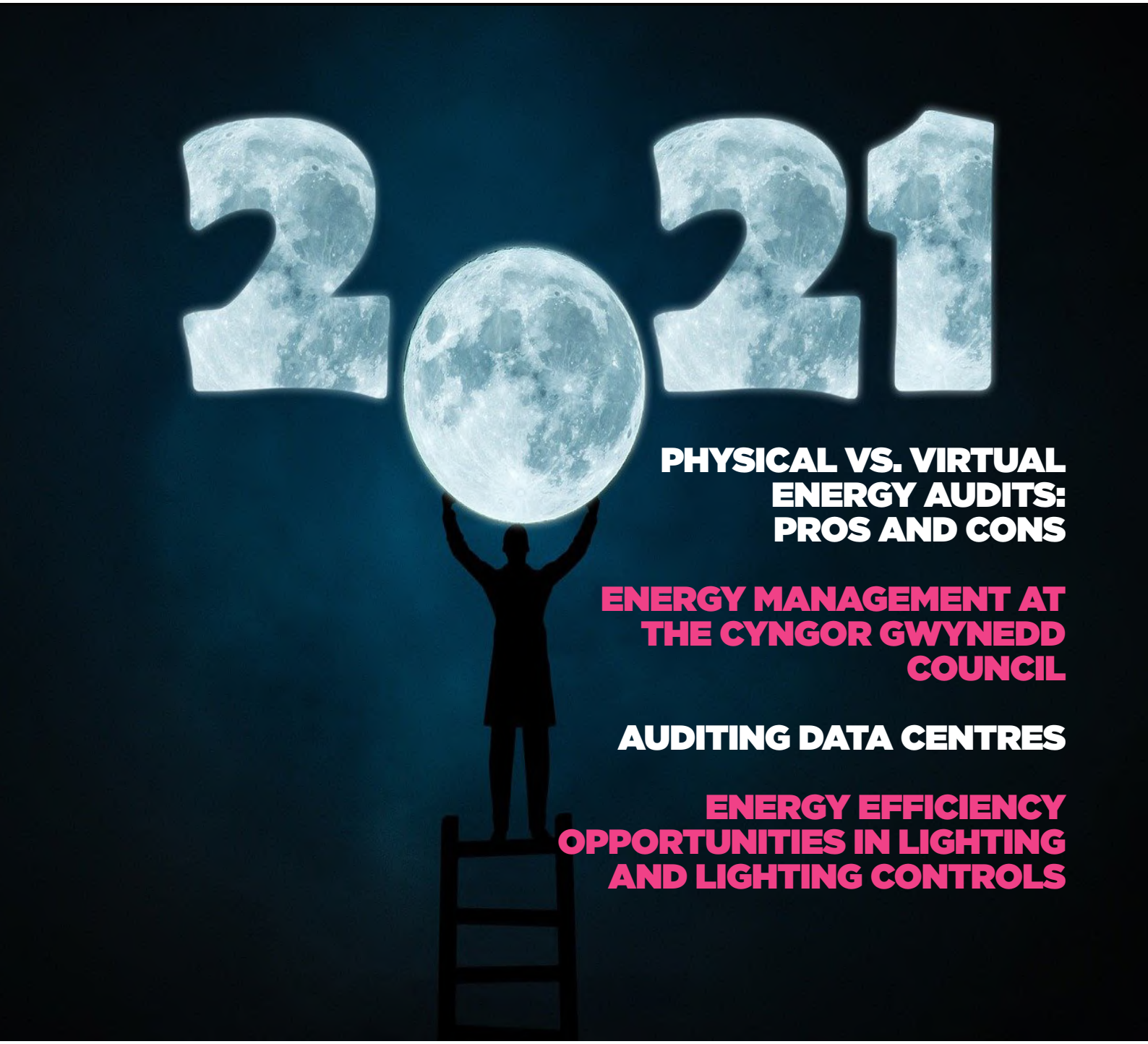
THE EMA MAGAZINE

www.theema.org.uk | ISSUE JANUARY-FEBRUARY 2021



PHYSICAL VS. VIRTUAL ENERGY AUDITS: PROS AND CONS

ENERGY MANAGEMENT AT THE CYNGOR GWYNEDD COUNCIL

AUDITING DATA CENTRES

ENERGY EFFICIENCY OPPORTUNITIES IN LIGHTING AND LIGHTING CONTROLS

Energy Management Trends for 2021

Our 2020 Contributors

My Role in Sustainability

LOCAL PARTNERSHIPS

refit

Accelerating investment and decarbonisation of the public sector estate

Re:fit is the framework of choice for the public sector. It enables change to be delivered at scale and pace, supporting you with the preparation and implementation of programmes of energy efficiency and renewable energy projects. This helps reduce carbon emissions, create income and improve the operational performance of your buildings, whilst helping accelerate the journey towards achieving net-zero.

Co-owned by the Greater London Authority and Local Partnerships, the Re:fit 4 Energy Performance Contract Framework offers a swift procurement route with an OJEU compliant framework of 16 providers. It is underpinned by a performance guarantee, providing certainty to organisations and de-risking projects, protecting the client and their investment.

As a managed framework, dedicated expert support is provided to all organisations, through every stage of the project. We help minimise cost and maximise savings and assist in appointing the best contractors for the project.

Local Partnerships is proud to be part of the public sector family. We are a joint venture between the Local Government Association, HM Treasury and the Welsh Government. We work solely for the benefit of the public sector.

Our experts provide trusted, professional support. We bring public and private sector experience that provides **confidence**, **capability** and **capacity**, helping public sector organisations achieve sustainable targets and a path to net-zero.

To find out how Rachel and her team can help
email rachel.toresen-owuor@localpartnerships.gov.uk or call on 07825 963 218. If you're based in London please contact retrofitaccelerator@london.gov.uk

JOINTLY OWNED BY

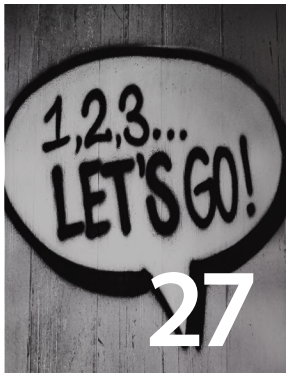
HM Treasury | Local Government Association | Llywodraeth Cymru Welsh Government

contents

FEATURES

CAREER & TRAINING

INDUSTRY FOCUS



THE EMA MAGAZINE

Dear Reader,

Welcome to the 29th issue of The EMA Magazine in which we bring a variety of articles and convincing reasons to use them as resourceful support in development of your energy management practices.

The expected new 'roaring 20s' certainly roared but not quite in the way we anticipated. The echoes of last year might still be with us when we look forward to energy management in 2021 and explore areas that energy managers are considering. The new and very positive turn is the recognition of energy management skills and knowledge as critical for the delivery of net zero targets. With only 10 years left to halve global emissions, I'd say, it's about time!

Reflecting on skills and the variety across the energy management specialisms, we are introducing a new feature My Role in Sustainability and Energy Management. Turn to page 20 where two sustainability professionals self-assessed against the energy management competencies.

With the year now well underway and to blow away those last year's cobwebs, we are turning our focus to some of the most important aspects of energy management – the energy audit. We take a look at the definition of virtual audits and their effectiveness with respect to the on-site audits. We also consider the complexities of auditing data centres.

Meanwhile on page 29, we take a closer look at a local authority the Cyngor Gwynedd Council and their energy management activities and challenges.

