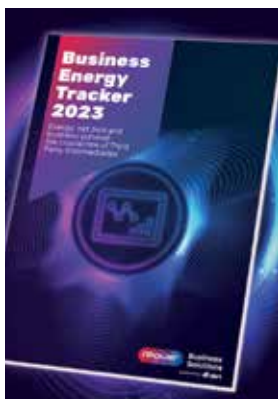


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ralph@energymanagemagazine.co.uk

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sarah@energymanagemagazine.co.uk

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SPAIN, GERMANY & ITALY REPURPOSING GAS NETWORKS CAPABLE OF CARRYING HYDROGEN

Chris Goggin reports on how European economies such as Spain, Italy and Germany are working towards phasing out fossil fuels and repurposing their domestic gas networks & distribution systems to accommodate other fuels including hydrogen.



Natural gas is still the predominant method of heating buildings and hot water provision across Europe. The UK, Spain, Germany, and Italy are economies that use substantial amounts of both natural gas and oil.

Each country has ambitious and binding decarbonisation targets and large functioning gas networks. What happens to domestic gas infrastructure once natural gas is fully phased out is a problem that each country is attempting to solve.

Italy, Germany, and the UK are the biggest natural gas markets in Europe whilst Spain uses natural gas as an integral part of its domestic energy mix. All four countries – UK, Spain, Italy, and Germany share similarities in population and building stock.

Spain has more than twenty-five million residential properties that houses a population just under fifty million. Italy maintains a population of just under sixty million and 26.2 million residential properties. UK population sixty-seven million and has a building stock of over twenty-five million. Germany holds a population of eighty-three million German and 42.5 million residential and non-residential properties.

Spain's gas transmission network is comprised of 13,361 km of pipeline and is operated by Spain's largest privatised natural gas distributor Enagas. Spain maintains significant energy security as supply is covered via a main Algeria route, providing an immediate alternative to Russian gas. Spain, however, consumes copious amounts of natural gas and relies on imports to satisfy domestic demand.

A majority of Italy's gas network is owned by Snam an independent

company. Snam operates a nationwide pipeline network of 32,000 km in length and supplies around 95% of the Italian market. Società Gasdotti Italia is the second largest transporter of natural gas in Italy, operating a length of pipeline network of around 1,300 km in length, in southern Italy.

Germany's natural gas transmission network has a total length of 511,000 km and its ownership is currently unclear. There have been multiple reports stating that major national German energy suppliers such as Uniper could become state owned. Doing so would nationalise gas supply making natural gas dispersal less problematic in times of crises.

Italian and German natural gas provision is still heavily reliant on outside exports from Russia. Although actively phasing out Russian gas imports both countries are yet to stop importing Russian gas due to national requirement.

Without natural gas all mentioned countries will possess thousands of kilometres of unemployed subterranean pipelines. What will each country do with these many miles of unused infrastructure? There is some evidence suggesting that big business and EU states are interested in purchasing gas infrastructure in anticipation of future widespread hydrogen usage.

Italy's major gas supplier Snam has recently acquired a 49.9% stake in gas pipeline infrastructure. Snam paid Eni €385 million to connections in pipelines that reach into Algeria and the Tunisian coast all connecting natural gas supplies to Italy.

These connections will give Snam access to a region that could become a future hub of solar produced green hydrogen production. Snam appear to be positioning themselves in favour of future hydrogen dispersal between Europe, Northern Africa, and the Mediterranean.

The German federal government is in discussions with the EU regarding the purchasing viability of purchasing German gas network operator Wiga who

are valued at around €3 billion to €4 billion. Wiga are already 50% owned by a state-owned organization SEFE (Securing Energy for Europe) and operate a pipeline network of over 4,000 km (2,485 miles).

Aims within the updated German National Hydrogen Strategy could be achieved through repurposing all current Wiga pipework to transport hydrogen. Doing so will enable the establishment of a national hydrogen network capable of dispersing hydrogen energy for commercial or domestic usage.

Main Spanish gas grid operator Enagas have also purchased a stretch of gas infrastructure from Spanish gas company Reganosa. Enagas acquired 130 km of gas pipeline for around €54 million. Enagás will use this transmission infrastructure which shares a connection to Portugal to fully integrate renewable hydrogen production and distribution by 2030 within the region.

As the UK operates 7,630 km of pipework that acts as a supplier of heat and energy into 25 million UK properties, UK energy policy is yet to outline how, or if, current natural gas infrastructure will be used in future power distribution. Continental economies have plans for hydrogen distribution using adapted gas infrastructure whilst UK policy is still unclear.

Although each country will have to find decarbonising solutions applicable to their own energy requirements, geographical positioning and production capabilities, UK decision makers may have to include hydrogen as an energy resource due to the amount of work that has been completed by major EU economies.

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Nottingham Trent University launches pioneering Net Zero Carbon Supplier Tool

Nottingham Trent University (NTU) has launched a pioneering tool to enable higher education institutions and their suppliers to meet Net Zero Carbon targets – with over 30 universities already incorporating it into their supply chain processes.

Developed by colleagues in sustainability and procurement (at NTU), and in collaboration with NETpositive Futures, the Net Zero Carbon Supplier Tool not only provides an institution with their supply chain carbon emissions data but also proactively targets and influences its suppliers to reduce their own carbon emissions. Following a successful trial with six universities, the Tool has now launched to sector with over 30 universities already on board as part of a one-year action research project.

The Net Zero Carbon Supplier Tool helps universities to calculate the carbon footprint of their supply chain. By collecting supplier-specific carbon footprint data, universities can report on the sustainability impact of the goods and services they purchase, as well as track reductions in emissions

when sustainability interventions are implemented. Aligning with sector-specific carbon footprint calculation methodology, the Tool helps universities to understand how suppliers are responding to the shared challenge of climate change and support them in taking actions to progress net zero carbon in their own businesses.

Suppliers are each provided with an estimated carbon footprint and a bespoke carbon reduction plan free of charge. Regardless of how many universities they do business with, only one account is needed as the data is shared. By completing some simple steps, suppliers who already know their carbon footprint and have committed to take action, can share this with multiple universities via the Tool.

Laura Mayhew-Manchón, Head of Sustainability at Nottingham Trent University said: "NTU has a commitment to not only meet its own Net Zero Carbon target by 2040, but also to build sustainable supply chains across the higher education sector. Supply chain emissions are the largest single source of



emissions within our own footprint – five times greater than our emissions from energy use, which is common in many organisations. Our Net Zero Carbon Supplier Tool goes some way to help us and the sector to reduce our Scope 3 emissions in a targeted and informed way

"The Tool has two main benefits to the universities who use it – a more robust understanding of supply chain emissions which includes being able to see the positive impacts of sustainability interventions as they happen; and providing a conduit to engage and support suppliers from across the supply chain on their own sustainability journeys."

Universities that are interested in signing up to the Tool will be able to do so once the year-long project has been completed at the end of 2024.

For more information, contact sustainability@ntu.ac.uk

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THE MAGIC WAND: HOW ENERGY EXPERTS WOULD SOLVE NET ZERO



Victoria Mustard,
Decarbonisation
Strategy Lead
at Xoserve

In 2023, I asked guests on Xoserve's podcast, Decarb Discussions, to participate in a little thought experiment about the future of energy. Using a theoretical "magic wand" that would eliminate all constraints on energy systems, they had one wish to bring about the energy system of the future. As we welcome the new year and make our resolutions for 2024, let's look at what energy experts from the commercial, academic, and non-profit sectors wished for.

DEVELOPING A HYDROGEN ECONOMY

One widely discussed solution is hydrogen. As part of Britain's net zero strategy, it could help decarbonise gas, provide seasonal storage, and keep hard-to-abate sectors moving forward. To boost the hydrogen economy and bring the UK to the forefront of decarbonisation, Charles Perez-Storey, Principal Engineer at Progressive Energy wished for "blending to be sanctioned, for the Gas Safety Management Regulations change to happen, and by 2025 let's have all the barriers removed and get ahead of the game again.

"The UK has fallen behind America and Europe in decarbonisation, so achieving those three things will be fantastic."

Part of Charles' wish did become a reality, with the Government announcing it would support the blending, up to 20%, of hydrogen in the gas networks following industry trials and a safety assessment. The power of the podcast magic wand!



Alex Brightman, Hydrogen Home Coordinator at Northern Gas Network also believes hydrogen will play a critical role in Britain's future energy mix and asked to "get some decent green hydrogen production. It'll benefit not just those who are on the gas network but everybody."

Unfortunately, Alex's wish was not realised before the Government announced the hydrogen heating village trial in Redcar, expected to start next year, would not move forward as the main source of green hydrogen supply would not be available.

A BOOST FOR NET ZERO FUELS

As well as hydrogen, policymakers and the energy industry, are exploring other solutions for decarbonising gas, including biomethane. John Baldwin, the Managing Director of CNG Services, believes that biogas is a valuable energy solution, but is aware that barriers created by inefficient planning processes hinder the implementation of renewable gas projects. To address this issue, John requested that "the government should chat with the Environmental Agency and come up with fit-for-purpose rules and processes. We don't want to take shortcuts, but we just don't want to spend years over quite trivial things – that's not the way to decarbonise."

Thomas Baxter, Senior Lecturer at the University of Aberdeen thinks nuclear fusion could offer a solution to meeting energy consumption demands. Providing a safer reaction process to nuclear fission used in power plants that doesn't create long-lasting radioactive waste. He said about safe nuclear fusion, "you

could get limitless energy" but expressed frustrations with the fact that nuclear fusion continues to be a long time coming. "It's 20 years away, and it's always been 20 years away" and so if he could, he would bring about developments in this area – "that would be pretty neat."

The final guest for 2023 on Decarb Discussions was Matthew Cole, the Head of the Fuel Bank Foundation. When asked what he would resolve, he said: "I'd make properties more energy efficient and just make sure that we use the energy we need to, then people's bills would reduce straight away.

"Even if you're struggling to pay, then your house is suddenly warmer because it's more energy efficient. That would be my big wish, but it has to be a really big wand because it's an expensive thing to do."

This hypothetical question – what would you do if you had a magic wand? – is a light-hearted end to the podcast's in-depth look at the challenges and potential solutions around decarbonising gas, as well as Britain's journey to net zero from all perspectives of the energy industry. It offers a fascinating insight into what experts in their field envision for our energy future.

Only by sharing these ideals can we hope to develop a plan to achieve them. There is not one wish or one fuel that can solve net zero but with collaboration, investment and policy decisions, we may be able to achieve some of these aspirations. Hopefully, they aren't inconceivable and may be an integral part of achieving the UK's emission targets. <https://www.xoserve.com/>

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WHY ENERGY CONSULTANTS WILL BE CRUCIAL TO BUSINESSES SURVIVAL AND NET ZERO SUCCESS

Anthony Ainsworth, Chief Operating Officer, npower Business Solutions

Over the past two years, businesses have had to deal with a hugely volatile energy market. High prices have seen many organisations reprioritising where and how they invest their capital, with sustainability measures falling down the list for many.

As a result, the role of Third Party Intermediaries (TPIs) has become increasingly important, particularly when it comes to advising organisations on energy purchasing strategies and the most appropriate measures to invest in that deliver maximum returns.

That is why we recently launched a new version of our Business Energy Tracker report, *Energy, net zero and business survival: the crucial role of Third Party Intermediaries*. Alongside the 100 businesses that participated in our original report, the updated edition now includes the views of more than 50 Third Party Intermediaries (TPIs).

We work closely with TPIs across the country, and believe that, to get a full understanding of the perspective of business energy users, their views need to be taken into account.

Therefore, this updated edition of the Business Energy Tracker represents a collective voice of both TPIs and businesses on today's key energy issues.

So, what did they tell us?

ENERGY WAS THE BIGGEST RISK THEIR CUSTOMERS FACED IN 2023

Global wholesale energy volatility, the cost-of-living crisis, rising inflation and political upheaval have all had an impact on business confidence.

As a result, the report revealed that more than half (55%) of TPIs say energy was the biggest risk their business customers had faced, with 84% stating that energy is now firmly a board level concern.

In addition, the TPIs we interviewed highlighted the important difference between commodity and non-commodity

costs, predicting that the largest increases will come from non-commodity charges. This is because the UK will need to invest in infrastructure, such as upgrading the transmission network, to help the UK move towards net zero.

LONGER TERM GOVERNMENT SUPPORT IS NEEDED

TPIs also believe that more can be done to support organisations through challenging economic conditions. Almost three quarters (71%) felt that the Energy Bills Discount Scheme (EBDS) – which was introduced on 1 April 2023 as a replacement for the Energy Bill Relief Scheme (EBRS) and is due to end on 31 March 2024 – didn't go far enough to support businesses.

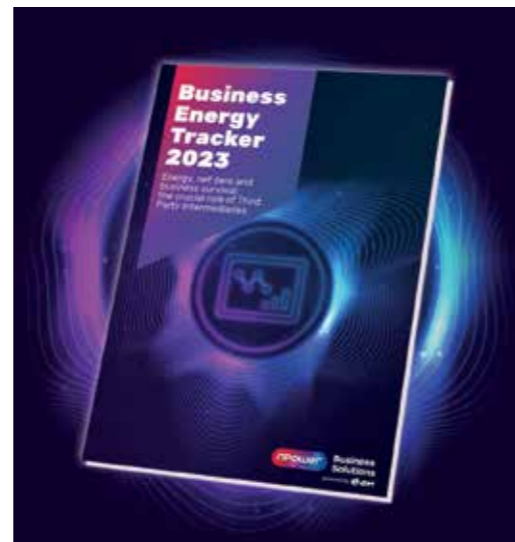
As a result, they told us that a long-term strategy to help businesses reduce overall energy demand needs to be a top government priority.

