorinated gas (F-Gas) regulations is vital for anyone working with refrigerant gas, especially considering that the refrigeration, air-conditioning and heat pump sector is the largest source of F-gas emissions due to refrigerant leakage.

F-Gas regulations, which aim to phase down the CO₂ equivalent emissions from HFCs by 79% (relative to 2015) by 2030, have been in force since 2020. The regulations stipulate that equipment must be fitted with a leak detection system if it contains F-Gas equivalent to 500 tonnes of CO₂. They have also raised the requirements for regular gas leak checks: leakage checks should be carried out at least once every 12 months if the system contains F-gases in quantities of 5 tonnes of CO₂ equivalent or more, at least once every 6 months if it contains F-gases in quantities of 50 tonnes of CO₂ equivalent or more, and at least once every 3 months if the system contains F-gases in quantities of 500 tonnes of CO₂ equivalent or more.

Additionally, to prevent the risk of ignition posed by the flammability of some refrigerants, operators are required to maintain in-room concentration levels below the lower flammability level. This requirement is reinforced by safety legislation and standards such as ISO 5149 and EN 378.

While the UK has continued to mirror the European F-gas regulations since Brexit, the government's own assessment found that the European phase down model may be unfeasible for the UK. As discussions around F-Gas regulations continue, it is important to know that the Environment Agency has the power to impose civil penalties of up to £200,000 for various breaches, including failure to comply with provisions in the regulations or permitting another person to breach those provisions.

Benefits of gas detection technology

Whether a leak results from mechanical damage, equipment failure or poor maintenance, a gas detection system can help prevent a minor incident from becoming a crisis. In fact, gas detection

systems offer many benefits – it alerts building occupants to the problem, enabling them to evacuate the area and thus minimising their risk of exposure; it ensures that proper procedures are activated so that timely corrective action can be taken; it minimises the risk of irreversible damage to equipment; and it prevents potentially harmful environmental impacts.

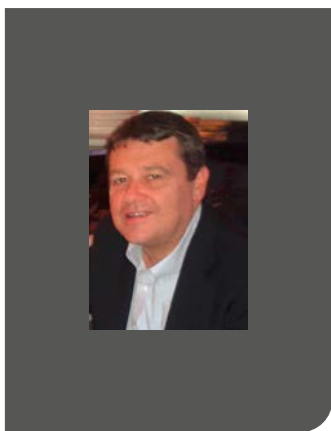
Functional and efficient HVAC systems are not only an integral part of modern buildings, they are a fundamental operational requirement. Turning to technology will ensure that, should a refrigerant gas leak occur, it is quickly identified and repaired, helping to keep energy consumption in check, minimising the risk to the health and safety of building occupants, preventing breaches in regulatory compliance, and minimising operational costs.



More information can be found at www.stonegate-instruments.com



Inside the **ultra-tight security** of a data centre



Nesson Frawley, Technical Sales Leader at Chubb Fire and Security provides an insight into the ultra-tight levels of physical security many hyperscale data centres adopt to protect their most valuable assets.

Security breaches in a data centre, whether that is cyber or physical, can have devastating consequences for the organisation. Last year, cyber-attacks increased by 38% from 2021. Hackers are attempting to breach the information of businesses across the world, and the information stored in a data centre can be an attractive target.

However, a physical attack can cause just as much disruption, damage, and financial loss for a data centre. Damage to critical servers could lead to catastrophic events such as business closures, economic loss and even planes falling from the sky.

Ultra-tight security

Data centres are meticulous in their planning and carefully select trusted suppliers to carry out the installation of their integrated systems. At a hyperscale data centre, for example, there are military-style barriers, gates, and physical perimeter security.

But before you even get that far, visitors, including the organisation's own employees, need to apply for access passes and provide information about the reason for their visit. This includes, but is not limited to, risk assessments, risk analysis, and method statements. Permissions will also need to be obtained if the visitor is required to take photos and/or bring other devices such as tablets, laptops, and phones.

Once approved and on-site, typically, the visitor signs in at the security office and provides biometric scans, such as fingerprint, iris, or facial scans. Many of the hyperscale

data centres use dual authentication, biometric readers, as well as card readers as a double security layer.

Integrated systems

Inside the data centre, the security systems are fully integrated. They are all intelligent. Each security device, from the Access Control, CCTV, to monitored alarms, is managed by one system. These devices are constantly capturing and recording information which is managed by both local and remote-control centres.

Every door inside the data centre is mapped with different alarms and different controls. Some critical infrastructure doors use anti-tailgate systems and anti-passback management to control the movement of people within the data centre.