As busy as 2021 may become, those who are up for a challenge – will certainly be in for a ride. We'll be there too, putting out emails, publishing bi-monthly issues of the magazine, hosting events and delivering courses. I hope to 'see' you along the way.

In the meantime, I wish you an enjoyable read and stay well.

Yours,

Jana Skodlova
CEO, The Energy Managers Association

PUBLISHER
The EMA Magazine is published bi-monthly by the Energy Managers Association (EMA).

EDITORIAL
The Energy Managers Association
www.theema.org.uk
Tel: 0203 916 5516

CONTACT
Edita Krupova; Editorial Enquiries & EMA Membership Services Manager
edita.krupova@theema.org.uk

CONTRIBUTORS:
Andrew Fletcher, Andy Creamer, Warren Pope, John Kyffin-Hughes, James Sharman, Ashley Whichelow, John Mulholland, Rebecca Nunn, John Booth, Philip Spiby, Matteo Deidda, David Lewis, Neil Bradley, Stuart McLeod and Bobby McHale

ADVERTISING SALES
The EMA Team
Tel: 0203 916 5516
enquiries@theema.org.uk

ABOUT EMA
The Energy Managers Association (EMA) was set up in February 2012 and represents Energy Managers across all industries. Our priority is to improve the position of energy management experts and their profession and act as their united voice. We aim to develop the skills, knowledge and experience of professionals through our training, high-quality peer to peer guidance and best practice exchange.

ENERGY MANAGEMENT ONLINE TRAINING SCHEDULE 2021

Energy Management Theory Combined with Real-World Applications

FEBRUARY
25th SECR Compliance

MARCH
5th Lighting – Basic Understanding
11-12th Fundamentals of Energy Management
23rd Monitoring, Targeting and Validation
26th On-site Electricity Generation

APRIL
13th Battery Storage for Business
16th Energy Auditing Techniques

MAY
14th Energy Procurement
21th Turning Data into Energy Savings
27th Understanding and Delivering Behavioural Change
28th Essential HVAC Control and Optimisation

JUNE
9th Waste Management
10-11th Energy Management in Building Services
17th Water Management

REDUCED PRICES

Knowledge and Skills Gap Analysis Interview
Understanding of a range of energy management competencies is required for professionals to effectively manage organisation's energy cost and consumption, monitoring and reporting energy use, as well as meeting energy efficiency requirements. The EMA can assess your knowledge and skills through the Knowledge and Skills Gap Analysis Interview. The Interview is an informal 60-minute conversation that concludes with a feedback on how to progress your professional development and advance your career.

Group Training
All courses can be delivered to teams or groups of stakeholders from the same organisation or industry in a standard format, or as tailored sessions (minimum 6 candidates). For a quote email jana.skodlova@theema.org.uk with your chosen course title and approximate number of staff. We can also develop new, bespoke material to fit specific client needs.

For an up-to-date list of all our courses visit our website at www.theema.org.uk

"The course built on all aspects of previous knowledge and added a potential new skill that I did not have before attendance."
Energy & Environmental Manager - Celtic Manor Collection

"It was informative, useful and given confidence to challenge quotes and suppliers."
Energy Efficiency Manager - Parkwood Leisure

by Andrew Fletcher, Andy Creamer, Warren Pope and John Kyffin-Hughes

Energy Management Trends for 2021

As we look forward to energy management in 2021, many of the trends will be informed by the past 12 months. Whilst, the pandemic continues to impact budgets and consequently projects, the net zero aspirations and electric vehicles infrastructure keep everyone eager. However, the notion is that to achieve the green targets there is a need for clarity, skills and knowledge.

Inspired by our annual membership survey on energy management trends, some of the participants set out what, in their opinion, are the most important trends that will transform energy management processes and profession this year.

Andrew Fletcher, Managing Director, Carbon Control Limited

Role of energy management profession to transform net zero from fiction to reality

Back in June 2019, the UK government enshrined in law the UK's commitment to reduce greenhouse gas emissions (GHGs) to net zero by 2050. In December 2020, the government released its long-awaited energy white paper and plans for a "green industrial revolution". In November this year, the UK will host the 26th UN Climate Change Conference (COP 26). Government's announcements surrounding the UK's commitment to deliver net zero have been followed by a deluge of announcements and press releases signing up to net zero and declaring ever shorter deadlines to achieve. Whilst many organisations have sought to proclaim their carbon neutral credentials for a number of years, with few notable exceptions, the vast majority have sought to rely solely upon offsetting through planting of trees or a range of other global schemes. However, with greater scrutiny of such schemes and their efficacy being called in to question, a shift in emphasis has emerged.

We are now seeing a shift towards Science Based Targets and verifiable evidence of reduction in Scope 1, 2 and 3 emissions over time. Additional requirements on quoted companies to calculate and report on global energy use and information relating to energy efficiency, coupled with the implementation of Streamlined Energy & Carbon Reporting (SECR) legislation for large unquoted companies, have further placed action ahead of merely box ticking.

I strongly believe that now is the time for the energy management profession to step forward. As the custodians of much of the data required to accurately calculate GHG emissions, coupled with the knowledge of how to reduce emissions, we must seize the opportunity to show how to deliver a realistic transition to net zero. Energy managers will attest that setting such a course must be

> "Whilst many organisations have sought to proclaim their carbon neutral credentials for a number of years, with few notable exceptions, the vast majority have sought to rely solely upon offsetting through planting of trees or a range of other global schemes.

underpinned by the principles of eliminating energy wastage, enhancing energy efficiency and switching from fossil fuel energy sources to renewable energy sources and / or on-site renewable energy generation. Similarly, Covid-19 enforced changes to working practices provide the opportunity to re-evaluate vehicle fleet policies in favour of Electric Vehicles (EVs) and challenge the need for historical norms allied to UK & overseas business travel. Spearheaded by those of us involved in all aspects of the energy management profession, will enable organisations to transform progress towards net zero from fiction to a reality.

Andy Creamer, Energy Manager, Mapeley Estates Limited

Blow the trends - just keeping the business afloat is current priority! In normal times, however, I would have said:

Self-generation

The expansion of photo-voltaic panels into the UK buildings estate is essential to keep the growth of non-centralised generation ahead of the curve. The emphasis seems to be on wind power, but in recent years the hottest and coldest days (in general) have been among the least windy. Perhaps this could be an opportunity to replace lots of duff building cladding (remember Grenfell) with a beneficial alternative. Odds on this has been thought of by betters than I – so why not to do it? Ground Source is already seen as a viable alternative – vis a vis the communal roll out in Oxford (and, no doubt, others), on the TV recently. We all know of CHP to generate heat and power (and CO2), but as Fuel Cells develop and scale up then the investment will become quite compelling as before without the CO2 to offset…..and pay for. Further help can be in the form of Building Regs and Planning approvals for these types of installations being easier to achieve.

Self-Storage

The energy we all produce in the multifarious ways to reduce the carbon is not always conveniently timed – the wind blows at night and being still in the day is not helpful; likewise a hot but cloudy day!! Saving and storing the energy is what we as a species need to do to speed up the reduction in long term climate (as opposed to weather) damage. Whether this is by battery or solid state, or means yet to develop, saving the energy reduces waste and will make the infrastructure more efficient and effective …. which is certainly going to benefit my budgets.