ORGANISATIONS BACK NET ZERO, BUT THE COST OF DELIVERY IS A CONCERN

Linked to this is how TPIs believe their customers are prioritising net zero. The good news is that many said their customers were being proactive, by investing in energy efficiency, using energy management tools, switching to renewable energy and installing on-site generation. In fact, energy efficiency was seen as the top way businesses could manage energy risk.

However, concerns around the cost of funding and delivering the net zero transition are high, with 87% of TPIs saying their customers are very or a little concerned about the potential economic impact on their operation. In fact, one told us that, "Although they (our customers) want to be doing the right thing and go 'green', some of them just can't afford it at the moment."

So, while many TPIs and the businesses they work with understand



the commercial, environmental and reputational benefits net zero can bring, it is clear that responding to the economic challenges of the here and now has become the primary focus.

A PROACTIVE APPROACH CAN PAY

What this latest version of the Business Energy Tracker has told us is that future government support needs to be pro-business and focus on both supply and demand. While new policies such as the Energy Act provide a more certain pathway for energy security, a focused and long-term approach is needed to enable businesses to reduce energy demand and improve their energy efficiency.

With a General Election likely to take place in 2024, there is a real opportunity for political parties to introduce pro-business policy that supports the important contribution organisations will make to both energy security and net zero.

That said, TPIs, alongside energy suppliers, have an important role to play to help their customers understand the best measures they can invest in right now, to lower energy demand and reduce risk. An informed and proactive approach to a business's energy strategy can pay dividends in terms of reduced costs and carbon emissions. www.npowerbusinesssolutions.com

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2024 ENERGY LANDSCAPE: FIVE THINGS TO LOOK OUT FOR

NEW ADDITIONS TO THE ENERGY SAVINGS OPPORTUNITY SCHEME (ESOS)

The Energy Savings Opportunity Scheme, a pillar in the UK's commitment to energy efficiency, is continuing to evolve. With the publication of the ESOS Phase 3 consultation response, new guidance and updated legislation, several additions have been made to the scheme. In 2024, businesses will have to comply with the changes in compliance requirements with a sharper focus on identifying and implementing energy saving measures.

If you fall into scope for the scheme one of the new, additional, mandatory requirements calls for you to submit an annual ESOS Action Plan, the first one being due by 5 December 2024. Additionally, organisations will now be required to report any efficiency savings made, this will be included in the Action Plan which will now be made publicly available. This means you may need to appoint a consultant to complete both your ESOS compliance and assist you with the development of your energy saving Action Plan this year.

If you are familiar with the Streamlined Energy and Carbon Reporting (SECR) framework, there are similarities although these new ESOS reports will be much more detailed.

It is also worth noting that despite the delay to the Phase 3 deadline, the compliance period for Phase 4 has officially started, so you will need to start thinking about your building energy audits and data capture for this next Phase too.

Staying abreast of ESOS developments has never been more crucial for organisations aiming to reduce their energy consumption and enhance overall sustainability. These new elements, subject to public scrutiny, make it impossible for organisations to put ESOS to the back burner until the 4-year phase deadline comes back around in 2027. ESOS will now need to be very much a part of an organisation's operations with energy efficiency progress being reported every single year.

HOW WILL COP28 IMPACT 2024?

At the end of last year UN climate summit, COP28, took centre stage. Providing an international platform for discussions around global climate policies, emission reduction

As we step into 2024, the UK energy landscape will continue to undergo changes as businesses strive to be more sustainable and energy efficient. TEAM's Head of Consultancy, Timothy Holman, explores five crucial actions to keep an eye on throughout the year.

targets and collaborative initiatives, the overriding focus from many governments, campaigners and lobbyists was on whether countries could agree to phase out fossil fuels. However, after days of negotiations the final deal called on countries to move away, rather than phase out, the use of fossil fuels.

With recent licences for North Sea oil and gas extraction, a process that allows us to mitigate the need to "import from abroad with higher embedded emissions than producing at home", according to the Minister for Energy Security and Net Zero, Graham Stuart, the current response to the COP28 narrative may question whether we, as a nation, are actually on track to meet the 2050 target.

There were also agreements where commitments have been set to double energy-efficiency improvement rates, triple renewables by 2030, as well as to establish new standards to unlock global trade in hydrogen.

It will be interesting to see what progresses over the coming year and whether these different messages have an impact on how businesses contribute to the UK's net zero target.

RISE IN ENERGY COSTS

Volatility around energy prices is set to continue through 2024, we already know that the domestic energy price cap has been raised 5% for this first quarter, significantly impacting energy expenditure for consumers. The impact on businesses will also be felt when renewing contracts as there is no forecasted big reduction in prices in the foreseeable future. High energy prices are here to stay and there will be no Government subsidies to support business this year as in 2022 and 2023, after the final support from Energy Bills Discount Scheme ends completely after March.

Proactive management of energy consumption will be a key focus for organisations looking to maintain competitiveness and financial resilience. Keep a close eye on energy data and establish good energy efficiency practices, particularly in these winter months, to offset higher energy costs and mitigate against any further insecurity.

HOW WILL CARBON REDUCTION STRATEGIES AND GHG REPORTING CHANGE?

ESOS is not the only compliance to be evolving.

Currently, large organisations are required to disclose their Scope 1 and 2 emissions under the Streamlined Energy and Carbon Reporting (SECR) framework, but Scope 3 reporting is largely voluntary.

Following a consultation that closed at the end of December, which sought views on costs, benefits and practicalities of increasing Scope 3 greenhouse gas emissions reporting in the UK, we are waiting to see if this will affect how organisations manage SECR.

However, with an increasing emphasis on decarbonisation, it is important for businesses to reevaluate and strengthen their carbon reduction strategies. It is becoming harder to be part of another business' supply chain due to tighter regulations around selling and buying to certain types of organisations and sectors. The NHS, for example, come April, will be extending their Carbon Reduction Plan (CRP) requirements to cover all new procurements, requiring all suppliers to publish their own carbon plans for Scope 1 and 2 emissions, and a subset of Scope 3 emissions before they can sell into the NHS. Businesses with a carbon reduction plan and a green procurement policy will not only have more freedom in the value chain but they will be ahead of the game when further regulations come into play.

IT'S AN ELECTION YEAR

The next general election must take place before the end of January 2025, so the expectation is that it will be held within the next 12 months. Existing uncertainty and lack of clarity around energy legislation and regulations will prolong frustration amongst business energy professionals. The Prime Minister, Rishi Sunak, promised to "set out the next stage in our ambitious environmental agenda" at COP28 last year, although this seems to have got lost in the discussions.

So, as we step closer to the UK's mandatory target of becoming net zero by 2050, focus on the knowledge and information that is available to you within your business strategy and operational data instead of waiting for the uncertainty to pass.

In 2024, energy management is not merely a business practice; it is a crucial driver of sustainability and resilience in the face of global challenges and potential change.

Staying informed about legislation, mitigating energy costs through energy efficiency, and building carbon reduction strategies will empower organisations to navigate the evolving energy landscape successfully. A commitment to responsible energy management will not only contribute to reducing environmental pollution but also position your businesses long-term success in an increasingly sustainable world. www.teamenergy.com

THE UK'S LARGEST EXHIBITION AND CONFERENCE TACKLING DECENTRALISED AND DISTRIBUTED ENERGY SOLUTIONS IS BACK

The Distributed Energy Show, taking place on 13th and 14th of March 2024 at the Telford International Centre, is a free-to-attend exhibition and conference bringing together the entire supply chain on diversified and distributed energy resources.



Innovative technological advances within the energy industry are allowing for a mass migration towards decentralised energy, enabling companies to move towards more flexible, sustainable, reliable, and efficient practices. With onsite and co-generation techniques, renewables, and energy storage on the rise, new approaches are paving the way to a brighter and more sustainable future for consumers and network operators alike.

The Distributed Energy Show features the UK's widest array of technologies for onsite and localised heat and power generation alongside the infrastructure, software, and components necessary to connect to the network and implement a low-cost, low-carbon strategy.

Those attending The Distributed Energy Show for free can expect to see a comprehensive array of the latest emerging technologies and systems that will enable the generation, storage, management, and distribution of power and heat. With a key focus on renewable and sustainable sources, technologies on display are set to include solar systems, gas and wind turbines, smart energy systems and platforms, flexible energy solutions, power plant systems, fuel cells, and many more instrumental innovations within the sector. In addition to the attendance of energy end-users, visitors include energy suppliers, network operators, and transmission and distribution companies sourcing technologies and expertise to increase their own efficiencies and sustainability.

Caroline Bragg, Head of Policy at The Association for Decentralised Energy: "This pivotal event for the distributed energy sector, including a large-scale exhibition and industry-

leading conference, will bring the whole supply chain together to showcase the technologies and systems to enable organisations to generate, store, manage, and distribute their own power and heat."

The free to attend, three track conference programme with exciting panel discussions, Individual presentations, fire side chats, and interactive sessions aims to further your knowledge of decentralised energy, as well as highlighting the innovations emerging from this growing industry. The Keynote conference session will delve into crucial and ever-present matters that will define the targets and steps needed to push towards a more sustainable and reliable energy economy. From smart grids to hydrogen, heat pumps to Net Zero targets, EV charging to local energy systems, the conference sessions will explore a huge array of technologies, techniques, and systems to improve your energy management, efficiency, and storage.

We are delighted to welcome a wealth of leading expert speakers from across the industry including Innovate UK, UK Power Networks, Northern Powergrid, Octopus Energy, Veolia, Alfa Laval, Bosch, Vattenfall and many more to be announced, who will be sharing their insights into their pioneering innovations and ideas. The conference panels will discuss topics including AI & Digitalisation, Regulation, Industrial Decarbonisation, Energy Flexibility, Heat Pumps, Hydrogen & Fuel Cells, Energy Innovations, Net Zero Targets, CHP, Heat Networks, Energy Price Volatility, EV Charging/V2G Infrastructure, and Local Energy Systems.

As well as receiving a record number of visitors through the door, the show welcomes industry-leading companies

to exhibit, showcasing their latest products and developments. We are delighted to be joined by organisations including Bosch, Clarke Energy, Conrad Energy, Ecotricity, Midlands Power Networks, National Gas Metering, Piclo, Powell UK Ltd, Schaltbau Machine Electrics Vattenfall UK, Wilson Power Solutions Limited and many more.

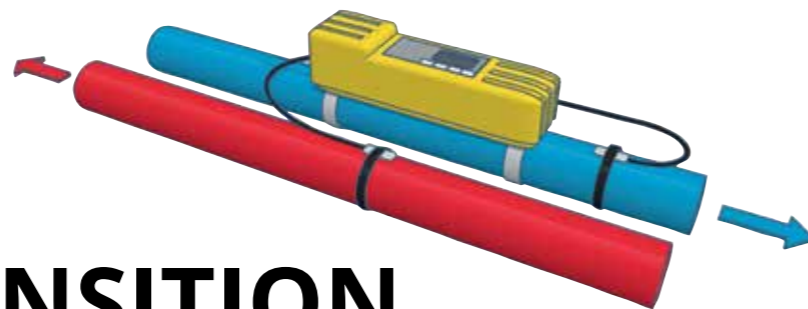
Following their successful event in 2023, Powerstar, who will be exhibiting at the 2024 show says: "The importance being placed on decarbonisation by businesses, governments and the general public alike is driving huge amounts of innovation within the sector, and an event like this is a valuable opportunity to better keep pace with new potential partners and new technologies that synergise well with our own."

Thousands will attend the show for two days of networking, lead generation and education at the Telford International Centre. Matt Pennington, Event Director at Event Partners Ltd, the host of the event, says: "We are absolutely delighted with the industry-wide support we have for The Distributed Energy Show, which is coming back in 2024 bigger than ever. Major global organisations, SME's and thought leaders are helping to shape the event, resulting in the exhibition doubling in size and an increased number of visitors attending the event."

The Distributed Energy show looks forward to welcoming all attendees, exhibitors, speakers, and VIP guests through the doors on 13th and 14th March 2024 for what is set to be a record-breaking show.

To register for your free ticket and to stay up to date on all the latest news about the show please visit: <https://distributedenergyshow.com/> X: @DistribEnergy LinkedIn: @the-distributed-energy-show Facebook: @TheDistributedEnergyShow

HOT WATER METERING FOR GAS TO ELECTRIC TRANSITION



The most consistent issue we see in commercial hot water systems is oversizing, whether through lack of understanding of application design or concerns over providing suitable back up to ensure system continuity. The result of oversizing is however always the same, unnecessary capital costs for system supply and installation, and ongoing excess operational costs associated with higher energy demands and therefore greater carbon emissions.

As organisations seek to adopt greener building operations, replacing old gas-fired systems with like-for-like electric is another guaranteed way to gain an oversized system. It can also lead to undersizing if storage is not large enough to account for low, slow heating associated with heat pump based electric systems. Getting that balance right is key as per kW price of electricity remains much higher than that of gas. More importantly, if the new electric system is oversized the required amperage could exceed a building's available electrical supply. Bringing in new supply means excavating, possibly as far as the substation. This can best be avoided by understanding your actual hot water demands and designing the replacement so that it is optimised to meet the specific needs of the building, this is why accurate data is so valuable.