For example; if an authorised visitor swipes their card to open a door and, for whatever reason doesn't go through the door and

the door closes, re-swiping won't open the door. As far as the system is concerned, that person has already walked through the door. Manned security would have to intervene, investigate, and grant access, with re-authorisation of that visitor's privileges.

Strict access

As the system is constantly providing data, it can track where and when people move around the building.

It only grants access to the pre-agreed areas and prevents people from entering restricted spaces. Any contractor required to carry out works such as electrical, electronic security, and any works that require access to secure enclosures will be further monitored as each cabinet, rack, and enclosure have anti-tamper sensors. The sensors send signals to the control centre, notifying them when a cabinet has been opened.

There is full traceability of the



contractor's journey around the data centre. The system records them passing through each door and opening cabinets using pre-assigned keys. If any of the information doesn't tally, the system will know exactly where, when, and who.

Constantly upgrading

Many hyperscale data centres upgrade their entire security systems to the latest and greatest technology on a regular basis to provide the highest level of security to their customers.

Many do prioritise their ESG and environmental credentials by frequently recycling and reusing their "old" equipment, despite replacing it often. In fact, cameras and card readers are commonly repurposed in real estate settings like warehouses, offices, distribution centres, and manufacturing sites.

Health checks

With the very best equipment, and providing ultra-tight security, data centres also run regular health checks to ensure their systems are operating efficiently. If there is an interruption to the main power supply, then

backup batteries will kick in to prevent prolonged periods of outage. These regular checks can highlight everything from battery failure, singular and multiple device failures, to system failure, allowing for immediate remedy.

The failover

Perhaps the best example of a data centre's meticulous security planning is its failover. For most of Chubb's data centre customers, security systems have various layers of protection so that they can remain operational. Additional switches and servers are used as backups in case anything happens to the first one, providing complete system redundancy and backup, eliminating a single point of system failure.

Even if a hyperscale data centre suffers a significant breach, there is often a complete failover from one data centre to another. Many of the big players in the data centre world will have GSOCs – Global Security Operations Centres – which ensure that there is always a backup.

Emerging technology

As mentioned previously, data centres are constantly reviewing and periodically upgrading their



systems to offer cutting-edge security and protection to their customers. Recent developments in technologies such as enhanced biometrics, video analytics, cloud-based support and much more give extra layers of security to Chubb's data centre customers. One such example of enhanced biometrics would be the development of long-range iris readers. They are ideally suited for entrance

barriers because they can read the iris of the eye through a tinted windscreen, through prescription glasses, from approximately 20 metres away.



More information
can be found at
www.chubb.co.uk



Modular Construction: Building a Greener Future with Panelised Solutions

By **Premier Modular Group**

With society becoming increasingly aware of the importance of sustainability, more and more businesses and individuals are seeking ways to reduce their carbon footprint and demonstrate their commitment to environmental responsibility. Sustainable building solutions are becoming ever more essential to meet the needs of modern businesses and consumers.

The construction industry has a crucial role to play in creating a greener future.

Modular construction has been gaining popularity as a sustainable and efficient building method. And with the increasing demand for environmentally-friendly solutions, panelised solutions are emerging

as a promising way to reduce emissions and meet green building standards. Panelised solutions involve the use of pre-fabricated panels that are manufactured off-site and then transported to the construction site for assembly. These panels are made from a variety of materials such as timber, steel, or concrete, and are designed to be lightweight, durable, and easy to assemble.

By using such solutions, we can say goodbye to the mess that comes with traditional on-site construction. These pre-fabricated panels are made in a controlled environment with minimal waste, making them not only eco-friendly but also cost-effective. Plus, the precision of the manufacturing process means that you won't need

to worry about any nasty surprises once the panels arrive on-site.

Transportation

Did you know that transportation of construction materials is one of the major culprits behind greenhouse gas emissions? That's why the panelised solution in modular construction is an innovative way to reduce our carbon footprint. By manufacturing the panels off-site, we can significantly minimise the need for transportation of bulky materials. This not only reduces the carbon footprint of the construction process but also makes transportation more efficient by being able to use lower-emissions vehicles as the panels are lightweight and compact, making transportation a breeze!

Panelised solutions can also provide a more energy-efficient building by creating a tighter building envelope than traditional construction methods. The building envelope encompasses the physical separation between the interior and exterior environments of a building, such as the walls, roof, and floor. By creating an airtight envelope, the building can reduce the amount of air escaping or entering, which in turn minimises the energy required for heating and cooling the building.