Power Cell H2 generation

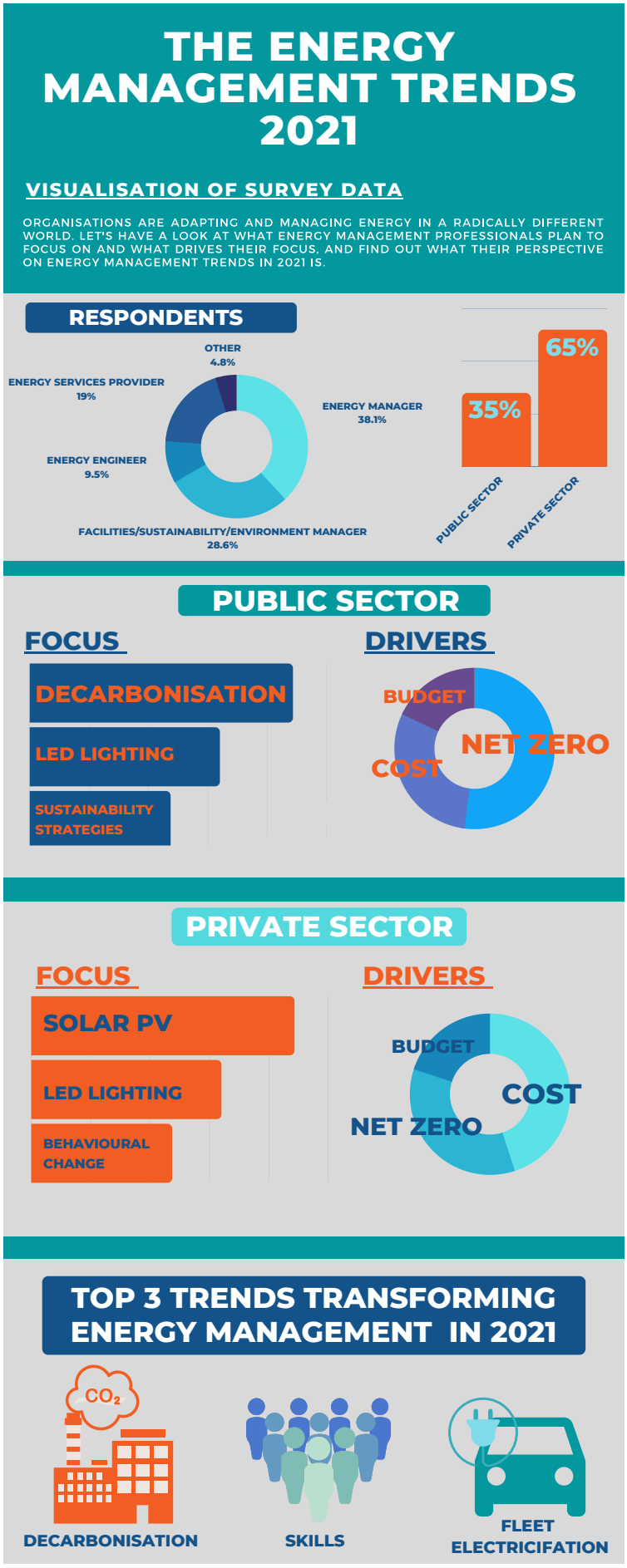
Fuel (Power) cells are being vaunted as the saviour of hybrid EVs to increase range and load by assisting the batteries under heavier load – and that's fair enough. But as above, anything with an internal combustion engine (ICE) can run (with adjustment) on hydrogen (H2), after all it's a primary component of all those Hydro-Carbon fuels with harmless emissions. I am sure this is going to be the saviour of HGVs, buses, railway shunters, ships (or boats if you prefer) and anything where batteries alone are inadequate (for now). And from my point of view, hydrogen is also a valuable alternative to Natural Gas for CHP systems going forward and a substitute fuel to existing installations.

But of course, none of this will come to fruition without tax breaks, planning permission and investment grants, in order to make the leaders investing into any such technology's development more palatable and thus attractive. Remember the Brexit bus £350M a week slogan? 3 weeks' worth of this is over a billion quid…quite a fillip to the investment funds to help preserve our children and their children's futures I think.

Warren Pope, Retrofit Project Manager, RetrofitWork Limited

General Confusion

A lot of people are publicly giving their views on reducing carbon, but most are ill informed. In quick succession I have seen the summary of two government working groups, one on the use and inclusion of modular housing, and one of the futures of climate change. The first



group decided that Modular/Modern Methods of Construction (MMC) was the future to resolve housing shortage and should be encouraged and supported. The climate group reported that the use of Modular housing would result in excessive deaths of occupants due to overheating and should be banned from the housing market.

Others rush for the removal of fossil fuel cars and enforce electric only, with no thought to the availability of electric cars, or how the physical network would deal with the power demand to charge vehicles, and let alone the current cost of the cars which would take them out of reach of many people.

Further issues relate to refurbishment of domestic properties, to provide best carbon and energy savings. Interventions need to be sequenced in a specific manner, the quality of work can be suspect, specifically with external wall insulation. It is imperative that a level of quality control is used from properly trained retrofit staff that will coordinate good quality best practice based on science and proven trials.

Over the past year I have read a lot of articles stating that electric cars should be banned as they are more polluting than fossil fuel cars, that road building should be stopped due to particle pollution from tyre wear. However, evidence is in short supply combined with miss information campaigns.

Government Confusion

I have seen ministers and MPs on prime TV promoting the installation of heat pumps to existing wet based radiator emitters, claiming it's a straight swap for a gas boiler. It's not correct, they may not work properly without consideration of insulation levels, yet the government continues to talk rubbish without the first clue of how little they know.

Those with a public presence need to be more mindful regarding the recommendation

> Over the past year I have read a lot of articles stating that electric cars should be banned as they are more polluting than fossil fuel cars, that road building should be stopped due to particle pollution from tyre wear. However, evidence is in short supply combined with miss information campaigns.

of technology, often with no technical knowledge equipment is recommended. While it is possible to put some heat pumps on a house, a straight swap is not best practice.

Race to Net Zero

Lots of local authorities are stating they will achieve Net Zero, but do not acknowledge the true cost that is required.

There appears to be a race as to which local authorities can achieve Net Zero the earliest, main thoughts seem to be with offsetting and changing to "green energy". Most have changed to LED but have not looked too much further. Local authorities need to be more innovative with finance, perhaps bulk purchase with a call off regime, repurposing building use, local refurbishment competitions for new technology.

A recent KTN webinar showed that some authorities shy away from innovation, which leaves a gap between normal and improved savings. But last of all, how about having clusters of local authorities working together to combine buying power, possibly even opening localised manufacturing centres and re-training the recent surge in unemployed for manufacturing low carbon technology at cost for use on local domestic and authority buildings?

John Kyffin-Hughes, Business Engagement Manager (Low Carbon SMEs), Aston Business School

Better understanding of carbon footprinting for influencing speed of implementing energy conservation measures

This year more than any other year will see the political winds blowing strongly in favour of acting on climate change; culminating in latest UN Climate Change Conference (COP 26) in November.

The clamour for action arising from public concern and political opinion will, I am sure, accelerate the cascade of organisations setting net zero targets. The exercise of target setting will reveal the enormity of the gap between where an organisation is presently, to where it needs to be to meet its net zero commitment. For organisation stepping up to fill this gap, this will necessitate an increased pace of roll out of energy conservation measures.

The experience of how organisations have responded to the pandemic in terms of finding new ways of working hopefully will not be lost. This should enable organisations to question more fundamentally how they deliver their products and services with net zero commitments in mind.