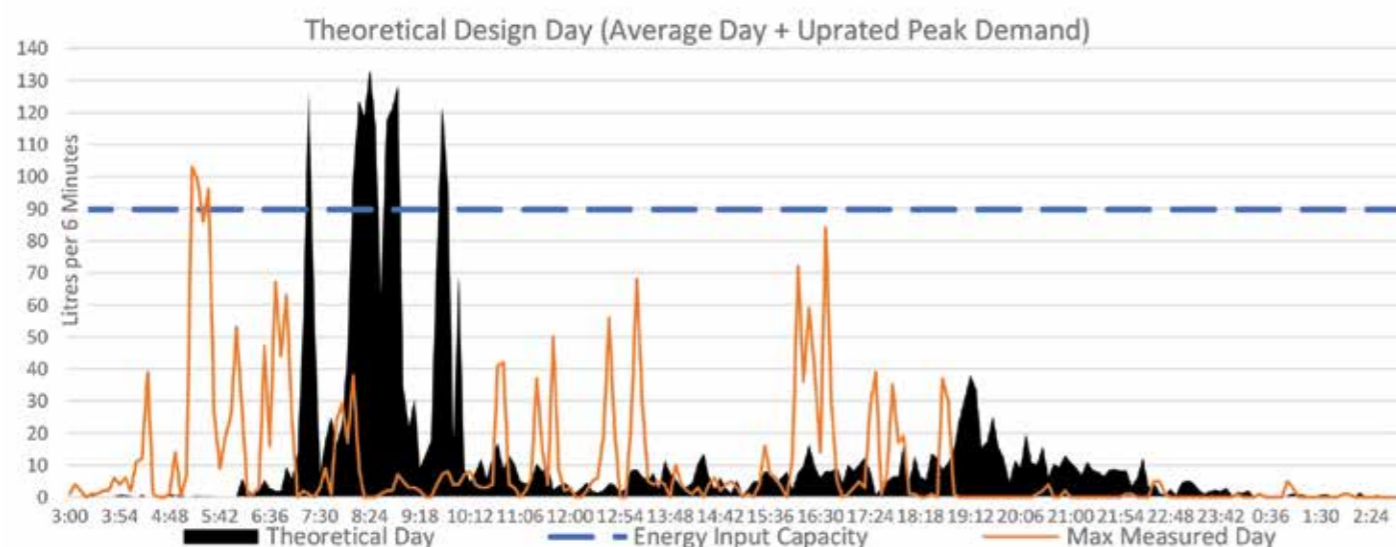
To support commercial and public sector organisations intending to replace legacy gas systems with more sustainable electric applications Advenco has created a Live Metering service for domestic hot water (DHW) systems. Advenco Live Metering is a simple to install, non-invasive onsite process that generates consistent 24/7 data on existing hot water systems to accurately understand actual usage, including critical peak demands. Advenco's specialist engineers will visit the site, fit the meters and monitor for an agreed period, typically a month before returning to remove them. The data will then be processed, and a report generated incorporating design recommendations for a replacement system that meets the exact needs of the building.

Data collected with Advenco's Live Metering Service has already enabled organisations to avoid excess capital costs whilst reducing emissions in line with decarbonisation strategies. It has demonstrated, for example, that a gas-fired hot water systems operating at 60 kW can be directly replaced by a system based around a smaller 12 kW ARDENT electric boiler and a cylinder optimised to meet storage requirements reducing carbon emissions by 2800 kg per annum. The demands of a system operating two 50kW gas-fired water heaters could be replaced

with a 24kW electric water heater and heat pump supplying the preheat, reducing emissions by 5100 kg per annum. With both replacement designs rated at 120% they provide more than enough storage capacity to meet unexpected peak demands and carbon emissions are expected to continue to fall as grid electricity supplies continue to decarbonise in the future.

By optimising the use of air source heat pumps, electric boiler and hot water cylinders, not only are capital investments reduced, but so too is the system size and complexity, making for easier installation and potential to recover valuable plantroom space.

Confident that accurate modelling would prove its immediate value, Advenco factored a minimal cost for engineering assessment, data collation and interpretation. With an agreement that 50% of this charge would be waived should the project proceed with the recommended system from Advenco. This has proven to be cost-effective with thousands of pounds saved on capital outlay on the system alone, offsetting any initial assessment costs. Critically, where re-cabling from the local grid has been avoided, savings of more than £250,000 were seen. Preventing such soaring project costs is helping ensure important decarbonisation projects are not stalled or cancelled outright. <https://advenco.co/>



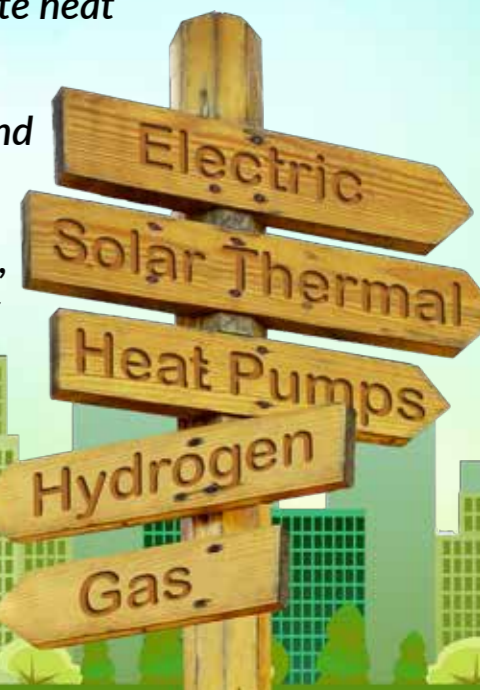
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CHANGING PERCEPTIONS AROUND SMART BUILDINGS

Much of Britain's housing is over half a century old and was obviously not built with home and building automation technologies in mind. Graham Martin, Chairman and CEO of the EnOcean Alliance, explains how – alongside new builds – retrofits can become a new champion of energy-efficient and cost-effective building design.

In Europe, buildings are responsible for around 40% of total energy consumption as well as 36% of greenhouse gas emissions. This makes the building industry Europe's single largest energy consumer, and one of the largest carbon dioxide emitters¹. Clearly, the building sector has a steep hill to climb in order to improve sustainability within the timeframes set out by the Paris Agreement.

By that same token, buildings also offer vast – and largely untapped – potential to save energy whilst leveraging new smart technologies. In doing so, the quality of life for the people who live and work within these buildings can be dramatically improved. In recent years, many of the most high-profile smart building projects have been in commercial new builds in urban areas. Whilst these projects should rightly be celebrated, they represent a mere fraction of Britain's stock of buildings. Most properties were built before 1980² and are now ripe for modernisation – needless to say, they were not designed to accommodate a 21st-century way of life.

The needs of the household have clearly evolved: indeed, some features of the modern home could be described as "smart" (e.g. smart electricity and water meters, smart doorbells and voice assistants like Alexa and Google

¹ https://commission.europa.eu/news/focus-energy-efficiency-buildings-2020-02-17_en

² <https://www.statista.com/statistics/292252/age-of-housing-dwellings-in-england-uk-by-tenure/>

Assistant). Even so, many households are reluctant to embrace smart technology on anything more than a piecemeal basis. There are a number of reasons for this, but one of the major barriers to a widespread rollout is the perception that smart technologies are expensive, complicated or not particularly useful. For now, the fully integrated smart home remains largely the preserve of the very rich, or the very tech-savvy.

However, recent developments have made smart functionality far more accessible, for new builds and older buildings alike. Crucially, technological innovations have also made these upgrades far more affordable.

To accelerate the transition towards smarter buildings, two things need to happen. One is that Governments need to legislate in order to expedite the issue. From an environmental perspective, the case for doing so is unquestionable. Buildings offer vast potential to make a significant difference on the journey towards a decarbonised society. Indeed, even small improvements in the energy efficiency of buildings can have an enormous impact when scaled up across wider populations. Therefore, more needs to be done to raise and enforce the minimum standards, which will in turn drive innovation across the sector and bring costs down for end users. Governments are already doing this by encouraging energy-efficient



retrofits as well as higher standards for all new builds. However, against the backdrop of the wider drive towards net zero, rapid progress is needed to meet climate objectives.

The second thing that needs to happen is on the vendor side. Technology providers must work together more closely. The EnOcean Alliance seeks to enable and promote interoperable, maintenance-free ecosystems based on the wireless EnOcean radio standard (ISO/IEC 14543-3-10/11). Keeping these ecosystems open is vital for encouraging rapid growth in the adoption of smart technologies. Moreover, it also makes these systems essentially future-proof, permitting easy upgrades as new solutions enter the market, whilst eliminating the risk of being locked into proprietary solutions.

The "Sonnenblumenfeld" project in Germany is an example of what can be achieved when you combine innovation, community, and political will. The residential complex of 96 energy-optimised apartments uses the "Zuhause-Plattform" smart building system featuring EnOcean self-powered wireless technology.



As well as offering considerably more safety, security and comfort for the building's residents, energy consumption can also be significantly reduced through building automation.

This residential complex, located in Düsseldorf-Lichtenbroich, consists of a U-shaped main building featuring 78 apartments and a roof garden plus a second unit with 18 two-room apartments. Many apartments have been designed specifically to cater for elderly residents, which necessitated the prioritisation of practicality and ease of use in any smart functionality.

Useful smart functions such as climate control, light control, shading control, access control, intercom system, smoke and leakage alarms, administrator and facility management contact, energy consumption data and many more features can be intuitively governed via a simple central display and control unit within the apartment.

The system also provides benefits for property owners and operators, with features such as automatic meter readings, and automatic alerts in the event of, for example, a broken door or window pane. The automation of many of the climate control functions also has the potential to vastly improve the energy performance of the building. As a result of the savings, the apartments have comparatively lower rents compared to average apartments in the same area.

EnOcean technology was chosen for the sensor systems. The sensors and

control units use energy harvesting to generate power from the environment: movement, sunlight, temperature variations and magnetic fields (or a combination of these) supply enough energy to power a sensor, operate a switch and transmit radio signals. The self-powered wireless devices are completely maintenance-free and require neither batteries nor mains power. They can be installed on any surface – even on glass – in a matter of minutes, without the need for wiring and installation work. No mess, no disruption, and virtually no installation costs. This unique combination of advantages is especially important when modernising older properties.

In the Sonnenblumenfeld context, the Zuhause Plattform system can receive EnOcean signals as well as wireless M-Bus signals from the water, electricity and heating counters within the apartment in order to enable intelligent consumption analysis. The administrator can access mid-month and end-of-month consumption data as required.

The success of this project can in part be attributed to commitment from the German government to promoting smart and sustainable building technologies. For example, it has recently implemented the Building Energy Act, which was developed in response to the EU's Energy Performance of Buildings Directive (EPBD), and specifically its revisions in 2018 and 2023. The directive has the ultimate goal of making the building stock



in the EU close to carbon neutral by 2050.

Germany's Building Energy Act means that from 2024 all new non-residential builds must have smart automation, while other buildings must be retrofitted with smart automation over the next 20 years, with the first milestones to be reached in 2024 and 2030. All new builds (residential or non-residential) must follow strict energy and sustainability laws, with new fossil-based fuel heating being effectively banned in the future. All EU Member States are committed to adopt the EPBD, whilst the UK is expected to announce similar legislation in the coming years.

Projects like the Sonnenblumenfeld complex show that "smart" doesn't necessarily mean "complex". It can be simple, affordable, and efficient. Building automation has been proven to deliver significant improvements in security, safety and comfort with greatly reduced energy consumption. Crucially, with technologies like EnOcean providing the building blocks for innovation, smart automation can be implemented with ease and at a relatively low cost within almost any building, old or new. <https://www.enocean-alliance.org/>

LIGHTING: A SMART APPROACH TO ENERGY USE

The installation of a smart lighting system has the ability to deliver huge energy savings in buildings of all uses and sizes. In this article we speak with Chris Anderson, Technical Manager at Ansell Lighting who highlights the many benefits of the technology, exploring its ability to revolutionise energy use throughout the built environment.

Accounting for almost 40% of all energy used in commercial buildings in the UK, lighting is a significant source of energy consumption and can have a huge impact on organisational sustainability and operating costs.

Given its considerable effects, efforts to enhance lighting installations with the latest, efficient technologies are paramount in today's world, if energy use is to be optimised and buildings efficiently run.

Alongside the use of LED's, which use 80% less energy than traditional bulbs alone, when it comes to the pursuit of more efficient and sustainable lighting solutions, smart lighting is a must. Harnessing the power of automation, connectivity, and intelligent control, it has the potential to reduce lighting energy use by up to two thirds, providing energy-efficient, sustainable, and adaptive illumination at the touch of a button.