Design flexibility

In addition to their environmental benefits, these solutions offer great versatility for businesses. They can be customized to fit various design requirements, such

as; different shapes, sizes, and finishes. This means that architects and designers have greater flexibility with their designs, and can create buildings that are both aesthetically pleasing and sustainable. The ability to create unique designs that meet specific project requirements can also be a significant competitive advantage for modular construction companies in the industry.

As the demand for sustainable construction solutions continues to grow, the modular construction industry is well-positioned to lead the way. By embracing panelised solutions and other innovative approaches, modular construction companies can help to reduce their carbon footprint, minimise waste, and create more energy-efficient buildings. Ultimately, this can help to create a greener world for future generations.

Climate Change

According to the UK government's Committee on Climate Change, buildings account for approximately 17% of the UK's greenhouse gas emissions. Within buildings, heating and hot water account for approximately 37% of emissions in homes and 49% of emissions in commercial buildings. By improving the energy efficiency of buildings through the use of panelised solutions, the amount of energy needed

for heating and cooling can be reduced, leading to significant reductions in greenhouse gas emissions associated with building operation.

Several sectors can benefit from innovative solutions designed for sustainability. In fact, The Department for Education in the UK has recognised the importance of sustainable and efficient construction methods, and is actively promoting the use of modern methods of construction in school building projects. In collaboration with other public procurement frameworks, the DfE is providing guidance and support to schools to encourage the use of modern methods of construction and panelised solutions in their building projects. This initiative is an example of how sustainability is becoming a growing priority in the modular construction industry, as more organisations recognise the importance of reducing their environmental impact.

Standards & regulations

Compliance is an important consideration when it comes to using panelised solutions in modular construction. In order to ensure that the panels meet the necessary standards and regulations, they must be designed and manufactured to specific requirements. For example, in the UK, the Building Regulations set

out the minimum standards for the design and construction of buildings, including requirements for energy efficiency, fire safety, and structural stability. Panelised solutions must be designed to comply with these regulations, which may involve using specific materials or manufacturing processes.

In addition to building regulations, there may be other standards or certifications that panelised solutions must meet in order to be used in modular construction. For example, the Forest Stewardship Council (FSC) certification ensures that timber products are sourced from responsibly managed forests.

Modular construction companies must ensure that the panelised solutions they use are compliant with all relevant regulations and standards. This may involve working with suppliers to ensure that the materials and manufacturing processes meet the necessary requirements, as well as conducting testing and inspections to verify compliance.

Acoustic performance

Panelised solutions should be extensively tested for both their acoustic and structural fire performance. Acoustic testing is important to ensure that the building meets the required sound insulation standards, which is

key in residential buildings or buildings where sound attenuation is critical, such as recording studios or hospitals – another example of a main sector that can benefit from panelised solutions – the healthcare sector. Panels can be designed to achieve the required sound insulation levels through the use of appropriate materials and construction methods.

Structural fire performance

Structural fire testing is another important aspect of panelised solutions, as it ensures that the building meets fire safety requirements and can withstand fire for a specified period of time. Panelised solutions can be designed to meet various fire ratings, depending on the needs of the building and its occupants. The panels are tested in controlled environments to ensure that they meet the required standards for fire resistance, and can be further enhanced with the use of fire-resistant materials.

By ensuring compliance with regulations and standards, construction companies can help to ensure that their buildings are safe, durable, and sustainable. Additionally, compliance can help to improve public trust and confidence in modular construction as a reliable and high-quality construction method.

If you're interested in exploring the benefits of panelised solutions for your building project, there are many options available. Companies that specialise in panelised solutions can work with you to design and manufacture panels that meet your specific requirements, whether you're building a residential, commercial, or industrial property. They can help you to optimise the manufacturing process, leading to a more efficient use of resources and a reduced environmental impact, whilst ensuring compliance with relevant regulations and standards. Many modular companies have adapted to meet the growing demand for panelised solutions. As an example; Premier Modular Group has launched Net Zero Panels to keep up with the requirements for this service.



More information
can be found at
**[www.premier
modulargroup.co.uk](http://www.premiermodulargroup.co.uk)**



Net Zero: Ambitious targets demand ambitious strategies



By **David Lloyd**, General Manager of Connected Energy Performance at Johnson Controls

Scaling up for sustainability as deadlines loom is a challenge of huge proportions, but there is much cause for optimism as we work to unlock the benefits of a decarbonised world. Awareness of the value of ESG metrics is on the rise. A 2023 study conducted by Aviva found that 93% of investors

now consider the net zero agenda fundamental to their real asset investment decisions. Climate action is now not only vital for our future on the planet, but is fast becoming a 'must have' rather than 'nice to have' for strategic success. Sure enough, we are now seeing businesses take note as they set ambitious public targets for decarbonisation. But where pledges are made, they must be supported by clear strategies for action.