Greater competency in energy management within businesses

To rise to the challenge of meeting net zero commitments there needs to be a step change within organisations in terms of understanding and enhancing their energy management performance.

Those involved in the implementation of energy conservation measures will need to possess as a minimum, basic skills and knowledge of energy management techniques. So that the increasing awareness, of need to do act to reduce energy use, turns to prudent and impactful action.

Areas I would consider as crucial in improving competency are in setting up proper monitoring and measurement systems, developing and internally selling business cases for energy efficiency projects, understanding and installing varied energy conservation measures and verifying the benefit of implemented actions.

Hence my prediction that improved competency in energy management will be an important trend over 2021. If only, to determine if the sales pitch by a representative of a technology provider is credible for your organisation's circumstances.

by James Sharman, Ashley Whichelow, John Mulholland and Rebecca Nunn

Physical vs. Virtual Energy Audits: Pros and Cons

As a consequence of the measures introduced to tackle the pandemic, the virtual energy audits have been considered more frequently. In this opinion piece, four experts explore the definition of virtual audits and their effectiveness with respect to the audits undertaken on sites.

James Sharman, Senior Energy Manager, Hospitality Energy Saving

As an energy manager working extensively within the hospitality sector, I have witnessed at first-hand the challenges faced by businesses due to the Covid-19 pandemic. The additional pressures on resources and the need for social distancing have made physical visits impractical and put a halt to normal energy auditing activity. Are virtual energy audits the answer?

The first step of an energy audit would normally involve carrying out a desktop assessment to identify opportunities and establish the ground for a physical visit. The visit itself would involve inspection of the building and equipment along with observation of on-site practices to develop an understanding of the impact of behaviours on usage. The findings of the desktop assessment and physical visit would then be combined into a report to summarise cost saving opportunities back to the client. A 'virtual' energy audit involves smarter use of data and the absence of a physical visit. So, no site visit and no face-to-face interaction with operators. But how effective can a virtual energy audit be in the absence of a physical component?

Here are my opinions on the pros and cons of each type of audit.

Physical audits pros & cons:

- Physical visits open up the possibility of making changes whilst on site. This might involve adjusting controls to optimise performance, resetting a time clock or simply turning something off that shouldn't be running. This has the potential to remove reliance on contractors and deliver immediate savings.
- Face to face interaction with front line teams can be incredibly insightful. Within hospitality, kitchens can be responsible for around two thirds of total energy costs. Discussing practices with chefs who may not ordinarily be exposed to the principles of good energy management can be key to unlocking savings.
- Physical audit costs are likely to be higher due to the logistics of carrying out a site visit. However, the potential to make changes whilst onsite and liaise with front line teams means this is likely to be accompanied by bigger savings.

Virtual audits pros & cons:

- Virtual energy audits rely on good quality data. If data is poor or incomplete, then the ability to carry out a virtual

> "A 'virtual' energy audit involves smarter use of data and the absence of a physical visit. So, no site visit and no face-to-face interaction with operators. But how effective can a virtual energy audit be in the absence of a physical component?

audit is compromised. In contrast, physical audits are not reliant on data to deliver savings, albeit an absence of data might make savings harder to quantify!

- The value of a physical visit can be hard to replicate virtually. Experience has shown that a virtual review can be improved significantly if you're able to talk to someone who knows the site and can help understand what you're seeing in the data.
- Virtual audit costs are likely to be lower due to the absence of a physical visit. However, the lack of physical checks and interaction with front line teams is also likely to mean that identified savings are lower. Furthermore, delivery of savings will rely more heavily on action by the energy user. Mitigation may include additional communications with site and further monitoring of performance, but these steps will add cost back in.

In conclusion, I believe that virtual energy audits have the potential to be an extremely valuable tool, certainly in the short term whilst the ability to carry out physical visits remains difficult. The move to new remote working practices and continuing developments in data provision, retrieval and analysis can only be a good thing for the longer-term integrity of energy audits and assessment of cost saving opportunities in a post pandemic world.

Ashley Whichelow, Utilities Manager, Bourne Leisure Ltd

With many thanks to Rhea Campbell-Smith and Jonathan Waldie who also contributed some thoughts included in this piece.

Working from home presents many challenges for us all, and as a Sustainability professional one of these is effective, remote energy auditing. It can certainly be a lot warmer, comfier (and less expensive for the business) to carry out an energy audit from the office chair, with all the data presented in front of us, but there are plenty of benefits we are missing as well.

Going to site may take longer and incur expenses, be tiring (especially the night walk) and take us away from our family for the night. But we also get to see the operational side of the site; how the team members interact with the equipment, fixtures and fittings in their daily roles gives us an insight into some of the efficiency measures we can recommend; we can use our eyes and ears to hone in on the source of consumption in a way numbers and graphs could never help us.

The opportunity to speak with the facilities manager and the general manager of the property yields great insight into the challenges they face, and spending dedicated time with them to explain and actually show them some of the measures that will save them energy is something that cannot be replicated when we are physically separated.

A physical audit gives us the opportunity to gather and provide photographic evidence to support our findings, which can in turn be used to promote behaviour change and engagement with energy users we might not meet, supporting our facilities managers. Being present also gives us a chance to become immersed in the culture and understand the methods of communication that will help to deliver such changes.

In contrast, whilst these benefits are absent during home working, a virtual audit presents other opportunities. Without the burden of travel and expenses, virtual audits can be undertaken with far more regularity. If one is able to combine frequent virtual audits and regular catch ups with general managers and facilities managers, this maintains focus much more easily, shortening the feedback loop and making marginal gains easier to obtain. The added benefit is that leaders in the business become used to looking at data as that is all we are able to present to them. As a result, we are now taking less time to explain the meaning of graphs and tables to them, and spending more time discussing the actions and results.

We have even found that operations directors attend some of our group calls and we have gained a more direct line to asking for any additional funding or support to meet challenges experienced by several sites.

With the data having gained such a high profile, we are finding also that there is a greater appetite to expand the number of submeters (and keep on top of any faults) on our sites to obtain greater visibility, at a more granular level, to facilitate targeted action. Improving the accuracy and analytics will help draw us closer to the level of detail we can expect from a physical audit as we narrow down the areas being metered.

Taking all of this into consideration, I believe there is now more momentum behind energy auditing, and more engagement at a higher level, as a result of how we've had to adapt and improve the techniques and reports used for virtual audits. I believe these processes are here to stay, but I also have no doubt that as soon as we are able, we will be back out at sites again to conduct physical audits so we can really see the usage, engage with the team on the front line of energy use, collect alternative forms of evidence for our reports and build relationships with the site managers and help them visualise the solutions in the actual space that we are identifying the opportunities. Energy audits won't fundamentally change in the long-term, but we will have gained more tools and processes to carry them out more effectively, and with better results.

> "The opportunity to speak with the facilities manager and the general manager of the property yields great insight into the challenges they face, and spending dedicated time with them to explain and actually show them some of the measures that will save them energy is something that cannot be replicated when we are physically separated.

Eur Ing John Mulholland BScTech (Hons) CEng CSci MIChemE FEI, Director, Mulholland Energy

Words are important as they convey meaning. Therefore, before comparing Virtual and Physical Energy Audits, it is helpful to define different types of energy audits and surveys.

CIBSE's *Energy Efficiency in Buildings Guide F* sheds some light. Their definitions and goals are summarised in Table 1.