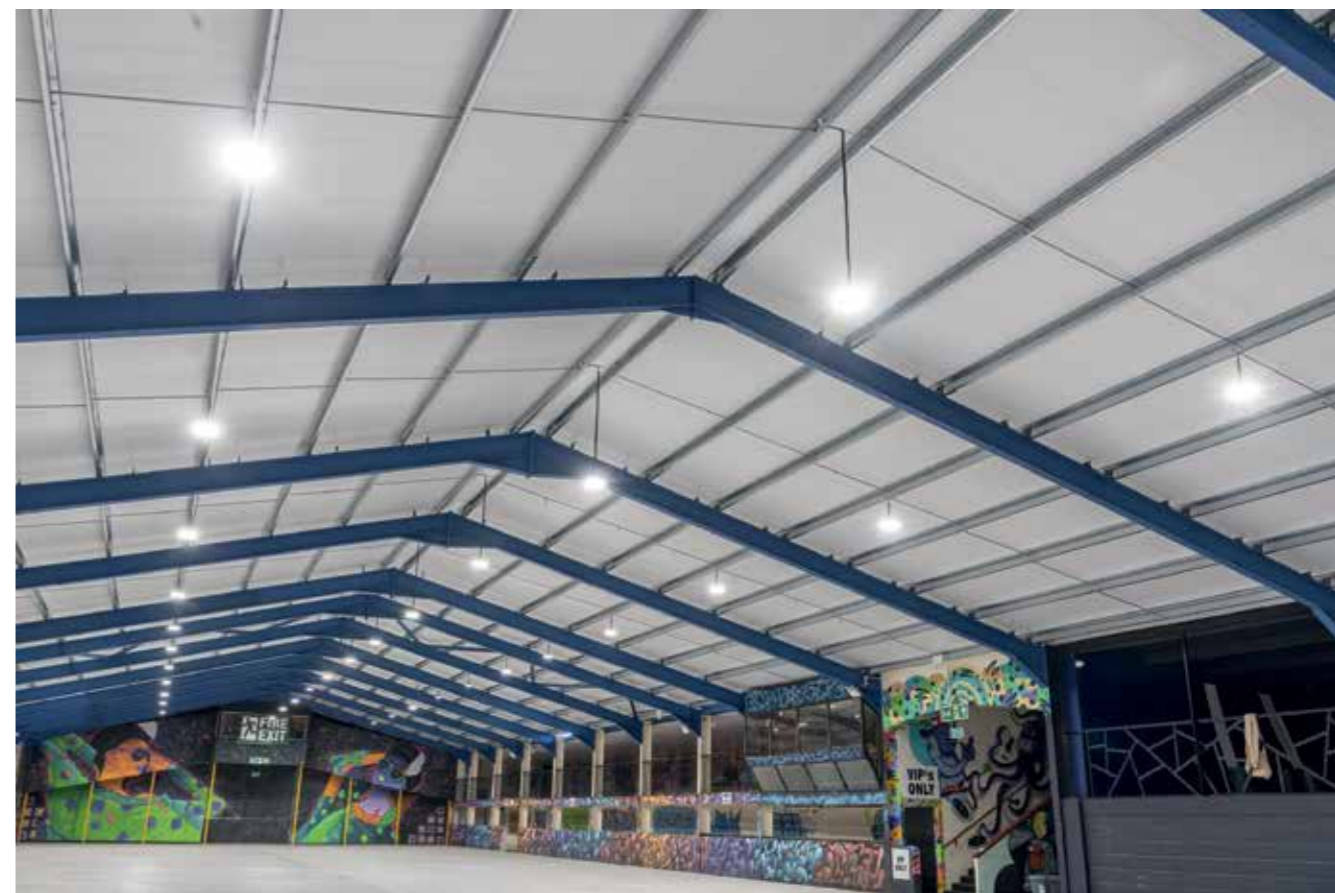
At the core of its offering is the fact that smart lighting enables every single



detail of lighting, both indoors and out, to be programmed and automated, ensuring that energy is used only where and when it is needed. From the timings of operation to the colour, brightness, intensity, and combinations of lamps in use, smart technology allows organisations to programme and control the output of every individual light fitting in their building down to the most minute detail, meaning that energy use is controlled to this exact level too.

Its agility and controllability mean that smart lighting can be used to illuminate any type of space from offices

and classrooms, to storage areas, car parks and outdoor recreational spaces. It is particularly effective where lighting requirements change regularly and in buildings that are being used sporadically. Here, fittings with motion or presence/absence detection sensors can be seamlessly integrated into smart lighting systems, enhancing functionality further in areas where lighting needs are more responsive. Such technology eliminates any reliance on human intervention, making issues such as unnecessarily leaving lighting switched on, a thing of the past.



Smart lighting systems can also offer real health and wellness benefits to staff and other building users. Light is one of the biggest influences on circadian rhythm, which controls the natural 24-hour cycle of sleep, wake, hunger, alertness, hormone release and body temperature experienced by humans. By setting 'scenes' to mimic the pattern of natural lighting indoors, it can be used to enhance circadian rhythm – our body's natural internal clock – resulting in improved focus and productivity during the day and fewer sleep disturbances at night.

Despite it being an advanced technology, another major benefit of smart lighting is that it is incredibly easy to fit and install, causing minimal disruption to ongoing operations. Operating wirelessly via Bluetooth and Wi-Fi, systems are controlled and hosted on the cloud, so there is no hub or wiring required and most units are simply installed like a lamp or switch. These user-friendly interfaces and intuitive installation processes ensure that businesses can seamlessly



transition to smart lighting without significant downtime, making it an ideal option for a wide range of settings.

Smart lighting systems are also incredibly easy to use and operate and are controlled via remote control, app, voice or by using an ecosystem such as Hey Google or Amazon Alexa. They also provide real benefits when it comes to measuring and monitoring energy use. Controls such as dashboard monitors provide a visual display of a building's lighting system in real time, supporting organisations to monitor usage and identify opportunities to reduce unnecessary wastage.

They can also be used to carry out maintenance testing. Instigating tests automatically and wirelessly, they can highlight remotely whether an individual luminaire or driver is operating outside of expected operational parameters.

When it comes to energy optimisation in the lighting arena, smart lighting is an exceptional technology and its benefits clear to see. Offering substantial consumption and cost reductions, it is an essential choice for organisations seeking to improve sustainability, reduce environmental impact and maximize energy efficiency. www.ansell-lighting.com

FIVE THINGS TO CONSIDER WHEN PURCHASING A LOAD BANK – ENSURE YOUR SET-UP IS EFFECTIVE AND TAILORED TO YOUR APPLICATION



Investing in a load bank is a decision any organisation relying on backup power systems needs to make. Load banks play a crucial role in testing and maintaining the performance of generators, uninterruptible power supplies (UPS) and other power sources. However, there are several important factors to consider before making the purchase. Here, Andrew Keith, director of load bank manufacturer Power Prove, outlines his top five considerations for prospective buyers.

1. LOAD BANK CAPACITY

The first step in choosing a load bank is to determine capacity that best suits your needs.

Load bank capacity is measured in kilowatts (kW) and should match the power rating of the equipment you plan to test. It's essential to consider your current needs and ensure you select a capacity that is neither less nor in huge excess of your testing needs.

It's equally important to anticipate future needs. Purchasing a load bank with a capacity slightly higher than your current equipment's power rating can be a strategic move. This approach provides room for growth and adaptation as your electrical systems or equipment evolve. Look for load banks with adjustable load steps, which allow you to fine-tune the load applied, ensuring flexibility in various testing scenarios.

2. PORTABILITY AND INSTALLATION

Next, you need to consider where you need your load bank to be. Some load banks are portable and easy to move around, like Power Prove's AC100-CPT, while others require a permanent installation. This makes them ideal for use in hard-to-reach areas or for testing temporary applications. They can also be used across different locations. On the other hand, permanent installations are typically more robust and suitable for continuous testing in a fixed location.

Additionally, consider the power source needed to operate the load bank. Some load banks require a specific power supply, while others are designed to work with standard electrical outlets. Make sure the facility can provide the necessary power source to operate the load bank effectively.

3. CONTROL AND MONITORING FEATURES

Load banks offer varying degrees of control and monitoring capabilities. Advanced load banks come with digital controllers that allow you to precisely adjust the load settings, monitor real-time data and conduct automated testing. These features save time and ensure accurate results during testing.

It's also essential to consider remote monitoring and control options. Some load banks offer remote access through mobile apps or web-based platforms,

allowing you to monitor and control testing from a distance. This can be especially valuable for organisations with multiple testing locations or those looking to streamline their testing processes.

4. COMPLIANCE AND SAFETY STANDARDS

Ensure that the load bank you choose complies with industry standards and safety regulations. Safety is paramount when conducting load bank testing, as it involves high electrical currents and voltages. Look for load banks that meet or exceed safety standards such as IEEE 450-2010 and NFPA 70E.

Additionally, consider the ease of maintenance and safety features incorporated into the load bank design. Features like emergency shut-off switches, overcurrent protection and cooling systems enhance the safety of your testing operations and protect your equipment.

5. BUDGET AND TOTAL COST OF OWNERSHIP

Carefully evaluate your budget and the total cost of ownership (TCO) when purchasing a load bank. While it's tempting to opt for the cheapest option, it's essential to consider the long-term costs, including maintenance, operation and potential upgrades.

Compare prices, warranties and the reputation of the manufacturer before deciding. Investing in a high-quality load bank from a reputable manufacturer may save you money in the long run by reducing downtime, maintenance costs and the need for frequent replacements.

Properly planning your electrical testing ensures your facility isn't caught out in the event of a sudden power outage. But just having testing equipment is not sufficient – careful consideration into the type, size and quality of the load bank you choose is essential to a safe, compliant and effective testing process.

Power Prove, the load bank division of resistor manufacturer Cressall Resistors, provides a whole range of off-the-shelf load banks to support a host of applications and specifications. To discuss your individual requirements, please get in touch. <https://powerprove.com/>

INTEGRATED SMART SOCKETS: THE NEWEST TOOL IN THE ENERGY SAVING TOOLKIT

Steve Kenny, vice president and general manager of Honeywell Building Management Systems



The Internet of Things (IoT) landscape is one that is continually evolving and shifting to meet the modern demands and needs of numerous industries and applications. Although IoT devices have impacted many sectors, these technologies have had a significant influence on automation within commercial buildings. Smart devices are proving invaluable for controlling, monitoring and automating individual functions within buildings, which is driving the use of increasingly sophisticated building management systems (BMS) to make larger scale impacts. Connecting a series of IoT-enabled lights with outdoor light sensors via a BMS, for example, can enable building and energy managers to automatically adjust room lighting based on sunlight levels.

With potential such as this, it's no surprise that the global building automation systems market is anticipated to grow from around \$77 billion in 2023 to over \$130 billion by 2030.¹ The value these systems can bring to businesses – by reducing energy consumption and operating costs – comes from how they are set up and, crucially, the smart devices underpinning them.

IOT DEVICES IN COMMERCIAL BUILDINGS

There are many different types of IoT building technologies available that energy managers can utilise to reduce operational costs and enhance energy efficiency. For example, smart building management systems offer a comprehensive solution by integrating various IoT components. These systems use sensors to monitor various factors such as occupancy levels, temperature,

and lighting conditions, enabling real-time adjustments. Heating, ventilation, and air conditioning (HVAC) systems with IoT integration can optimise temperature control by responding to occupancy levels and weather data, reducing energy usage and costs.

While these smart systems present the opportunity to reduce energy usage and operational costs in the long run, they can come with significant upfront costs. For businesses that might not have the funds available, installing these systems might not be a possibility especially as it could be a while before savings can be made. Nonetheless, there are other actions that can offer meaningful reductions in energy usage with a shorter payback period.

In any building, like a commercial office space, there tends to be hundreds if not thousands of plug sockets. From computers, printers, fridges, and other plug-in devices, offices have countless devices which consume energy – referred to as small power. In fact, small power can account for a quarter of a building's entire energy usage,² and this consumption happens in plain sight.

Although many businesses can address small power usage by encouraging employees to be mindful of turning devices off at the outlet when they're not in use, this might not be a reliable solution, especially if there are a significant number of outlets.

INTEGRATED SMART SOCKETS

Historically, electrical sockets were not integrated into BMS, but new technologies now make it possible, enabling continuous insight and control into small power loads. These solutions can help establish any sockets across a building that have been left on unnecessarily as well as any devices

in sleep mode that might consume electricity without staff noticing.

These smart electrical sockets allow businesses visibility into their building's energy usage, remotely power down unused sockets, and automate functions such as scheduling, grouping, and alarms. Data is available down to an outlet level, enabling more robust information and control of energy use in a building along with other site energy data such as HVAC and lighting use. Furthermore, whilst these ready-now smart sockets can integrate with a BMS, they can also run effectively as a stand-alone solution. As such, these smart solutions are a perfect alternative for businesses that are looking to reduce energy usage, but are not able to offer full BMS integration or implement costly HVAC strategies.

LOOKING AHEAD

Today, IoT devices are continuously adapting and evolving to meet ever-changing needs. Considering automation within buildings is set to increase rapidly, energy managers should look towards adopting the latest IoT offerings to ensure their buildings are running as efficiently as possible.

Reducing energy usage is an important initiative for many businesses and, to prioritise energy efficiency, it is vital for energy managers to utilise IoT offerings. Modern technological electrical sockets are the latest IoT devices that can help to reduce building energy use as quickly and efficiently as possible, without a large upfront investment. <https://buildings.honeywell.com/>

¹ Fortune Business Insights, Building Automation Systems Market Size 2023-2030, Published: August 2023 [Accessed: October 18, 2023]

² US General Data Administration, Plug Load FAQ, Poll, S. and C. Teubert, 2012 [Accessed October 18, 2023]

MITIGATING THE INCREASED RISK OF CLIMATE CHANGE IMPACT ON THE UK'S NUCLEAR INFRASTRUCTURE

Andrew Buckley, Principal Engineer, ABS Group (UK Office) looks at the impact that Climate Change is having (and is set to increasingly have) on the UK's nuclear infrastructure, and how the multiple threats associated with increasing extreme weather events may necessitate a reassessment of risks associated with nuclear sites – both today and into the future.