With 2030 on the horizon, time is ticking to cut carbon emissions by 45%. To reach ambitious targets we need equally ambitious strategies for action. It's about reimagining what is possible. The Climate Group has highlighted that 40% of global emissions originate from the built environment. With this in mind, we

need a buildings revolution that capitalises on the best people, processes and tech available.

The game plan for sustainable investment

Investment into net zero initiatives is relatively new territory for many businesses. So, proving ROI to board members can be complex. Many organisations will not have implemented large-scale projects before, with no track record to prove payback. It poses the question: how can sustainability leaders increase confidence in green investment decisions without evidence of prior success?

The truth is that energy reduction and optimisation will aggregate positive effects quickly. Improvements to technology can

start from local solutions – for example; switching from gas boilers to air source heat pumps, installing solar panels and implementing LED transformation. A case study Johnson Controls conducted with Hounslow Council found that these simple switches created a 50% reduction in cost. On-site energy production and the use of LEDs offset the increase in electricity use. Investors and businesses leaders alike can take comfort in seeing these short-term gains. The Carbon Trust found that new technologies – such as heat pumps – can deliver CO₂ savings of up to 70% in comparison to traditional electric heating. And where legacy infrastructure is updated, smart buildings can aggregate data to build a picture of likely cost savings in the long-term.



Cost-effective solutions and clean technology aren't mutually exclusive

Digital technologies play a pivotal role in forming a detailed picture of an estate's carbon footprint, enabling the energy needs of factories, warehouses, and offices to be tracked and monitored. Knowledge is power – a wealth of data ensures the unique needs of every building are clearly understood. Thus, feasible net-zero plans become far easier to create and implement. AI platforms transform the way in which we view buildings, making it easy to scan across entire estates to pinpoint inefficiencies and advocate the corrective action needed to fix them.

One way the route to decarbonisation can be accelerated is by utilising 'single pane of glass' digital platforms. These enable businesses to keep a close eye

on expenditure whilst meeting green goals; optimising building performance whilst ensuring cost savings. In addition to this, with the regulatory demand to report on Scope 1, 2 and 3 emissions becoming increasingly pressing, technologies for visualisation are essential. Reporting on and perceiving the complexity of such emissions can be a challenge without the help of digitisation.

Doing the homework – the case for education on net-zero

Many businesses have started to move towards science-based targets such as B Corp certification and CDP scoring, but still need to make more significant steps towards strategies that are fully integrated. For example, the immediate ROI to reduce bills amid the energy crisis by turning down heating appears beneficial on a base level but has minimal impact on wider net zero initiatives. So, clarity in direction, as well as education on what truly progresses the net zero agenda, will ensure effective implementation of long-term strategies.

There are immediate changes businesses can make, too. Innovations such as Central Utility Plant (CUP) technology use predictive algorithms to anticipate future scenarios and identify opportunities for cost reduction. Lack of education means that many businesses simply aren't aware of the 'quick wins' that are available to them.

Successfully implementing green initiatives is complex. Truly laying the foundations for change involves the creation of detailed action plans that match pledges made. For example; available specialists in the industry will encourage board-level investment, but such creation of talent takes time. The World Economic Forum's Future of Jobs report found that in demand skills across jobs are changing, with 40% of workers requiring up to six months to reskill. One thing is clear: change needs to happen now rather than later.

The green economy demands expertise to match

Companies have started to drive forward upskilling and reskilling initiatives amid an abundance of skills gaps and shortfalls in headcount. Increasingly, organisations are looking to recruit staff with demonstrable expertise in sustainable engineering and

ESG compliance. The burgeoning need for skills in specialised areas such as heat pump and solar technologies is ever-increasing.

For wide-reaching organisational change, enterprises need industry expertise that is embedded in their workforce. Businesses face pressure as growing demand for experienced consultants and auditors exceeds supply. And, designing achievable goals for the environment as well as the business is no small feat when they are in the dark. Then once new technologies are installed, there exists a lack of experienced engineers to build, monitor and maintain necessary systems.