What is the overall goal? To significantly reduce energy consumption by implementing cost effective energy saving opportunities identified in the energy survey. But there is a logical order in Table 1.

There are three steps:

1. Preliminary Energy Audit
2. Full Energy Audit
3. Energy Survey

Step 1 needs to take place to enable Step 2, which, in turn, enables Step 3.

Type	What?	How?	Who?
1. Preliminary Energy Audit	Analysis of energy invoices, sub-meter data and half hourly data.	Desktop analysis remote from site.	Data Analyst
2. Full Energy Audit	Assessing detailed energy use breakdown by calculation, sub-meter data and additional metering, attributing energy to end use such as heating, chillers, ventilation, lighting, catering etc., balancing incoming energy over the audit period.	Combination of desk top analysis and on-site investigation.	Energy Specialist
3. Energy Survey	Detailed technical investigation which identifies specific cost-effective energy saving opportunities.	On-site investigation.	Energy Specialist

Table 1 Definition of Energy Audits and Surveys

The European Standard on Energy Audits is EN 16247 and it defines an "energy audit" as:

"Systematic inspection and analysis of energy use and energy consumption of a site, building, system or organisation with the objective of identifying energy flows and the potential for energy efficiency improvements and reporting them."

Slightly confusingly this definition encompasses Steps 1, 2 and 3 in Table 1. This same is true of the definition of an "energy audit" in the ESOS guidance document issued by the Environment Agency. In both cases the definition of "energy audit" encompasses CIBSE's definitions of Preliminary Energy Audit, Full Energy Audit and Energy Survey.

Is it therefore possible to conduct an "energy audit" compliant with EN 16247 or with ESOS minimum audit requirements without conducting a site visit **and** specifying detailed cost-effective energy efficiency measures? The answer is an emphatic, "No".

Moving focus on to "Virtual Energy Audits", often offered by data analytics companies, who usually also offer energy procurement services, here is a typical offering: *"Energy audits take time, can disrupt your business and can cost more than they save. Our virtual energy audits take the pain out of understanding where you use your energy."*

The statement implies Virtual Energy Audits are cheaper, easier and faster than conventional energy audits, partly because 'Virtual' means a desk top study with no site visit required. But what are the typical inputs/outputs of a Virtual Energy Audit?

Inputs: Typically, these are two years of energy invoice data for gas and electricity.

Outputs: From a 'smart analytics platform' an energy and carbon dashboard arranges the data showing quantities/cost of energy over time. Bar charts and pie charts are used. Carbon emissions are shown, as well as the heating degree day analysis on gas use to identify the level of heating control response to variations on outside temperature.

How does this relate to the definitions in Table 1? The Virtual Energy Audit is the equivalent of CIBSE's definition of a Preliminary Audit (Step 1) which can be done remote from site. But does a Virtual Energy Audit deliver the outputs from a Full Energy Audit and an Energy Survey? The answer is, "No".

Does a Virtual Energy Audit comply with EN 16247 or ESOS? The answer is also, "No". This is because no site visit is conducted, there is no analysis of energy use and energy saving measures are not identified.

Is it fair to compare the cost of Virtual Energy Audit (Preliminary Energy Audit) conducted by a data analyst with a Preliminary Energy Audit, Full Energy Audit and Energy Survey conducted by an energy specialist? The answer is, "No".

The final question to conclude with is, are Virtual Energy Audits worthwhile? The answer is, "Yes". This is because they are the equivalent of a Preliminary Energy Audit (Stage 1) which is needed **before** a Full Energy Audit (Stage 2) which is needed **before** an Energy Survey (Stage 3) which is needed to save energy.

Rebecca Nunn, Operations Manager, Efficiency Direct Ltd.

The overall objective for carrying out a site energy audit is to understand how, when and where energy is used and identify potential for energy efficiencies. The question is, can this be done equally effectively remotely?

Energy audits, historically and traditionally required a physical site presence/ site visit by a suitably qualified energy auditor. Typically carrying out a walk-about of the premises, whilst taking notes, photographs and gathering as much information as possible to gain understanding as to how, when and where energy is used and identify potential for efficiencies.

By physically attending premises, the auditor can use their honed observational skills as well as other senses (smell, hearing and touch) to pick up on clues to identify what is driving energy use. In my experience, the physical site survey gives an all-important opportunity to meet site staff, build a relationship and have an open conversation about energy. However, it is realised that a physical survey on its own, may not provide sufficient insight as it only offers a brief "snapshot" over one or two days on-site.

Whilst my team and I have always, habitually used a physical site survey approach, I have always emphasised the importance of coupling a physical site visit along with in-depth off-site energy data analysis, which forms the core basis for a virtual energy audit.

Virtual energy audits aren't a new concept, but are growing in popularity firstly, due to the impact of Covid-19, and the importance to minimise virus spread and keep people safe, and secondly, the drive to be environmentally conscious and minimise non-essential travel.

Besides from the obvious that virtual energy audits, are in themselves, more efficient, (time efficient, resource efficient, cost efficient and energy efficient) virtual energy audits will become more common practice for one main reason. Data. We live in a data driven world – data is king.

Businesses and buildings are becoming smarter and with that comes more data. Data from sub meters, data from BMS points. The more data, the more insight. Data tells us things that we cannot always physically see. For instance, data can tell us when a piece of equipment within a ceiling void has failed. Data also has the ability to warn us when a piece of plant equipment is getting to end of life and is about to fail. Data allows us to assess the efficiency of things that we can't normally see. The old saying a picture paints a thousand words – well, data paints a thousand more.

> "The old saying a picture paints a thousand words – well, data paints a thousand more.

Certainly, in the short term, virtual audits offer a safer way of working during the pandemic. I have adapted the use of virtual audits, where appropriate as part of ESOS assessments, a methodology which has been supported by the Environment Agency at this time and has gone down well with clients.

The pandemic has taught us to adapt to new ways of doing things and this goes for energy auditing practises too.

EMA SERVICES

PUTTING ENERGY MANAGEMENT AT THE HEART OF BRITISH BUSINESS

NET ZERO

- We can help you to understand and calculate your carbon footprint
- We can help you to create an action plan and put practical measures in place to meet your targets

SECR COMPLIANCE

- We can help you to prepare your report and meet the compliance requirements
- We can verify your report to assure accuracy, completeness and consistency to ensure compliance

ENERGY MANAGEMENT

- We can help you to deliver energy management and energy efficiency
- We can identify training needs, deliver tailored training & embed the knowledge within your team

ema
energy managers association

For more information please contact:
E: ema.team@theema.org.uk
W: www.theema.org.uk

by John Booth
Managing Director at Carbon 3IT Ltd

Auditing Data Centres

Background

Data Centres are homes for digital infrastructures, systems that allow us to use social media, get news, make online purchases, check bank information, watch programmes plus a whole host of hidden activities such as traffic monitoring and controls, rail infrastructures, airport management, they are the beating heart of the digital economy.

Data Centres are designed, built and operated to be essentially off-grid if necessary and this will be in line with the operating organisations "risk profile". The risk assessment (conducted by senior management) will determine the level of equipment required, hence a business that is operating entirely online will be different to one that can withstand some disruption, for example a bank will have a higher risk profile than a conventional high street retailer and the data centre exposure to risk will be reviewed and resilience and uptime designed in. These will result in different designs, globally, many data centres are designed and built to the Uptime Institute Tier ratings, being I, II, III and IV (ROMAN NUMERALS) but the EN50600 series of Data Centre Design, Build and Operate Standards define these levels as classes, 1, 2, 3, and 4.