The impact of Climate Change – both today and increasingly into the future – is changing the way the nuclear industry needs to look at safeguarding its infrastructure and its risk levels – especially where the ageing infrastructure of current sites is concerned.

Recent findings of a high-resolution model¹ found that under a high emissions scenario (RCP 8.5), rainfall events in the UK exceeding 20mm/hr could be four times as frequent by 2080 compared to the 1980s.

In a report from the UK Parliament Joint Committee on National Security Strategy published at the end of October 2022, it claimed the UK saw six major storms in the 12 months leading up to the publication of the report, including some of the highest wind speeds recorded in over 30 years.

July 2023 was also the hottest month ever recorded on the planet², bringing with it heatwaves and wildfires in some countries, whilst simultaneously deluges and heavy rain episodes in others.

Looking ahead to 2050, the independent Climate Change Committee (CCC) anticipates that the UK will experience warmer and wetter winters, drier and hotter summers, and continued sea level rises; predicting that by 2050, about a third of England's coast will be under pressure from flood risks.

The impact on nuclear infrastructure security is undoubtedly going to be challenged on an increasing basis by Climate Change.

Under the 2008 Climate Change Act, the UK Government lays an assessment of the risks to the UK from Climate Change before Parliament every five years through its Climate Change Risk Assessment (CCRA). It has highlighted that flooding is set to become more frequent and severe, affecting critical infrastructure including energy, transport, water, waste, and digital communication

¹ <https://www.nature.com/articles/s41467-023-36499-9#Abs1>

² <https://www.un.org/en/climatechange/july-2023-hottest-month-ever-recorded>

assets. In its last independent assessment, published in June 2021, it found that the UK is not ready for even the best-case scenario of Climate Change, let alone the current trajectory, and that “the gap between the level of risk we face and the level of adaptation underway has widened” since its last report in 2017.

CLIMATE CHANGE IMPACT ON NUCLEAR POWER INFRASTRUCTURE

One of the key questions we need to ask of our existing infrastructure is: renew and re-strengthen or replace?

Our advice is that organisations should look with fresh eyes from a risk assessment perspective when it comes to Climate Change impact – in particular, the impact of rain, wind, and rising sea levels. A wait and see approach is not a good option, and operators should take the view that just because an extreme event has not happened does not mean it cannot or will not.

It is also important to look at infrastructure risks from a multi-hazard perspective. Rarely is there just a rain episode; so you could be looking at 100 mph winds accompanied by heavy rainstorms which could in turn lead to building damage, flooding, and wider associated risks.

TAKING STEPS TO REASSESS RISK

So how is the growing threat of Climate Change impacting assessments on UK nuclear licensed sites as part of the required operational safety reviews, particularly when looking at sites operating beyond their original lifespan?

STEP 1: REVIEW DEMAND

The biggest impact Climate Change is having on these assessments is when we Review Demand at facilities – especially around changes of use and changes in the hazard.

You should review original design loads against the requirements of both modern standards (Eurocodes), and also the potential impact for increased

loads from developing Climate Change hazards and threats, and any revised demand. For example, although the frequency of an event (1 in 1,000 or 1 in 10,000 per year) has not changed, the magnitude of the event may well have changed.

Wind speed increases, rainfall increases, snow, and/or hail loads are typical weather hazards that should be considered and that are changing. Wind speed considerations are also influenced by any changes of the surrounding terrain (new buildings, etc.).

STEP 2: CURRENT CONDITION

Has the condition of the building or equipment deteriorated in the years since the last safety review? Are there signs of aging, damage, or have any modifications been made that could have an impact when looking at Climate Change loads, and the prospect of increased and heavier extreme weather episodes?

STEP 3: CURRENT CONDITION AND FUTURE USE CHANGES

Assessments should consider and review current condition against modern standards, whilst also addressing and assessing any potential future use changes, via analysis and assessment or another route.

STEP 4: SAFETY CASE/OPERATIONAL SAFETY REVIEW

As part of Operational Safety Review procedures, operators have to demonstrate to the regulator that conditions haven't deteriorated and risks are not increasing. There is a need to build Climate Change considerations into each Safety Case.

STEP 5: PLANNING FOR THE WORST CREDIBLE SCENARIO

Just because a weather event has not previously happened does not mean it cannot or will not, and you should plan for a worst-credible scenario.

The goal here is to take the potential for an event or series of events – no matter how incredible and unlikely it may seem – and assess its credibility; in turn assessing the potential risks associated with primary, multiple, and consequential secondary risks.

CONCLUSION

Climate Change effects impacting our critical national infrastructure are already significant and look likely to worsen substantially under all reasonable Climate Change scenarios. The risk of future flooding of major infrastructure sites, high wind damage, landslides, and power outages are significant. They may also happen simultaneously, creating the potential for multiple cascading effects across infrastructure. The scale of the challenge facing Government, operators, and regulators is clear: there is an urgent need to review and, if require, adapt our infrastructure to the potential impacts of Climate Change. <https://www.abs-group.com/>

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THE PERFECT YEAR

The start of a new year is the time to make plans, but also to take a moment and reflect on last year's performance and achievements. Huge energy saving statistics, new product launches, and two awards made 2023 a milestone year for Prefect Controls.

SMARTER PRODUCTS

The first Iirus SMART Tanks rolled off the production line. This new product is the only hot water cylinder, pre-plumbed, pre-wired with factory fitted on-board control. SMART Tank is proven to make significant savings in both energy and water consumption.

It monitors the volume and temperature of water entering the system. Providing accurate readings inside the tank, plus hot and cold water at point-of-use. It also alerts maintenance teams to leaks, and when water is flowing through the tundish.

Analysis since launch suggest more than 25% savings in energy consumption. While leak detection sensors attached to one toilet cistern measured more than 72K litres of water wasted during a 21-day period before maintenance teams attended the fault.

CONTROL SAVES ENERGY

During May, data from the Iirus installation at the University of the West of England (UWE) was analysed. Heating is controlled in more than 3000 rooms at the Frenchay campus. When comparing

energy consumption from 2021-23 with pre-pandemic years (2017-19) almost 900,000kWh is being saved per year.

Iirus is a central control system where all programming and monitoring is maintained via the secure web based portal. The system monitors individual rooms and prevents energy from being used unnecessarily. Rooms are maintained at a comfortable temperature but, should the occupant require more warmth, they press a button engaging Boost range. Temperatures rise to a pre-determined level for a pre-set time, after which it reverts to Setback.

ADDING IN SAFETY

To add to the scope of Iirus, HobSensus has also been installed at the Bristol campus. HobSensus is a kitchen safety device that prevents hobs from being left switched on if kitchens are left unattended or temperatures on the cooking surface approach dangerous levels.

100+ IRUS SITES

2023 saw the largest Iirus installation programme Prefect has ever encountered. The team of Project Managers travelled the length and breadth of the UK PBSA estate from Aberdeen to Exeter. 21 sites were added to the Portal bringing the total number to 101. In September a milestone was met when the 50,000th room was commissioned.

THE AWARD GOES TO...

In November, Prefect attended the Electrical Safety First (ESF) annual conference at Westminster. ESF is a campaigning organisation recognised by government and industry as the leading authority on electrical safety. It aims to reduce death and injury caused by electricity.

As part of the conference, the Safety Innovation Award is presented. The 2023 winner was HobSensus. Collecting the award on behalf of Prefect, Adrian Barber commented, "Recognition from an authority such as Electrical Safety First demonstrates the scale of the issue that exists with kitchen fires. It would be reassuring if this type of device became as commonplace as CO₂ monitors and smoke detectors."

The eventful year was capped off in December with the UWE installation being recognised at the Energy Saving Awards by winning the Education Sector Project of the Year title.

Kirsti Norris, Energy Manager at UWE commented, "I am delighted that Prefect Controls has received recognition of their fantastic product and customer service. The Iirus system has made UWE significant savings in energy, money, and carbon. It has also improved the comfort of our students, and the service we give through improved controllability of the accommodation heating systems."

So, on reflection, 2024 has a lot to live up to! www.prefectcontrols.com

COLLABORATION & ACTIVE CO-OPERATION IS KEY TO LIQUID RENEWABLE FUELS FUTURE IN COMMERCIAL & DOMESTIC HEATING HOT WATER MARKET – RINNAI

Close collaboration and co-operation on all aspects of the off-grid renewable fuels market is helping both the appliance manufacturers and the liquid fuels industry make significant inroads into achieving lower carbon footprints for all in the supply chain, all the way to the end-user.

"From a manufacturers perspective, and on the journey towards renewable liquid fuels, it became incredibly important that we collaborated with industry members and truly understand the nuances of the LPG market under times of such considerable regulatory overhead and that we start to systematically educate all relevant stakeholders regarding the critical steps in achieving our changing objectives," Chris Goggin of Rinnai told a recent conference on renewable liquid fuels.

He added, "This collaboration requires a complete value chain perspective in establishing the reality of practical, economically and technically feasible solutions for the wide array of off grid buildings."

Mr Goggin continued by saying that "new challenges are around the corner. For example, how will LPG / BIOLPG and Renewable liquid fuels be measured in building performance modelling tools and how will this impact the deployment of such appliances and fuels in the future."

Rinnai's operations director Chris Goggin addressed the recent Liquid Gas UK Conference held in Liverpool. Liquid Gas UK is the trade association for the renewable liquid gas industry across the UK. Members of this trade association represent every position in the UK energy industry from BIOLPG and LPG suppliers, specifiers, heating engineers and installers.

Chris Goggin's presentation also announced Rinnai's professional relationship with Dimeta that seeks to encourage clean domestic alternative fuel usage in the UK. Both Rinnai and Dimeta aim to advance the national

Rinnai



deployment of DME and r-DME that will assist in UK decarbonisation plans.

A MOU (Memorandum of Understanding) has been agreed upon by both Rinnai and Dimeta through ongoing collaboration. This partnership will work on the following critical areas: appliances, appliance iteration requirements for 100% DME and appliance materials compatibility. The MOU will explore the development and ultimate deployment of DME fuel and appliances.

As UK energy usage transitions towards cleaner carbon reducing fuels Rinnai has adapted its product range to include hydrogen, solar thermal, heat pumps, BIOLPG and LPG technologies and advanced developments with DME. Domestic, commercial and off-grid properties can decarbonise immediately with Rinnai's H3 range of products that have been designed purposefully to introduce a new era of UK clean energy acceptance.

Rinnai's H3 range of products include domestic and commercial heat pumps that offer immediate property decarbonisation. Rinnai is determined to provide UK customers with cost



Chris Goggin

effective low carbon solutions towards domestic and commercial hot water and building heating provision.

Visit www.rinnai-uk.co.uk for more information.

THE HOT WATER CHALLENGE

The focus on closing the performance gap for more energy-efficient newbuild schools is causing a rethink of the hot water strategy to avoid large scale energy usage. Rob Erwood, Commercial Sales and Specification Director at Baxi, discusses the uptake of Passivhaus standards for newbuild school programmes and the options for meeting the hot water demand efficiently.

In the drive to meet tighter efficiency requirements for newbuild schools, focus has intensified on designing buildings that achieve reliably high comfortable levels all year round with consistently reduced energy use. This had led to an uptake of Passivhaus design standards to deliver local authority newbuild school programmes – particularly in Scotland where 35 Passivhaus schools are underway.

On the surface, Passivhaus school buildings will look no different to other schools. But their future proof design, optimised for net zero with reduced heat losses, results in ultra-low energy demand and an excellent indoor environment. The challenge, arguably, lies in the hot water design.

POINT OF USE SOLUTIONS

When it comes to heating, school buildings built to the Passivhaus standard are designed to require less energy for heating. But the hot water design is central to achieving buildings that are truly energy efficient, environmentally friendly and economical to run.

One option to meet the hot water demand is to use point-of-use electric water heaters or cylinders in areas like washrooms and kitchens as they only use energy when hot water is required. This makes it much easier



to monitor, measure and control hot water usage as well as keeping any hot water pipework runs to an absolute minimum to avoid heat transfer losses.

Reducing the kilowatt rating and capacity, increasing control and lowering flow rates will be further considerations. Selecting products with enhanced controls such as a smart thermostat can also help with energy management as it can learn the pattern of hot water usage in the school building over a period of time.

MIND THE GAP

Take Riverside Primary School, one of the first Passivhaus standard primary schools in Scotland and the first to achieve certification. Rigorous and continual quality verification, which must be evidenced to achieve independent certification, means that this Passivhaus building operates as predicted, with no gap in efficiency levels at the design stage and real-world operation.

The new multi-million-pound school is part of Perth and Kinross Council's ongoing capital programme of school upgrades and improvements through hub East Central Scotland Limited (hubco) to enhance the environment for learning and teaching across the area.

Instrumental in forming the energy strategy for Riverside Primary School was the multi-disciplinary design, engineering and project delivery company BakerHicks Motherwell, appointed by Perth and Kinross Council to provide mechanical and electrical design services for principal contractor Robertson Tayside.

AVOIDING LARGE SCALE ENERGY USAGE

Riverside Primary School is designed to be well suited to low-carbon heating. Air Source Heat Pumps (ASHPs) provide the primary heat energy for the school building with separate systems for the heating services, including radiators and underfloor heating and the kitchen domestic services, where the ASHPs provide preheat to a Megafluo Eco hot water cylinder.

"The hot water strategy was one of the main challenges when designing the system

as we needed to avoid large scale energy usage," explained David Coulter, Associate Engineer and Certified Passivhaus Designer at BakerHicks. "We wanted to explore using all-electric point-of-use solutions that would only generate energy when required, for example during break or lunch times. So, we asked Baxi for help with the solution."