So, how can companies instigate these changes in meaningful ways? They need to adopt ways of working that are companywide, reviewing processes in full to facilitate practical delivery. Further to this, they must ensure workforce buy-in. With buy-in, as well as the right tools and information at their disposal, employees will be equipped with the tools to drive forward success in any transitional programme.

The demand for green talent is only likely to grow, given that the UK's net zero economy is expanding exponentially. It is currently valued at £70bn; and will likely exceed this value in future, the Energy and Climate Intelligence Unit has found. The report also observes the need for talent across the UK; particularly if the levelling up scheme is to be achieved across key UK regions and cities. The recruitment of top green talent, as well as investment in learning and development for the future, demands a pre-emptive approach. Leaders don't have to

make this transition alone. They can consider partnering with organisations that are already ahead of the talent curve.

The case for action now, not later

So, what is truly needed to successfully drive the net zero agenda forwards? First and foremost, it is vital that businesses start to implement emerging technologies now to reap both short-term and long-term benefits. Rich data allows a building's energy usage from a macro level to be fully understood and allow leaders to make strategic decisions that are driven by a wider net-zero agenda.

Secondly, closing the green skills gap will allow businesses to draw out achievable routes to net zero, implementing and maintaining new technologies for years to come. Finally, as leaders navigate this ever-evolving landscape, collaboration will be key. By working together with industry partners, businesses can find the most cost-effective and climate-friendly solutions to suit their needs. With the right people, processes, and technology in place, leaders can deliver net-zero strategies with longevity for generations to come.



More information can be found at www.johnsoncontrols.co.uk



Heavy Industry's Transition to Clean Energy



Chris Voet, Director of Key Accounts Europe at SolarEdge Technologies considers solar as a solution for companies operating in heavy industries to achieve their sustainability goals, and the business opportunities it can bring.

With governmental pressure in most countries ramping up and bold deadlines to phase out fossil fuel within the upcoming decades, many companies and industries are adapting to the large-scale transition to clean energy. For traditional heavy industries such as manufacturing and logistics, the shift is a big one, and identifying how to achieve that objective can seem like a very complex challenge.

In Europe, there are some 300 industries – many of them international – that have set due-dates to significantly reduce carbon emissions. The years commonly range from 2025 to 2035, and for some, 2050, depending on the country. Promises have been made by companies to shareholders and communities, and pledges posted on websites. While genuine commitment to 'play their part' is a key factor, action is also spurred by incentives from regional utilities to encourage adoption of renewable energy – as well as the incoming carbon taxes on industries that do not meet legislated emissions levels.

Major polluters

Among the companies leading the cause are the heavy industries

historically perceived as major polluters, such as oil and gas, chemical and automotive, logistics and large-scale industrial manufacturing. I have been working closely with companies in these industries for over a decade, helping them to transition to renewable energy, specifically solar. These operators typically have large premises and potentially acres of empty roof space, and solar modules provides a very visible demonstration of their commitment to sustainability. At the same time, the flexible nature of solar means it does not typically require planning permission, and, thanks to improvements in solar technology and fluctuating energy prices, the ROI period for solar projects is becoming ever more attractive.

For organisations whose business has never been power generation, making the transition to solar can present a challenge, and certainly there are several considerations that need to be taken into account. For example; there may be variations in national or even regional regulations that dictate the maximum size allowed for a PV system. Sometimes, the buildings used by companies may not have suitable rooftops, or the buildings may only be leased or rented making the landlord's commitment to installations problematic. Landlords are often reluctant to allow a solar

installation with a return on investment (ROI) of less than the occupier's lease.

Within large industrial corporations there can also often be complexity in the decision-making process. This may involve corporate-level management, investors, regional management, plant managers, risk assessment officers, energy managers, sustainability managers, insurance officers, local officials (including fire departments), and often risk, insurance and energy consultants. The challenge here is to ensure all stakeholders in the decision-making process understand what the end-goal is and that they can work together to achieve it.

Addressing concerns before taking the road to transition

Once a company is aligned internally, the next step is to find competent partners who can help it navigate the transition and minimise risk. These are likely to include a mix of companies, from consultants and EPCs to technology providers who can provide expertise based on decades of installing solar systems. These providers could be either local or global depending on the needs of the company, though many companies that have made the transition often find that the involvement of local partners who know the regulatory and operational conditions is very important.



In a recent meeting with a large chemical company, I was asked in jest, 'if our tree has always been fruitful, why take it down and grow a new one?!'. Referencing their longstanding use of traditional energy supply, they knew the answer to the analogy, but it does exemplify a wider industry consensus that while the transition to solar is needed, it comes with a lack of understanding of its value and how to best implement it.