	UTI Tier	EN 50600 Class
Basic	I	1
Redundant	II	2
Concurrently Maintainable	III	3
Fault Tolerant	IV	4

In essence, to reduce the exposure to risk, the more components will be required, thus incurring more expense and complexity (to manage the failover). Most on-site server rooms will be at Tier/Class 1, on site-data centres at Tier/Class 2, colocation sites and some larger enterprises at Tier Class 3 and some very mission critical sites at Tier/Class 4.

This also means that as you rise up the Tier/Class levels the amount of energy being used increases, and it could be argued that this is "wasted" energy, although it is necessary to provide the all-important resilience and fail-over functionality.

Service Level Agreements

In all commercial and some enterprise data centres (those managed by 3rd parties on the facilities side) there will be historical service level agreements that specify operating ranges for cooling equipment, in some cases these can be quite tight and implementing energy efficiency measures is all but impossible.

As a result Data Centres are one of the most complex environments to audit, as they contain electrical, mechanical and ICT Equipment and support systems such as access controls, fire detection and suppression systems, leak detection, UPS and Generator backups etc and it is imperative

that such audits are carried out by specialists in the field. Specialists that understand these complexities, can identify where energy saving measures can be adopted within affecting the mission criticality of the data centre itself.

However, this is not always the case and results in poor advice or misunderstanding of the functionality and external requirements that data centres can have, and often results in these reports not being acted upon.

Data Centre Business Models

Cleary, enterprise data centres are there to support the business and as such the costs are often wrapped up into the overall energy cost to the business with no clear breakout from office space or manufacturing energy costs. In commercial facing sites (colocation) however, they operate on a space, power, cooling model, there will be a cost for the space, often a single rack or cabinet, a separate cost for energy which will include a portion of the cooling costs and any "remote hands" or networking costs charged on a MB of inbound/outbound traffic. This makes calculations for energy very difficult as some costs are spread out over multiple customers using shared infrastructure and the colocation companies themselves are wary of trying to attempt the calculation.

Audits

The audit environment is also complex, for a standard organisation, a data centre/server room often constitutes a substantial energy cost but is often controlled by the ICT department who push back on any estates or facility manager who dares to tell them, to reduce energy!
In commercial data centres there are often highly skilled energy managers who again push back on auditors without specialist knowledge of data centre operations.

"Cleary, enterprise data centres are there to support the business and as such the costs are often wrapped up into the overall energy cost to the business with no clear breakout from office space or manufacturing energy costs.

So, what kinds of energy audits are used in data centres? ISO50001, ESOS, SECR, are the obvious ones, but there are also specialist energy efficiency audits such as CEEDA which are more data centre specific.

ISO50001 Audits

Data Centres, especially commercial facing often get certified to ISO50001, however, in the UK this is mostly to rid themselves of the ESOS and potentially SECR compliance, as the exemption applies. This means however, that the site still needs to be signed off by an ESOS Lead Auditor, some have even appointed their own ESOS assessors (often the energy manager) who will use existing ISO data to sign off the ESOS compliance requirements.

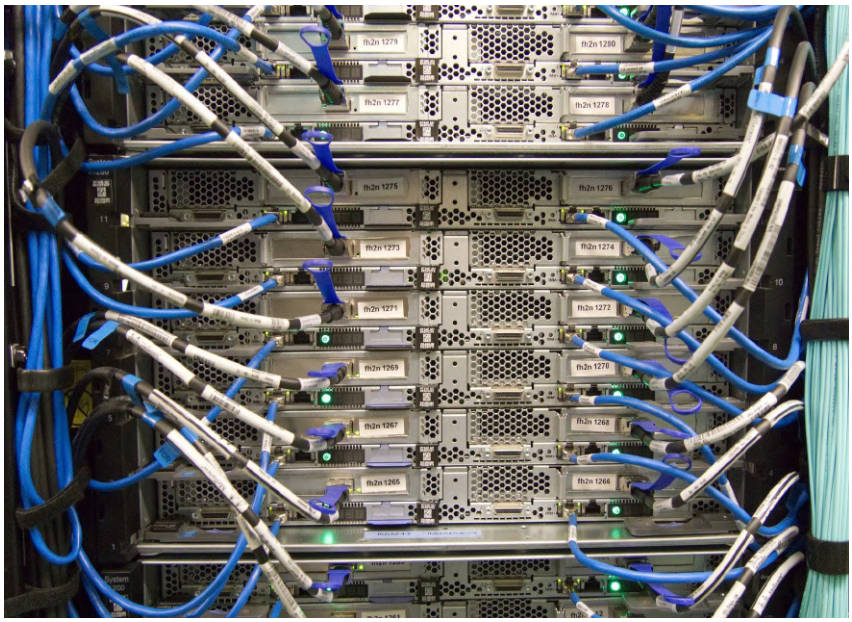
The primary focus of ISO50001 is energy consumption reduction using the appropriate policies, processes and procedures to achieve this, but in a data centre the energy consumption in the main will be rising, especially so in commercial data centres where there may be a significant period of time between opening and full capacity.

Indeed, some may never reach full design capacity due to advances in ICT equipment footprint/energy density, meaning that space is superseded by electrical capacity. This means that over time energy use will actually increase rather than decrease!

This essential fact is the reason why the BSI TCT7/3 committee, that in conjunction with European partners developed the EN 50600 series of Data Centres, Design, Build and Operate Standards, are in discussion with the BSI committee that is responsible for ISO50001 to work through the problem.

ESOS Audits

ESOS, the energy savings "opportunities" scheme audits are particularly problematic, as some of the published guidance is very poor indeed, citing the raising of operating temperatures and the implementation of aisles. The best option is to advise the client to adopt the EU Code of Conduct for Data Centres (Energy Efficiency) (EUCOC) best practices, of which there are over 160 verified measures that will reduce energy. For advice on the implementation of the Code it is wise to conduct a professional, as the incorrect application of them can cause problems, seek specialist advice!



CEEDA – Certified Energy Efficient Data Centre Award

CEEDA is based upon between 75-95 of the EUCOC best practices plus some of the ISO30134 series (also replicated in the EN50600-4-X series) of Data Centre Key Performance Indicators.

The difference between CEEDA and ISO50001 is that CEEDA is data centre specific and thus of more value to a data centre operator (over 100 organisations across the globe have CEEDA Accreditation in addition to local regulatory requirements). The CEEDA assessor also provides a list of energy saving opportunities, to date the programme has yielded over £10Million in savings.

Physical Audits

It's always good to get to site to see what's going on. Policies, processes and procedures and data from Building or Energy Management Systems (BMS/EMS) or Data Centre Infrastructure Management Systems (DCiM) is all very well, but it is no substitute for your eyes and ears.

Remote Audits

Obviously, due to the ongoing pandemic it has been difficult to assess any site physically to conduct a normal energy audit. But some data centres are classed as **Critical National Infrastructure** in the UK and in many parts of Europe.

This means that the staff are exempt from travel restrictions and this applies to the supply chain as well, meaning that an auditor with a suitable qualification such as the Certified Data Centre Audit Professional (CDCAP[tm]) armed with a letter from his/her operations director CAN visit data centre sites to conduct audits, especially as clients may require ISO50001/ESOS/CEEDA accreditation to be maintained, pandemic or no pandemic.