Baxi's Public Health technical sales and specification team, headed up by Stephen Lynch, worked with David to identify the selection of equipment required to meet the hot water demand efficiently at Riverside Primary. "A key benefit of the Heatrae Sadia water heaters is that the units are sized, thereby providing more flexibility to meet accurately the required volume," David added.

In total, seven Heatrae Sadia Multipoint 15 units, six Multipoint Eco 30, three Hotflo 10, two Hotflo 15, 24 Aquaheat 7 as well as the Megafluo Eco cylinder have been installed within the new school building.

EDUCATIONAL PROCESS

Using the Passivhaus standard brings major advantages to schools, making them more efficient and cost-effective to operate and maintain, and helping them meet sustainability goals and lead by example.

However, the concept calls for outside-the-box thinking to achieve the most energy-efficient hot water design strategy. This makes it an educational process for designers and school estates managers alike, as it encourages a rethink of hot water consumption to avoid large scale energy usage and prioritise energy savings.

With Passivhaus certification successfully achieved at Riverside Primary School, which is now nearing the end of its first term, Perth & Kinross Council has achieved its commitment to enhance education provision for children north of Perth and taken a step closer to its net zero carbon ambitions – with the hot water strategy and point-of-use electric water heaters playing a critical part in its success.

Heatrae Sadia is part of Baxi. For more information on the Heatrae Sadia point of use water heater range, visit: www.heatraesadia.com/products/

HEAT PUMPS – THE WAY FORWARD TO DECARBONISATION

In the UK the built environment accounts for about 25% of our greenhouse emissions and to tackle climate change it's clear that to reach our net zero ambitions we need a tight focus.

We also need a realistic focus – together we must meet legally binding targets of reducing carbon emission by 75% by 2035 and achieve net zero by 2050.

How realistic is this? And how are we going to get there?

At Salix we are working hard with the public sector across the country to decarbonise estates and provide a whole series of deadlines to reduce carbon emissions over the next few years.

One of our flagship schemes is the Public Sector Decarbonisation Scheme. This is aimed towards more electrical based solutions across public sector buildings which includes large estates across the country from NHS trusts, to universities, schools, and leisure centers.

The scheme, delivered by Salix and run by the Department for Energy Security and Net Zero, is constantly encouraging us to look at new technologies, fresh approaches and to be innovative in our outlook.

Whilst the schemes look for a holistic approach to managing building stock and we encourage a fabric first approach, it aims to specifically remove old stock of fossil fuel boilers, and to replace these with a type of heat pump. The preferred replacement is often air source, ground source or water source heat pumps.

However, a range of low carbon technologies are also considered, including district heating, hot water electric point of use heaters, solar thermal and biomass boilers, among others. For example, as part of Phase 1 Public Sector Decarbonisation Scheme, Leeds City Council implemented a district heating network powered by household waste to replace old inefficient gas boilers, as well as installing multiple energy efficient technologies, such as solar panels and LEDs, to reduce its carbon footprint.

EMBRACING CHANGE

Heat pumps come in a variety of designs but are mainly categorized as air source (air-to-air or air-to-water), ground

Matthew Everett, an Energy and Carbon Analyst at Salix.

source or water source heat pumps. As technology advances, a variety of refrigerants are being used to enable the right technology application to be applied to the right building design.

Heat pumps generally work well with low flow and return temperatures and being much lower than conventional fossil fuel systems, they often require some infrastructure enabling works and larger heat emitters (e.g. radiators), including the fabric first approach. However, this is not always the case and there may be sound reasons why this is not possible in all applications.

The idea is that by taking a fabric first approach to buildings, to ensure that they are as efficient as possible in terms of heat retention, we are then able to size and operate heating systems aligned to the improved peak heat loss figures, at low temperatures and improve the coefficient of performance. In simple terms, we are replacing an old, inefficient fossil fuel boiler, with improved insulation and a new, efficient, electrical heat pump system to achieve the same or improved comfort levels, whilst at the same time, being more efficient and importantly, greener, by saving on carbon. It's a bit like trying to get old, inefficient cars off the road!

To determine, what type of heat pump is best for each building, our public sector colleagues will normally engage with qualified architects to determine the fabric first approach and then mechanical and electrical consultants, to carry out feasibility studies to determine the works required, the sizing of the equipment in order to meet the peak load of any building. This will capture any enabling work and focus the task on what type of heat pump is right for your particular application.

For example, Derby College's installation of water source heat pumps utilises natural resources by drawing water from the nearby Ouse River. It serves as a heating system, replacing gas boilers and contributing to the decarbonisation of the buildings heating. Additionally, they implemented Genius Controls, which operate similarly to movement sensors, regulating

heating based on room occupancy.

Bridlington Hospital undertook a transformative project, which involved employing an air-source heat pump capable of meeting 100% of the hospital's demand. It also included thermal insulation, modifications to air handling units, and system optimization, to enhance energy efficiency across the hospital estate. Additionally, the integration of 1,600 solar PV systems ensures 100% renewable electrical supply for the heat pumps, leading to zero-carbon heat generation.

Rather than using a heat pump, Exmoor National Park overcame its isolated location by incorporating a biomass boiler. It is situated in an off-grid location with no mains gas, electricity, or water and an ageing oil. Public Sector Decarbonisation Scheme funding helped facilitate a biomass boiler fuelled by local wood resources, along with additional battery capacity for storing energy from existing wind turbines and solar panels. Advanced building energy management systems were also introduced to optimise heating efficiency based on user demands and external conditions. Energy monitors were integrated into their existing wind turbine, solar panels, and batteries, providing real-time data on renewable energy generation. The initiative achieved a lifetime carbon saving of 605 tonnes of carbon dioxide.

These three examples alone are estimated to achieve lifetime carbon savings of 2,305 tonnes of carbon dioxide.

Heat pumps are most definitely here to stay, and the financial support offered from the Public Sector Decarbonisation Scheme from the Department for Energy Security and Net Zero has been instrumental in providing opportunity for public sector clients to launch into their strategic management of building stock, with a low carbon, sustainable, green approach. www.salixfinance.co.uk



WHY THE RENEWABLE HEATING SECTOR MUST CHALLENGE THE MYTHS SURROUNDING HEAT PUMPS

Mark McManus, Managing Director,
STIEBEL ELTRON UK

Last month global leaders came together at COP 28 to discuss action which would tackle the world's most urgent and pressing environmental challenges. But as the summit reached its climax, controversy emerged as wording to phase out coal, oil, and gas was inexplicably dropped from the conference's deal.

What ensued was a mass scramble of almost 200 countries on the conference's final day as they looked to salvage a deal which would significantly reduce humanity's impact on the planet. In the end, they just about agreed to include a move away from fossil fuels following furious condemnation on a global scale.

What's clear is a widespread desire for greener initiatives which will safeguard the planet moving forward, with reducing carbon intensive fossil fuels top of the agenda. One such initiative is the decarbonisation of home and building environments, something which leading supplier of renewable heating products, STIEBEL ELTRON, is seeking to drive forward.

Moving towards sustainable heating resources, such as the adoption of heat pumps in buildings, will significantly reduce a nation's carbon footprint. However, the transition towards heat pumps is being hampered by misinformation around the technology's ability to perform effectively when compared to a traditional gas boiler.

Solutions presented to consumers need to be practical, viable, and above all, an effective option which they can have confidence will perform. So, it is up to the renewable heating technology sector to demonstrate to consumers why heat pumps tick all the boxes when it comes to changing their heating system.

A common misconception is that transitioning to heat pumps is prohibitively expensive, and while the initial installation cost can be higher than traditional heating systems, it's crucial

to consider the long-term savings and benefits. Being highly energy-efficient, they generate lower operational costs over time, while many governments and energy companies offer incentives and rebates which ease the financial burden of their installation.

Meanwhile, there are concerns that heat pump systems consume a lot of electricity, however this is not the case. A properly designed heat pump system will use around a third to a quarter less electricity than traditional forms of electric heating. This is because a heat pump should only need electricity as drive energy, with additional energy required gained from the air, earth or groundwater.

Then there is the notion as to whether heat pumps are too good to be true and can they really be as green as highlighted. The simple answer is: yes. Heat pumps use renewable energy to generate heat, so no CO₂ is created on site, and when combined with green electricity to drive them, none at all is generated. Heat pumps thus make a huge contribution to climate protection, saving around 2.5 tons of CO₂ annually per system.

With 28 million households in the UK, this would see savings of 70 million tons of CO₂ each year if they were implemented in every home across the country. This leads us to another concern that heat pumps are only suitable in new buildings, but the reality is that they can be successfully used to heat even the oldest properties. Modern heat pumps can be used in renovations, even with radiators, when design is appropriate. Indeed, STIEBEL ELTRON estimates that more than 50 percent of existing heating systems could be converted to heat pumps without the need for major measures. Meanwhile, this could increase exponentially with greater will power from the government to drive forward measures to improve insulation



and energy efficiency within buildings.

Meanwhile, another misconception is a heat pump's inability to work effectively when air temperature is below freezing. However, heat pumps on the UK market today can work down to -25 degrees Celsius, with many designed with large surface areas allowing them to work better and more efficiently at lower temperatures.

The stark reality is that the negative myths surrounding heat pumps are largely unfounded and driven by the those with an interest in maintaining the status quo, no matter what the cost to the planet. Heat pumps will play a vital role in helping humanity rise to the present climate challenges and the renewable heating sector should demonstrate this.

With 100 years' experience in driving forward renewable heating solutions, and 50 years' experience in manufacturing heat pumps, STIEBEL ELTRON aims to galvanise their adoption and open the door for consumers to implement these sustainable technologies in their homes. For those interested in learning more about the numerous benefits of heat pumps, they should give us a call.

Mark McManus is Managing Director of STIEBEL ELTRON UK. Since 1924, STIEBEL ELTRON has combined the success factors of technological expertise, quality, innovation, reliability, and customer proximity. Today, it is one of the world's market leading suppliers of technology products for building services and green tech. Headquartered in Bromborough, Wirral, the UK branch was established in 2008. <https://www.stiebel-eltron.co.uk/>

SETTING SCHOOLS ON THEIR NET ZERO PATHWAY

With ambitious government decarbonisation targets to meet and inflated energy prices to mitigate, sustainability is now high on the school agenda.



Anne Wraith,
Head of Building
Services at Baxi,
discusses the
role of heat

pumps in the net zero journey and approaches to help schools achieve their goals.

Decarbonising heat across all sectors, including education, is central to the government's strategy for net zero. Ultimately, the goal is to transition to low-carbon technologies such as heat pumps. However, while new school buildings will be optimised for net zero and high efficiencies, refurbishing the ageing heating and hot water systems that many existing schools rely on can be a more complex task. A whole range of factors – from the variety of building type to available funding and time constraints – will all influence how quickly and easily refurbishment can be achieved.

Certainly, heat pumps offer a multitude of benefits, but here's the caveat: they are not a panacea in themselves. For schools to reap the many advantages from optimal heat pump performance, each is likely to need a bespoke solution tailored around the individual requirements.

PLAN AHEAD

Where, then, to begin? The immediate aim when refurbishing existing buildings should always be to reduce operational energy usage and heat losses. Understanding where and how energy is being used will help determine any opportunities for improvement and how and where ASHPs can best be used. Taking advantage of the free site surveys that some manufacturers offer can be beneficial at the outset to identify and evaluate the options.

If planning a phased refurbishment project, set immediate, medium and long-

term goals that factor in the available time to complete the work and the budget. Take time to investigate any funding opportunities such as the Public Sector Decarbonisation Scheme as this will make the transition to heat pumps more affordable.

ALL-ELECTRIC APPROACH

If possible, consider an all-electric approach. Air source heat pumps (ASHPs) can provide a highly efficient, sustainable method of supplying low carbon heating or hot water requirements. We are pleased to be expanding our range to include both high and low temperature ASHPs. With an exceptionally high seasonal co-efficient of performance (SCOP) of up to 400%, they can deliver up to 4kW of heat output for every 1kWh of electricity used to run the heat pump.

Once the heat pump design is locked in, address the following considerations.

First, electrical connections – is there sufficient capacity? Avoid any delays by notifying the local Distribution Network Operator (DNO) immediately and completing the necessary connection application form.

Next, space. Ensure that sufficient external space is allocated for the heat pump. Contacting your chosen manufacturer at the early stages is advisable on school projects due to fixed nature of project schedules.

Finally, consider including additional renewable technologies such as solar panels as these may enable you to produce all the energy you need to run your heat pump.

HYBRID APPROACH

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

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

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

CASE IN POINT

A recent example of best practice planning, design and collaboration is the



decarbonisation programme implemented by the Priory Federation of Academies Trust at a series of its academies. The carbon reduction initiative targeted the swimming pool buildings, where gas boilers were previously heating the water in the pool and Air Handling Units.

Oakes Energy Services and Baxi collaborated to propose the best solutions at each of the three academies, bespoke to the individual requirements in each building.

At both Witham and LSST Academies, two Remeha 88kW ASHPs now supply all the heat demand in the building, feeding underfloor heating and radiators, and providing hot water for the changing rooms and the swimming pool plant. Remeha is part of Baxi.

At Lincoln Academy, which has a larger 25-metre swimming pool, five Remeha 88kW ASHPs supply heat to calorifiers for the hot water system as well as to the swimming pool heat exchanger in what is the first phase of the decarbonisation programme.