The transition to solar requires a solid understanding of the requirements and risk factors involved. First, the financial case needs to be considered. Solar provides a very attractive ROI over the total lifetime of a system, having saved many of our longstanding customers millions. However, companies will have to bear the majority of the cost up front as CAPEX.



The next step is the process of putting solar panels on the roof of buildings and achieving the promised energy supply, which is a relatively simple and low risk exercise.

Safety and Risk Management

With chemical, oil and gas, and automotive companies, the main concerns are around safety and risk. These concerns come from a variety of sources, from risk and safety officers, to building managers (and owners), local councils and fire departments, and the companies' insurance managers. The insurance element is itself complex as it includes building insurance, insurance of the solar system, business insurance and general liability.

As the solar industry matures and the number of installations increase, stricter safety standards and

regulations are now commonplace. These safety standards often outline that should maintenance on the roof be necessary, or in case of an emergency, the solar inverter must be able to reduce the DC current produced by solar panels to a touch-safe voltage within a specified amount of time.

Cross-industry collaboration is key

Once the first PV installation has been successfully completed, we find that companies quickly move on to the next one, often accompanied by the question 'why didn't we do this sooner?!'. The completion of each successful solar project becomes the model for the next, albeit local adjustments may need to be made. For example; in some countries, excess solar energy cannot be fed into the grid.

However, we can help implement energy storage systems so that excess energy can be managed and used to further reduce the dependency on the grid.

It's important to recognize that every industry has its own unique set of challenges which must be taken also be taken into account to ensure a smooth transition away from fossil fuels. One of the ways we do this is to bring together different companies from within the same industry

Transitioning to a brighter future

While COP27 certainly shone a spotlight on the need to accelerate change, the reality is that the dial is slower than most of us would like. For heavy industries, the introduction of solar energy requires a shift in mindset on many levels. For example; it requires greater

collaboration between separate departments and responsibilities. It also requires stakeholders to move away from thinking about risk reduction centred around initial CAPEX, to recognizing the opportunities to future-proof businesses, especially against the recent energy pricing volatility we've seen in many countries. I've spoken to many companies who now view solar as a valuable asset that not only helps meet corporate sustainability goals, but can also be turned into a revenue stream. When that suddenly clicks and the mindset changes, it really is a magical thing to see.



More information
can be found at
www.solaredge.com/uk

Hamworthy Heating provides Shastid Energy with a quick and reliable solution

Following a long and established relationship, Hamworthy Heating, has supplied Shastid Energy with a Tyneham Air Source Heat Pump for installation at its premises in Cambridgeshire.



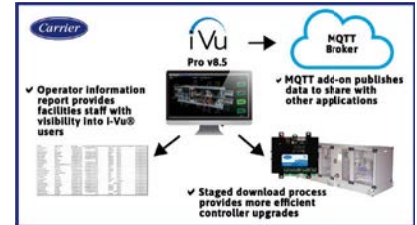
The Tyneham heat pump range offers superb operational reliability, excellent quality, and outstanding performance backed up by engineering excellence and lifetime support. One of the lightest commercial heat pumps on the market, it features a co-efficiency of performance (COP) rating of up to 4.85, to provide efficient, low-carbon heating. The seven models in the range have six nominal outputs of between 14 to 70kW, which can also be cascaded to achieve higher outputs in larger installations. Incorporating an inverter controller compressor to accurately match the heat demand, Tyneham heat pumps use R32 refrigerant to deliver increased efficiencies.

Designed with installers in mind, Tyneham heat pump components are conveniently housed in the main unit which is compact and lightweight for ease of commission and installation.

www.hamworthy-heating.com

Carrier Launches i-Vu Pro v8.5 Software Enhancing Security, Commissioning and Integration Capabilities

Carrier released its latest i-Vu® Pro v8.5 software for the i-Vu building automation system. The digital lifecycle solution delivers an operator information report for added security, a staged



download process for more efficient controller updates and Message Queuing Telemetry Transport (MQTT) integration. Carrier is a part of Carrier Global Corporation (NYSE: CARR), global leader in intelligent climate and energy solutions.

The operator information report provides facilities staff with visibility into who is using the i-Vu system. The report includes detailed information on operator configuration and security policy compliance.

The software includes an efficient staged download process for upgrading controller firmware, improving serviceability for customers. While traditional downloads disrupt HVAC equipment operation throughout the entire download, the new staged process splits the download into discrete steps, which helps reduce downtime of connected HVAC equipment.

www.carrier.com

Kingspan Supports Birmingham Regeneration Pipeline

Kingspan Kooltherm Pipe Insulation and Insulated Pipe Support Inserts have been installed as part of the community heating scheme for a new apartment block.