Even so, due to travel restrictions and some organisational policies it has been required to undertake a number of remote CEEDA audits. These are only offered to the existing clients (where we have assessed/audited before) and where we have a good handle on the site, the staff and the operating processes and access to historical data and which we can compare with the new data. We also conduct telephone or zoom interviews with clients, prior to, during and post audit.

Conclusion

Data Centres are complex and very mission critical, if not to the general public, then to its owner, thus normal auditing rules cannot apply. And it is unfortunate that well meaning external auditors have conducted ESOS assessments that are really only considered to be tick box exercises by their clients, thus, in addition to the non-mandatory nature of the scheme itself (for the time being at least) probably ending up in the circular wire filing systems located under desks rather than being used.

This is a shame, as it is estimated that the prudent application of the EUCOC in UK server rooms and data centres could save up to £77Million in energy costs for UK Government, and £2Billion in academia, commerce, and manufacturing.

Author's Profile

John is a registered EMA ESOS Lead Auditor, an ISO 50001/ISO22301 Lead Auditor, the CEEDA Global Lead Assessor/Auditor, the Data Centre Alliance Certification Global Lead Auditor and Training Partner. He is the Vice Chair of the British Computer Society Green IT Specialist Group and a member of the Advisory Board for the Sustainable Digital Infrastructure Alliance.

ema
energy managers association

SHAPING THE FUTURE OF ENERGY MANAGEMENT

ENERGY MANAGEMENT TRAINING COURSES

PUBLIC TRAINING - IN-HOUSE TRAINING - ONE TO ONE TRAINING - VIRTUAL TRAINING - TAILORED TRAINING

2021 TRAINING CATALOGUE OUT NOW

IN 2020...

1334
PARTICIPANTS

49
TRAINING SESSIONS DELIVERED

41
ENERGY MANAGEMENT TOPICS COVERED

E: ENQUIRIES@THEEMA.ORG.UK T: 0203 916 55 16

by Philip Spiby and Matteo Deidda

My Role in Sustainability and Energy Management

The drive behind organisations' energy management continues to evolve. The latest rise of the climate change topic has seen a new shift towards corporate responsibility, stakeholders' engagement and Government's policies. These tools will be used by those who have the skills to lead the delivery towards the set goals. The roles of those in energy management may differ but the common goal remains.

The EMA defines energy management by 10 core competencies which are required for individuals to effectively manage organisational energy cost, consumption and its monitoring and reporting, as well as energy efficiency requirements. Energy Management can sometimes be viewed as more technical than other similar disciplines. However, is that really the case? We have asked two sustainability professionals to compare their role to our 10 energy management competencies and here is what they told us.

Philip Spiby, Sustainability Advisor at UK Power Networks

What does your role at UK Power Networks entails?

UK Power Networks operate the electricity distribution network in London, the South East and the East of England and are responsible for the cables and substations that take the electricity from the National Grid to the homes and businesses of around a quarter of the UK's population. I am responsible for measuring our business carbon footprint and advising on how

it can be reduced. I was also responsible for launching our Green Action Plan at the start of 2019 which set short term targets for all of our environmental touchpoints with a view to reducing these.

As a regulated industry which operates under agreed price control periods, I have been helping with our Environmental Action Plan which will cover the period 2023-28. My role largely focuses inwards on the carbon we generate as a company. Colleagues in the innovation, smart grid and connections team focus outwards as DNOs have a huge role to play in facilitating society's journey to Net Zero through the roll out of the electric vehicle charging infrastructure, electric heat and facilitating the connection of more and more renewables to the electricity network.

Are you involved in regulatory & legal compliance and carbon management?

YES It is a regulatory requirement of our licence to distribute electricity that we measure and report our business carbon footprint to Ofgem, and I am responsible for this. In terms of legal compliance, I facilitate our ESOS audits, the reporting under SECR and worked with the facilities management team on the CRC reporting. We have reduced our carbon footprint by 25.5% since 2014/15 (the end of our previous price control period). We have also contributed to the fact that the carbon intensity of a kWh of electricity in the UK has reduced by nearly 50% in less than 10 years, reducing everyone's carbon footprint. Around 60% of our current carbon footprint is tied up in diesel however, used in the vehicles and generators required to maintain, upgrade and fix the 188,000 kms of cables and 130,000 substations which provide electricity to the 18 million people that live in the 29,250 square kilometres we cover. That is our big internal carbon challenge in the next decade.

Are you involved in energy management strategy and/or plan?

YES Over the years I have worked closely with the Facilities Management team on reducing the energy we use in our office and depot estate. One of our short term commitments in the Green Action Plan is to reduce the energy used in our Top 6 buildings (which use 60% of the energy across our office and depot estate) by 10% by the end of 2021 compared to 2018 levels. Covid will have had an impact here as those staff who can have been working from home for long periods. All UK Power Networks employees are classed as key workers as maintaining the electricity supply is fundamental. No one has been furloughed within the organisation and offices have been open with Covid-safe measures for those that need them throughout. Going forward, ambitious carbon reduction is at the heart of our Environmental Action Plan for the next funding period for our industry, which requires a major contribution from all aspects of the organisation.

Are you involved in energy procurement?

YES This is managed by the Facilities Management and the Procurement teams with my role being more advisory. I am pleased to say that we have purchased a 100% renewable energy tariff since the start of 2018 for all our offices, depots and substations.

Are you involved in waste management?

YES Again, this is largely managed by the Facilities Management team with the Sustainability and Environment team working closely alongside. We

had targets of a 70% diversion from landfill for office and depot waste and to recycle 98% of street works waste for this price control period, which we have been able to meet. For the Green Action Plan, we upped this to 90% diversion from landfill and also designated six of our main operational depots as exemplar sites where the aim is to achieve 80% recycling (excluding energy from waste). The next aim is to achieve zero waste to landfill and the Sustainability team is drawing together an application for the Carbon Trust waste standard.

Are you involved in managing transport?

YES

In an advisory capacity only, rather than managing. We have a dedicated Fleet Management team as we have in excess of 3000 vehicles. We work closely with the Fleet Manager and Logistics teams as reducing vehicle carbon is essential to meeting our ambitious carbon reduction goals over the next decade and a key element of our Environmental Action Plan. In the short term, Covid will have a negative impact on our Scope 1 transport carbon. While we used to send two engineers to a job in one van, we hired extra vehicles to enable our employees to travel to jobs in isolation. Our Green Action Plan targets for fleet and generators were longer term than most others aiming to reduce NOx emissions by 30% by 2030 to help combat pollution - particularly important in London.

Are you involved in water management?

YES

Again, working alongside the Facilities management team. We have not historically managed water to the same extent that we have managed energy but set a Green Action Plan target of a 15% reduction in our Top 6 offices. We asked our ESOS assessor, while auditing our offices to make water reduction recommendations at the same time. The Sustainability team are pulling together an application to the Carbon Trust Water Standard.

Are you involved in behavioural change and motivation?

YES

We provide the content for regular internal and external comms articles on sustainability issues, including a monthly Environment Moment which goes to all staff focusing on an appropriate topic for that month - be it energy saving, water saving, recycling, more efficient driving or biodiversity issues such as nesting birds. Pre-Covid, we ran for several years a Talking Rubbish campaign where we visited different offices to encourage recycling and identify any barriers to recycling at that site. We had intended a big save water campaign in the offices last year but this was parked for the moment as there was concern that it provided mixed messaging with a more important health and safety message of wash your hands frequently!

Are you involved in IT?