The proposals developed by Oakes, which illustrate the expected carbon savings, were used to securing funding from the Public Sector Decarbonisation Scheme operated by Salix. In total, the design of the entire scheme is expected to save 227.5 tonnes of CO₂ a year, equivalent to planting 7,000 trees.

COLLABORATION IS KEY

While the enormity of the decarbonisation challenge facing the public sector cannot be ignored, inaction is simply not an option. Projects like the programme outlined above illustrate how, by applying careful planning and a school-by-school approach, the heating industry can work with the education sector to tackle the task at hand. Encouraging early collaboration and information sharing, as well as tapping into manufacturers' valuable experience, will all serve to set schools on their unique pathway to net zero.

To book a free site visit or find out more about Baxi's commercial heat pump range, visit: <https://www.remeha.co.uk/lp/more-choice>

Ryan Ayrton



Rhiannon Elias



Jennifer Charles



KEY TAKEAWAYS FROM THE NEW UK BATTERY STRATEGY

The UK Government has recently published its new UK Battery Strategy (the “Strategy”), which sets out its vision for the UK to have a globally competitive battery supply chain by 2030, to help support economic prosperity and the net zero transition.

The Strategy sets out the government’s current and planned activities to support its strategic objectives, as well as establishing a framework and priorities for future work with industry. It also highlights the scale of the opportunity that batteries represent, for example, by 2040, nearly 200 GWh of capacity will be required to satisfy UK battery demand for cars, commercial vehicles, heavy goods vehicles, buses and grid storage.

The Strategy is based around a “Design-Build-Sustain” approach, which is summarised below:

DESIGN

The government will seek to leverage the UK’s research and innovation base to develop the ‘batteries of the future’ by focussing on the following:

- **Innovation:** the Strategy outlines the government’s plan to support innovation across the value chain, including by (i) investing £2bn of new capital and R&D funding for zero emissions vehicles, batteries and their supply chains for five years to 2030; (ii) investing £50m in UK development facilities, such as the UK Battery Industrialisation Centre; (iii) investing £11m in competition winners developing technologies across the battery value chain; and (iv) exploring opportunities to promote the establishment of R&D centres in the UK;

- **Access to Financing:** the government aims to incentivise battery investment through government-backed finance programmes that are predictable and sustained, for example through the British Business Bank (“BBB”), UK Infrastructure Bank (“UKIB”) and UK Export Finance (“UKEF”); and
- **Battery Safety:** the Strategy commits to maintaining stringent safety and product standards in industrial-scale batteries, for example through collaboration across government departments and the engagement of the British Standards Institution (“BSI”) with the battery manufacturing industry in the UK.

BUILD

The government plans to develop the battery sector to secure a resilient UK supply and remove barriers to investment through the following:

- **Supply Chains:** support will continue to be provided to firms developing domestic mining capabilities, including through the Automotive Transformation Fund. The government also seeks to strengthen the resilience of global critical mineral supply chains and, to date, has signed international critical mineral agreements with seven countries (Australia, Canada, Japan, Kazakhstan, Saudi Arabia, South Africa and Zambia);

- **International Collaboration:** the UK will continue to build strategic partnerships to enable technology transfer and cooperation on supply chains and innovation – the Strategy cites a number of existing bilateral partnerships with the USA, Canada, Japan and Norway. Free Trade Agreements will also be key in reducing barriers and deepening trade relations;
- **Energy Prices and Grid Connections:** given the energy intensive nature of battery manufacturing, competitive and sustainable energy prices are key to the development of the battery sector. The Strategy highlights a number of steps the Government is taking to address this, including through various financial relief schemes. On grid connection, feedback from industry has noted that long lead times to access the grid represents a barrier to investment. The government recently published its Connections Action Plan (jointly with Ofgem) to provide actions to reduce project delays in connecting to the transmission network and further measures to acceleration connection timescales are detailed in the Strategy; and
- **Planning and Permitting:** The Strategy notes that potential investors in battery projects perceive the planning and permitting processes to be onerous and risky. To address this, the government is seeking to implement a number of planning and permitting reform actions to benefit the emerging battery sector – for example, it has recently announced a £24m Planning Delivery Skills Fund to help local planning authorities clear backlogs and ensure they have the requisite skills to respond to developments.

SUSTAIN

The government plans to support a sustainable battery sector, supported by proportionate regulations that drive investment across the supply chain through the following:

- **Skills:** the Strategy notes that upskilling across the UK battery supply chain will be essential to satisfy increased demand; in particular, there is an urgent need to increase workforce capability and capacity for the expansion of cell manufacturing;
- **Green Trade:** trade in batteries (including their materials, components and waste products) will increase substantially over the next decade. The Report cites the importance of collaborating with international partners to align on environmental standards and remove barriers to trade (with current work ongoing through the WTO and G7 Climate Club); and
- **Circular Economy:** scaling up the UK recycling industry will enable a battery’s economic value to be kept within the UK and reusing and repurposing batteries can significantly extend their useful life and support supply chains for other products. A number of other nations are rapidly expanding their recycling capacities (most notably China) and regulatory changes are being implemented in the EU to establish mandatory minimum levels of recycled content for batteries sold within its borders. The Strategy highlights various government initiatives to support R&D in the field of battery recycling.

Overall, the Strategy sets out a framework to support the developing battery sector in the UK, but given the scale of the opportunity and the rapid projected increase in battery demand over the next few decades, there is a lot of work to be done to ensure that the UK remains competitive in this field.

www.wfw.com

YOUR FLEXIBLE FRIEND

The new Demand Flexibility Scheme incentivises businesses to reduce their energy consumption – but how easy is it to benefit from this initiative? We talk to Connected Energy and VEST Energy to find out more.

While the public was focused on scare stories about potential blackouts this winter, the National Grid rolled out a new fund to ensure the lights stayed on across the country.

The Demand Flexibility Scheme (DFS) incentivises businesses and households to reduce their demand on the grid during peak periods. Essentially, companies can get paid for using less energy. This helps the electricity network to flatten out spikes and significantly reduces the risk of blackouts.

“This scheme is a game changer for the energy flexibility market and is incredibly lucrative for businesses,” says Aaron Lally, managing partner at VEST Energy. “For just a short amount of time, at set periods throughout the winter, businesses can earn a significant amount of revenue for very little inconvenience. And this is especially true for businesses which have energy storage on site.”

HOW IT WORKS

Over the winter period - November to March - there will be at least 12 periods of time known as ‘events’, when the National Grid will ask businesses and homes to stop drawing energy from the grid. This will be at times when demand is exceptionally high, likely between 4pm – 7pm - and for short periods, typically an hour.

Each event could last up to four hours, but a business doesn’t have to participate for the full duration. The minimum period is 30 minutes - you get paid for the length of time you take part and the amount your energy consumption is reduced. National Grid has quoted this as £3,000 per megawatt-hour (MWH).

“We’ve already seen eight events taking place this winter, with some returns being at a higher price than we anticipated, and it looks likely that we’ll see more than 12 events this winter in total. adds Aaron. “It’s super flexible. A business can participate in all events or decide in advance if a session is not feasible. You’re not penalised if you don’t take part – you just won’t be paid if you choose not to.”

HOW TO BENEFIT

While this all sounds enticing, for some companies the challenge is how to square the circle – after all, you need energy for your operations.

This is where battery energy storage comes in. Any business with a battery energy storage system (BESS) can store the energy they need in advance and draw on that energy during the DFS event. Effectively, the BESS acts as an energy reservoir, meaning you can continue operations as normal while still reducing your grid energy consumption. “This means no interruption to operations, no turning the lights off or stopping equipment from running - but still knowing that they will be paid at the end of the period,” adds Aaron.

A standard BESS from the likes of UK provider Connected Energy has a 300kW capacity, meaning it can generate £1,000 of revenue per DFS event. The systems are modular so companies can easily multiply the benefits. VEST Energy works with Connected Energy’s customers to make it simple for them to take part in this market.

So far this winter, there have been eight ‘events’ meaning a company with a Connected Energy system could have earned £8,000 by taking part.

“For many years, our customers have been using our battery energy storage systems to participate in grid balancing services,” says Nigel Dent, Head of Sales, Connected Energy. “But the Dynamic Flexibility Scheme makes it so much easier for businesses to benefit.”

“With alerts provided in advance, we can ensure that the battery system is fully charged to take advantage of the event. Our customers don’t need to do a thing and will only know they have taken part when they receive their payment at the end of the month.”

OTHER OPPORTUNITIES

DFS is just one of several ways that businesses can make money from their BESS. “This is definitely the start of more schemes to come. The regulatory environment is becoming more and more pro-flexibility and the direction of travel suggests more schemes will be launched. Businesses will be financially rewarded if they can provide flexibility to the grid – and that’s what energy storage can give them,” adds Aaron.

Connected Energy is offering businesses feasibility studies to model these potential revenue benefits from battery energy storage systems. For further details email info@connected-energy.co.uk or contact 0191 495 7321.

RENEWABLE ENERGY: THE PATH THROUGH THE ENERGY TRILEMMA



Tobias Kueter,
Senior Manager, ENGIE Impact

Addressing the energy trilemma has been a challenge for governments, companies, and even individuals for years.

Trying to improve only one aspect – energy supply security, energy cost, or the environmental impact – has often led to worse outcomes for the others. But increase in fossil fuel prices, combined with ongoing advancement in renewable technologies, makes it now possible to concurrently address each portion of the energy trilemma.

IMPORTANCE OF ADDRESSING THE TRILEMMA

As companies align their business goals and operations with societal expectations and regulatory trends, they face the inherent tensions of the energy trilemma. Simply put, companies will need reliable, affordable, and clean energy to operate. As they do so, they should expect to enhance their reputation and minimise long-term environmental risks, as well as achieve cost savings with the advancement in technology and economies of scale.

Historically, it has not been easy to find energy solutions that effectively address each dimension of the energy trilemma, which led to companies continuing to rely on fossil fuels. Recent geopolitical issues have led to volatility around energy supply and energy prices globally, which has been an opportunity for governments and organisations to reassess the status quo. Europe had become overly reliant on Russia for its supply of natural gas and was now looking for other suppliers globally. The U.S. reaffirmed its reliance on fossil fuels, expanding fracking and discussions around strategic oil reserves. Neither of these approaches addressed the environmental impacts.

The fact remains, investing in renewable energy now is the most attractive short-term and long-term option – and addresses each aspect of the energy trilemma.

THE IMPORTANCE OF RENEWABLE ENERGY

Renewables are becoming less expensive, are more readily (and locally) available than they have been previously, and have a very low environmental impact. They include both energy production for heating (e.g. biogas and geothermal sources) as well as electricity generation (e.g. on-site solar systems, wind turbines, biogas). Some examples of potential interventions include:

- Power Purchase Agreements (PPAs) and Virtual Power Purchase Agreements (VPPAs) where a company purchases renewable electricity from a specific project, often with a fixed price, for its own use.
- On-site energy generation through solar PV and/or thermal panels, biogas plants, or geothermal heat sources.
- Companies signing contracts and partnerships to finance such projects without major capital investments.

These trends have gained momentum as the levelised cost of electricity (LCOE) from renewables has had a downward trend over the last few years. Companies can now bridge the gap between sustainability, energy security, and affordability by strategically adopting renewable energy solutions.

Specific needs and challenges vary between sectors and across regions. The regulatory framework and cost variations also continue to play a major role in these decisions. But even if solutions are not immediately available to instantly decarbonize every organisation, steps can be taken now to address each aspect of the energy trilemma for a long-term decarbonisation strategy.

THE DATA BEHIND RENEWABLES

ENGIE Impact's ongoing assessments of industrial and manufacturing sites have shown that decarbonisation is economically viable today, that many of the financial risks of site-level interventions are a thing of the past,

and that the greatest risk posed to organisations currently is inaction. There are now proven technologies, cheaper energy sources, and shorter payback periods that allow any organisation to commit to a bold decarbonisation strategy and programme.

Our research shows:

- Sites can achieve up to 50% carbon reduction by utilising existing, proven technologies.
- Five technologies – namely: solar, heat pumps, biomethane boilers, electric boilers, and biomass boilers – account for more than 75% of manufacturing sites decarbonisation levers.
- 60% of organisations have significantly reduced energy costs as a direct consequence of decarbonisation.
- Sites working toward decarbonisation are seeing an average of €500K in energy cost savings.

Financing support from legislations such as the Inflation Reduction Act, and the EU Innovation Fund, as well as new financing models like Energy Savings as a Service (ESaaS), also make the transition to renewables easier – helping overcome each challenge that's part of the energy trilemma.

SOLVING THE ENERGY TRILEMMA

The energy trilemma has always been present, posing a significant challenge for companies across industries and around the world. However, it is possible to efficiently address it now due to major advances in renewables, increasing stringent regulations, as well as innovative financing models available in the market. Companies recognising the trilemma's challenges must see that adopting renewables is the key to reliable, affordable, and clean energy – with the added benefits of enhancing reputation and cutting long-term costs. Renewables, with decreasing costs and environmental impact, offer a comprehensive solution, and the data supports its economic viability. Committing to renewables now aligns with both economic and environmental imperatives.
<https://www.engieimpact.com/>

2024 – The year of the battery

When reflecting on the past 12 months there would be few that would not struggle to use the word 'challenging' to describe 2023. It feels somewhat overused, however, coming through a disruptive global pandemic, with an economy impacted by significant conflict in Europe and latterly the Middle East, it has, without question, been just that. Yet 2023 has also seen pockets of real buoyancy, not least in the UK solar energy market. Underpinned by a strong desire for business owners to protect livelihoods by adopting cost-effective and self-managed approaches to energy and sustainability, while protecting a planet for future generations.