Work on the block will provide much needed extra care housing provision with 268 one- and two-bedroom apartments.

With the city committed to reaching Net Zero Carbon by 2030, ensuring efficient operation of the network was crucial. To support this, Kingspan Kooltherm Pipe Insulation and Insulated Pipe Supports were fitted across all low temperature hot water (LTHW) and domestic hot water services (DHWS) pipework within the building by specialist contractors Insulation & Cladding Services Limited.

Kingspan Kooltherm Pipe Insulation offers one of the most thermally efficient pipework insulation solutions, allowing the M&E team to minimise losses from secondary pipework with a slim insulation thickness.

www.kingspan.com/gb/en/business-groups/kingspan-insulation/kooltherm

Envirovent expands its ventilation range with whole house heat recovery system

EnviroVent has launched a new MVHR (Mechanical Ventilation Heat Recovery) range, which is Passivhaus certified*.



The Sabik 350 & 500 series has been designed to provide balanced and sustainable ventilation for new and refurbished homes, incorporating modular features, with user-friendly controllability.

The systems have significant airflow capacity of up to 414m³hr** and 601m³hr** respectively, and are suitable for handling airflow directions and drain on site to offer flexibility when it comes to ducting configurations. These modular units incorporate a range of features as standard, including integrated relative humidity sensor, touchscreen controller and frost protection.

The unit is Passivhaus certified providing that the modular preheater and enhanced ePM1 70% filter are installed. Optional features of the Sabik 350 and 500 systems include a pre-heater, Volatile Organic Compounds (VOC) sensor, wall spacer bracket for tight installations, and constant flow module which provides the ultimate versatility.

www.envirovent.com

Hung up on finding a versatile solution? EVO S boiler range from ACV provides a flexible option

ACV UK, stainless steel, hot water and heating specialist, is pleased to announce the introduction of its new EVO S wall-hung boiler range, which incorporates the latest stainless steel heat exchanger technology for energy efficiency and reliability.

Available in seven different outputs from 40 to 150kW, EVO S features a 5:1 turndown ratio and excellent low-class 6 NOx emissions across all models.

Designed for straightforward installation and maintenance to help optimise performance, the EVO S range is lightweight for its class with a compact design, with the flexibility to wall mount or install into a prefabricated floor-mounted frame. For larger buildings or those with more complex layouts, optional low height frame and header kits offer cascade ability, up to 900kW (exceptions apply) and modulation up to 30:1. Where required, the EVO S is LPG convertible out of the box with no additional kits on all models up to and including 120kW.

The EVO S has also been designed for ease of use, featuring a simple and intuitive control interface and a large backlit display, and integrated sequence control.

Backed by a five-year parts and labour warranty, and fully compliant with Building Regulations Part L, this versatile range of condensing boilers is approved for installation on multiple flue systems with all relevant components available to purchase.

 www.acv.com/gb



Mitsubishi Electric upgrades flagship ventilation system for offices, schools, hotels and more

Mitsubishi Electric launches the LGH-RVX3-E Lossnay Mechanical Ventilation with Heat Recovery (MVHR) system to provide clean and healthy air for every commercial setting.

We all spend an average of 90% of our time indoors, so ensuring the air inside buildings is fresh and clean is vital for our health. Dangerous pollutants like particulate matter and carbon monoxide are found indoors, and outdoor pollutants like nitrogen dioxide can also enter buildings from the outside. To combat their potential negative effects on health, equipping offices, schools, shops and more with the technology to support good air quality is essential.

This is why Mitsubishi Electric has upgraded its trusted flagship Lossnay ventilation range, with the new LGH-RVX3-E system designed specifically for the UK's commercial buildings. The units are designed to extract stale indoor air continuously and efficiently, and replace it with fresh filtered air from outside. With heat recovery, the system also minimises the amount of energy lost by recovering the heat from the extracted air and transferring it to the supply of fresh air.



The new system features a host of improvements to enhance performance, efficiency and versatility – all while reducing running costs. The units can now be installed vertically for the first time, to allow for use in more spaces and make quality ventilation accessible to a wider range of buildings.

Enhanced controls, with five different levels, allow for optimal efficiency, and fan speeds can also be adjusted in 5% increments to use less energy where possible and comply with Part L. The system is also designed to operate at ultra-low noise levels, to provide a comfortable environment for every building occupant, from office workers to hotel guests.