So, it's fair to say, 2023 has been a real mixed bag – often presenting a dichotomy of business decisions.

PV – AN INVESTMENT OPPORTUNITY

For Aztec Solar Energy, we have been fortunate, the UK solar energy market has seen substantial growth. 2023's estimate is that it will have reached over 15GW of installed capacity and the upward curve continues expecting to hit 43GW within the next five years. Globally, despite lingering supply chain and trade issues, a similar picture is replicated with continued significant growth predicted. As a share of global energy generation, in 2021 global PV was 3.6%, it had risen in 2022 to 4.5%. It has become the most rapidly growing regeneration technology and one of the best energy investment opportunities.

VOLATILITY

Alongside the ups are inevitably some downs. The complex and ever shifting economic backdrop continues to create volatility and is taking its toll in the general construction market. Further impacted by predictions that commercial new builds are slowing down, we are seeing debt risk and borrowing rising; yet our access to a wide range of funding options means we can support customers through this. We too have faced increases in materials costs in early 2023, although we don't anticipate

Chris Cowling, Aztec Solar Energy's commercial director, reflects on a mixed, yet fast-moving year for the solar photovoltaic (PV) and battery storage market and looks ahead to even brighter times in 2024.



these continuing. We are optimistic levels will remain constant.

INCREASED EFFICIENCIES

In a relatively new and evolving market, exciting new technological developments often present good news. As we saw in 2023 with the launch of new N-type panels from several different manufacturers. Delivering greater efficiencies, more power, improved robustness and safety features, and reduced degradation. These improvements adding even greater confidence in the solar marketplace.

SAFETY

Safety remains high on Aztec Solar Energy's agenda and as such we've become avid supporters of the proposed new Solar Stewardship Scheme proposed by trade association, Solar Energy UK. Encouraging the early adoption in 2024 of a Joint Code of Practice for solar PV specifiers, designers, suppliers, operators, and insurers; the RC62 is designed to further improve safety for commercial and industrial rooftop mounted PV installations. In addition to industry-wide standards, it will include a guide for insurers and clients on procurement, ownership, and operation and maintenance. We are keen to see this initiative move forward as soon as possible.

THE YEAR OF THE BATTERY

Predictions for 2024 is that the commercial solar rooftop market is set to take off. With decarbonisation high on the agenda and increased

recognition of the benefits of self-generated energy and more affordable storage options, 2024 will see a substantial growth in battery storage installations.

Batteries allow businesses to store power and draw on it when needed, as well as being force charged overnight at lower electricity rates and the energy used in the day when electricity rates are higher. Battery size and costs have decreased over the past 5 years by at least 40%.

So, the next 12 months will be bright. As the PV solar market expands year on year, it will be about how we are all seizing that opportunity. Inevitably, like many other sectors we will be facing resourcing issues and as a sector need to encourage the development of skilled electrical installers to meet the growing demands.

At Aztec Solar Energy our expansion year on year will see further developments with a branding refresh in order that we are best positioned to capitalise on the growth opportunity. Also having recently become the UK's specialist commercial PV and battery systems partner for the Effective Energy Group, this will accelerate our expansion plans. We are all set to take the business to its next phase.

As both our commercial and private sector landscapes change around us, we will see more PV and battery systems, powering an increasing number of local and national services, creating improved energy security and capitalising on the power of greener energy solutions for all. We should embrace 2024 with optimism and commitment to a brighter and greener future.
<https://aztecsolarenergy.co.uk/>

WISE UP ON WATER USE IN THE PUBLIC SECTOR TO IMPROVE RISK MANAGEMENT AND REDUCE ENERGY COSTS – IN WINTER – AND BEYOND

Whether you're a facilities team, business manager, sustainability manager, energy manager - or in another role - water is an essential part of any public sector operation. Looking closer at water use at a site during the year can have a range of benefits for organisations - large and small - including lower utility costs and can support the progress being made to net zero.

Savings can stack-up soon for the public sector through little actions to see where and how water is used at buildings - and harnessing people power at sites.

Water Plus, the largest water retailer in the UK and a multi-award winner for work with organisations around water use, shows how to tap into more benefits around water that's used in the public sector.

KNOWING WHAT WATER'S USED - AND WHERE - IS KEY TO SPOT OPPORTUNITIES

Being more aware of water that's used helps organisations reduce water waste and risks to supply interruptions on site water pipes. This webinar, with the Public Sector Sustainability Association (PSSA), covers some of the steps - and other savings and benefits seen, through looking closer at - and managing - water more effectively. View here: <https://www.youtube.com/watch?v=UXZGap4UukI>

A range of more than 40 sites in England, including in the public sector, have seen an average 34.6% water-saving in 2023, after water efficiency audits were completed and water efficiency devices were installed.

If less water needs to be heated, or less moved around by pumps at a site, for example across a hospital or council-owned buildings, then there's an energy saving too. Less water



Image: Jos Speetjens via Unsplash

used overall also means fewer carbon emissions, under Scope 3, so helps with progress towards net zero targets.

Whether it's for Estates Returns information for councils, hospitals and PCTs, or to help track reductions in water use in general, noting down meter readings regularly, if the meter is safe to access, and providing these online, is worth doing to track use and spot any unexpected changes. There is also technology that can help track use and update bills, reducing estimates on use.

ENGAGE MORE EYES, TO HEAR WATER-SAVING IDEAS AND ISSUES

Staff and visitors can play a big part of the water management approach at a public sector site.

A Sustainability Day at an NHS Trust this year engaged doctors, nurses and other site staff around water and the environment. Water Plus were at the day, and a quiz of staff at the event found a lot got the questions right on

how much water was used in different ways and some were already limiting shower times. Staff were also very conscious of costs and how they were using water and gas as Water Plus highlighted the links around water-saving and wider benefits. Along with other communications and virtual meetings, Key Account Managers at Water Plus have visited more than 10 public sector sites in 2023 to help organisations with proactive water management and areas for efficiencies and energy saving.

Water leaks at public sector buildings could cause a supply interruption, so being on the lookout for water issues is wise, whatever the time of year it is.

It's important to consider if your staff and those visiting or using your site would know who to alert if they saw a water leak.

REGULAR CHECKS AND MAINTENANCE CAN REDUCE WATER RISKS

Regular servicing and maintenance of taps, toilets and urinals - as well as any

water efficiency devices in buildings - is important - so it's known they're working properly and no water's being wasted.

Cold weather and changing temperatures can make a burst pipe more likely at sites, so tracking water use helps reduce risks and keeps your public sector building functioning and providing services. The changes in temperatures can cause ground movements that can affect underground pipes at sites - and even a small trickle, or drips on a tap, can cause a pipe to freeze.

DIVE INTO MORE DETAIL ON OPTIONS TO TAP INTO WITH WATER

Changing approaches to water use, at sites, doesn't need to be complicated, or costly.

Scott MacIndeor, who heads up the Advanced Services team at Water Plus, which won a Global Gold for Water Management in the Green World Awards in 2023, said: "On a day-to-day level, innovation with water can be as easy as a small change at a site, including raising

awareness amongst staff and visitors, to be wiser with water use, reduce use where possible and highlight areas where improvements can be made or where any tap or pipe issues can be raised.

"There are a variety of solutions out there around how water is used - and it's important to understand what would work best for your site when it comes to water efficiency measures - and seek experts for projects and installing kit. It's also vital to make sure any changes around how water is used complies with the relevant laws and byelaws in place, like the Water Fittings Regulations, Water Industry Act and others."

Scott continued: "We manage the water and wastewater services for many public sector organisations, including some of the largest and most diverse in the UK - such as councils, schools, colleges, universities, hospitals and the emergency services - so we understand their different needs and drivers and we've helped organisations make significant savings across their portfolio, reducing water use and contributing

to their sustainability aims and the UN Sustainable Development Goals."

Water Plus, which won a UK Customer Satisfaction Award in 2023 and two National Sustainability Awards in October 2022 for work with sites around their water, is highlighting water efficiency and water pipe winter messages, to help organisations of all sizes - under their #BeWiseOnWater awareness campaign. The water retailer has won 16 awards since October 2022 for work with organisations around their water use and its steps to increase water efficiency, help reduce water waste and support projects that help communities.

To find out more about how Water Plus can help public sector water-saving, email hello@water-plus.co.uk, with the subject heading "Energy Manager and PSSA". Further information can also be found on the Water Plus website and on the Water Plus social media channels. <https://myaccount.water-plus.co.uk/help/article/cold-weather-advice>



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12th - 13th March	Energy Efficiency in Buildings

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DATA: THE PUBLIC SECTOR'S NORTH STAR

Data is often overlooked when looking to cut costs and carbon across public sector buildings. In theory, it offers everything needed to monitor, predict, and reduce energy use and emissions. In practice, real-world complexity and resource constraints result in data being filed in the 'too frustrating' bin. Data can be a North Star, guiding the way to better projects and energy procurement, and budget-friendly buildings that help direct funds to vital public services.

The Open Data Strategy laid out a clear roadmap and action plan as to how industries should be harnessing data to realise the economic, social, and technological opportunities that it holds. The energy sector is no different. In recent years it has made significant progress in developing its data capabilities; utilising data across the full energy supply chain to improve the planning and operation of the network. Programmes such as the Energy Data Taskforce have stimulated the industry and spawned a myriad of initiatives that make up the energy data ecosystem.

The good news is that the resulting data and tools can be utilised by organisations pioneering the use of energy for their decarbonisation journeys. Data strategies can start simple, identifying some of the key elements and challenges that need to be addressed, and then iterated on as it develops to provide continual value from your data activities. The Energy Data Management Canvas tool provides an extensive, flexible framework that can be used to shape and plan this development.

STAKEHOLDERS AND THREADS

A key first step in managing energy data is understanding everyone who has a stake in that data and what they hope to get out of it. These "data stakeholders" include building owners, facility managers, utility companies, technology vendors, tenants, regulators, and others.

The Energy Data Management Canvas tool encourages the creation of short "data stakeholder profiles" for projects. These explain who the stakeholder is, what their goals are, what questions they'll want answered, and what data could help provide those answers. For example, a building owner may want to track the performance of new HVAC equipment to prove payback.

Documenting user needs makes it possible to follow the data from origin to collection, storage, analysis, and reporting. Doing this mapping upfront prevents

Comment by Marcus Alexander, Advisor – Sites at Energy Systems Catapult



dead ends or gaps from cropping up later. It enables trade-offs and priorities to be balanced across multiple parties.

SOURCES AND COLLECTION

Once data stakeholders and their needs are defined, the next piece is identifying data sources and collection methods.

For a building retrofit project, data sources might include meter readings, equipment sensors, weather data feeds, utility bills, and tenant surveys. Legacy systems, proprietary platforms, public databases, and custom collection tools may all play a role.

As options are considered, the canvas prompts several key reflection points:

- Data quality – What accuracy or granularity is truly required? How can consistency be ensured across disparate streams?
- Costs – Are there fees to access certain datasets? What is involved in new infrastructure for gathering data?
- Risks – Are there contractual terms or legal requirements governing the use of certain data? How vulnerable is the data pipeline?

Thinking through these aspects in advance prevents unwanted surprises. It focuses collection efforts on what is essential for stakeholders, leading to responsible data management.

STORAGE AND GOVERNANCE

Once relevant energy data sources are identified for building projects, decisions must be made about storage infrastructure and governance policies.

On storage, factors like frequency of access, retention requirements, and disaster recovery tolerance determine whether databases, data lakes, or warehouses are most appropriate. The canvas helps assess needs for data security, backup systems, and patching schedules.

Documenting rules that apply to managing privileged data is crucial – from customer privacy policies to regulatory compliance mandates. Roles and responsibilities should be defined across partners. For example, who is authorised to access raw tenant energy usage data?

Taken together, storage and governance tactics ensure operational reliability as well

as oversight. They also facilitate trust and participation from tenants. Following established protocols allows more impactful use of building energy intelligence.

IMPLEMENTATION AND OPERATION

Onsite metering can be challenging. Often, sites lack sub-metering, especially when it comes to heating demand or fossil fuel consumption. Additionally, it may be that fiscal meters are not automatically read, and there's a lack of ownership and skills for data monitoring. Solutions include upgrading meters, more resource allocated for regular data monitoring, a unified dashboard for all meters, and better granularity of metering to provide valuable insights on fossil fuel and heat use. Free tools like the Business-as-Usual (BAU) Estimator can help.

Once you have a comprehensive baseline, you can begin planning for decarbonisation. This forms the basis of your plan – and a measure against which you can assess the impact of your proposed interventions. By including aspects such as asset lifetimes and future plans or anticipated changes to your estate, you can estimate the size of low-carbon heating solutions, as well as outline costs based on sizing and necessary alterations.

WHAT DOES THE FUTURE HOLD?

The true potential of energy data is yet to be unlocked. With machine learning and AI, we can manage buildings more efficiently. Big datasets will help us create accurate benchmarks, better understand decarbonisation pathways, and the performance of different technologies in the real world, paving the way for more sustainable practices. Help is available. Step forward 'InSite!'

Backed by Innovate UK, InSite is a new project to develop a national energy database that holds and synthesises data from 1000s of sites, projects and technologies. The aim is to set benchmarks, unlock finance by demonstrating returns, and cut costs and carbon across UK sites. A pilot is currently underway with NHS England. www.es.catapult.org.uk

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