A built-in automatic summer bypass also allows the RVX3 units to bring in fresh air from outside without recovering heat during hot weather, in order to reduce the risk of offices, gyms or other commercial spaces overheating. With 100% airflow still operating during bypass mode, the same volume of air is brought in – while staying cool.

The addition of optional CO₂ sensors from Mitsubishi Electric also allows for automatic incremental fan control, and the sensors can optimise efficiency by managing the RVX3 system to react to the air quality. The sensors are directly powered by the RVX3 unit, so no additional power supply is required.

The new system also offers patented fan coating for improved air quality, longer life and easier maintenance, and comes in a range offering air volumes from 150 m³/h to 2,000 m³/h to meet the need of every project specification.

 www.les.mitsubishielectric.co.uk

Riello Introduces CONDEXA HPR Wall-Hung Modular Condensing Boiler

Riello announced the launch of the CONDEXA HPR unit, a new wall-hung modular condensing boiler, developed to allow dimensional compactness and installation flexibility for very high energy efficiency. Riello is part of Carrier Global Corporation (NYSE: CARR), the leading global provider of healthy, safe, sustainable and intelligent building and cold chain solutions.

The stand-alone or cascade (linear or back-to-back) configurability, and the high-power modulation ratio (1:8 as stand-alone; 1:32 in cascade) allow CONDEXA HPR to adapt to large variations in system heat demand, making it suitable for a wide variety of applications.

The CONDEXA HPR range consists of four models from 35 to 70 kW, all equipped with a modulating circulator enabling a variable flow rate according to the flow and return temperatures, to allow operation in maximum condensation conditions.

The new combustion modules, housed within the CONDEXA HPR, are equipped with a stainless-steel heat exchanger and premixed burners, fitted with a wire mesh combustion head and air-gas mixer, and allow a wide modulation range, silent operation and reduced pollutant emissions.

The electronic control, with its calculation speed and advanced management algorithms, allows sophisticated room temperature regulation and optimal operation. The cascade system of up to four modules, which can achieve a total output of 280 kW, is controlled by the Cascade Manager accessory device, that can regulate the ignition and power modulation of all system modules. The redundancy of the cascade's thermal modules provides uninterrupted operation of the CONDEXA HPR system, even during maintenance operations.

The wide range of optional accessories completes the offer, allowing multiple configurations of the product. These include the possibility of interfacing primary and secondary circuits with both hydraulic separator



and plate heat exchanger, electronic modules for remote control, management of additional thermal zones, production of domestic hot water, also with solar integration, hydraulic kits for cascade installation and the set of components for the management of the flue system.

www.riello.com

MHIAE helps cool energy prices with FDTC-VH series

Mitsubishi Heavy Industries Air-Conditioning Europe (MHIAE), part of the MHI Group, encourages energy-efficient and sustainable air conditioning with its "A" Design award" winner FDTC-VH series. The 4-way compact ceiling cassette has been designed to provide cooling and heating for a wide variety of commercial environments such as small to medium offices, retail shops, fitness centres, restaurants and many more applications.



The series boasts a flush and modern finish in white with panel dimension (620 x 620) mm & only 10mm panel depth, seamlessly blending into the ceiling and can fit perfectly to standard ceiling grid to suit all indoor spaces, ideal for installers looking for an energy-efficient yet sleek solution. Each unit within the range is available with two grill designs to fit most interior themes, a honeycomb or grid-type grill, resulting in a cooling and heating unit that offers clean airflow and merges into any environment.

Designed with user comfort in mind, each unit is also available with an optional Draft Prevention Panel with improved flexible flap control that prevents cold/hot drafts from being blown directly on the user.

Noise levels are also reduced for additional well-being by implementing a turbo fan within the unit, improving heat exchanger performance, DC fan motor and DC drain pump lifts to 850mm from ceiling reducing overall energy use and providing low operating costs.

An optional fresh air intake accessory allows the user to transfer fresh air directly via the indoor unit. The FDTC-VH series boasts several features which simplify installation and servicing, including an improved panel design, which allows the panel to be temporarily fixed to the unit. A transparent inspection window enables the suction port of the drain pump to be checked quickly and effortlessly for easy access to the fan motor.

MHIAE also offers five optional remote-control devices with this series, three wired and two wireless, enabling simple and convenient operation. In addition, for enhanced comfort and energy saving an optional motion sensor is available that detects human movement to reduce unnecessary use and costs and at the same time promotes energy efficiency.

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