NO

This is managed separately by the IT department. It has a major role to play in carbon reduction across the organisation. For example, they have rolled out Toughpads to all field staff which enables them to receive detailed network cable plans on the go rather than have to go to an office and depot between jobs to pick these up.

Are you involved in technical and operational activities?

YES

In an advisory capacity. UK Power Networks is one massive technical and operational organisation

maintaining an electricity network covering nearly 30,000 square kilometres. Reducing the carbon emitted by this operation is fundamental to my job and our future plans.

Are you involved in energy assessments, measurements and verification?

I work closely with the Facilities Management team, analysing half hourly data and meter readings to try to get a better understanding of opportunities for energy reduction. I also organise the four yearly ESOS assessments, the recommendations of which are pulled into our long-term plans. Meter readings and verification is undertaken by an external agency contracted by Facilities Management.

Has your organisation set a Net Zero target?

But we have a key role to play in helping enable the UK's journey to net zero, by making sure people can use new and emerging low carbon technologies such as Electric Vehicles, and we recognise that as a company we can also improve. We worked closely with the Carbon Trust to determine exactly what is required to achieve a 1.5 degree Science Based Target for the emissions within our control and a well below 2 degree target which includes other elements such as network losses and supply chain. Putting in place the specific plans required to achieve this is a major element of our Environmental Action Plan for the next price control period. A challenging Net Zero target is likely to follow. However, we wanted to take the approach to first determine what is necessary to play our part in keeping global warming to below 1.5 degrees, put the plans in place to achieve that and then develop a challenging Net Zero target - rather than take a pick a date with your finger in the air approach.

What are your biggest achievements in your role?

- Launching the Green Action Plan in 2019 which sets short term (end of 2021) targets for all our environmental touch points, carbon, energy, waste, water, biodiversity, pollution and noise. This has had a real impact focusing the minds of different areas of the business on their impact in these areas and puts us in a good place while currently developing long-term plans covering these areas taking us to 2028.
- In 2019, we became the first electricity DNO in the UK to be accredited with the Carbon Trust Carbon Standard.
- Developed plans for Science Based Targets which we hope to shortly get accredited by the SBTI.

What are your thoughts on the link between sustainability and energy management?

Energy Management is key to many areas of sustainability and the closer sustainability teams work with Facilities Managers and Energy Managers the better. Sustainability teams also have to ensure they work closely with the Fleet Managers, IT, operational teams and everyone else in the organisation as you can't have a siloed approach to sustainability. It is the role of sustainability to bring all the different parts of the organisation to work together to common environmental goals. Things like carbon targets can be set by the sustainability team but they are actually delivered by technological changes put in place by the managers of the specialist areas and the behaviour of everyone in the organisation.

> "It is the role of sustainability to bring all the different parts of the organisation to work together to common environmental goals. Things like carbon targets can be set by the sustainability team but they are actually delivered by technological changes put in place by the managers of the specialist areas and the behaviour of everyone in the organisation.

Author's Profile:

Concerns over climate change meant Phil made the move from journalism and in-house PR to Sustainability. To educate himself in this field he gained a 1st in BSc (Hons) Environmental Science from the Open University. Phil worked as Senior Executive on EEDA's £2.5 million Cut Your Carbon campaign and then as Communities' Manager for the Energy Saving Trust, East of England, before moving to UK Power Networks in 2011.

Matteo Deidda, Sustainability Manager (Energy and Carbon), Property Design at Lloyds Banking Group

What does your role at Lloyds Banking Group entails?

As a Sustainability Manager working in the Property function, my core objective is to drive a reduction in operational carbon emissions and improve energy efficiency and effectiveness across the group estate. To do so, I lead several workstreams including project investment, technology innovation, optimisation of the existing portfolio and colleague engagement.

As often happens when working for large organisations, I spend a good chunk of my time engaging with our supply chain and colleagues across the group such as Finance, Sourcing, Operations, Retail and FM, in order to build support for the sustainability programme and identify new opportunities for action.

Are you involved in regulatory & legal compliance and carbon management?

YES

Although this is not a primary accountability of my role, the responsibility for ensuring environmental compliance sits within my broader team. So, it is important for me to have a sound knowledge and understanding of the compliance and legal landscape, as most of the initiatives that I work on will have some level of interdependence with external reporting requirements.

Are you involved in energy management strategy?

YES

This is an essential part of my role from different aspects including innovation, implementation and ongoing operation.

From an innovation perspective, I am interested to test new and improved technologies and how they perform in our estate. Once I am clear that the solution has delivered the expected benefits, I can then present the findings back to key stakeholders so that we can bid for internal investment and move to implementation.

Part of the energy and carbon benefits come from the optimisation of existing assets that will not necessarily require replacement any time soon, in this case I work closely with our O&M suppliers to coordinate the desktop and onsite activity.

Finally, colleague engagement at every level, is essential not just to deliver direct reduction in energy usage and carbon emissions, but also to support access to funding, buy-in for bigger projects and identify opportunities for improvement.

All these activities are always underpinned by a broader, longer term strategy and business case that guides myself and the rest of the team in what investment and actions must be prioritised to meet the group sustainability ambitions.

Are you involved in energy procurement?

YES

I think there is real value for organisations in having a close working relationship between the energy procurement and the sustainability teams.

There are many overlaps between the two functions, and I get involved at different levels. For example, I take an active role when discussing PPA requirements, because of the importance in the longer-term carbon management strategy. From an operational level, I attend the regular monthly risk and procurement strategy updates.

Are you involved in waste management?

NO

I don't have direct accountability of waste management and one of my colleagues in the team is the subject matter expert in this area. Although I don't have much of an active role, I find this area extremely interesting and I spend time listening carefully to the regular team updates and ensure we have regular 1-2-1s to understand more about what it is happening and the longer term strategy.

Are you involved in managing transport?

NO

Similarly to waste management, my involvement is limited to specific projects and activities. I am close enough to understand the numbers, the strategy and be aware of the key initiatives ongoing, although the delivery accountabilities remain with other colleagues.

Are you involved in water management?

This is also one of the key accountabilities of my role, from an investment and infrastructure perspective. Although water usage in the group is relatively small in comparison to energy consumption and carbon emissions, it remains an area of focus with a direct link to our group sustainability commitments.

Are you involved in behavioural change and motivation?

As a team we have a strong focus on engagement and communication with colleagues across the group. We share our strategy, planning and progress with regular and focused updates. I am also currently working on a pilot study to engage branch colleagues on the broader sustainability subject. Colleague engagement is complex but can deliver huge benefits for the organisation but requires planning and hard work. Colleagues, especially those with customer-facing roles, are extremely busy, and therefore any message and training material needs to be well-thought to ensure it is clear, engaging and straight to the point.

Are you involved in IT?

I am involved in specific areas around energy optimisation and monitoring at our data centres, and I have regular catch ups with key stakeholders. However, in my experience, data centres onsite management and operational teams are very skilled, with a deep technical knowledge about the assets that they manage and therefore the involvement from a central function, such as mine tends to be limited and mainly as a support of the great work already happening on site.

Are you involved in technical and operational activities?

For me this goes hand in hand with the energy management strategy, so I am involved in all sorts of technical and operational activities, from expanding and fine tuning key sites BMS, to making sure the engineering standards for new and existing assets are aligned with the sustainability strategy, as well as evaluating new technologies to test, and optimise the existing assets. Although I rely very much on the expertise of our supply chain and engineering colleagues, I think is important to be hands on when it comes to technical matters and not being afraid to ask what may seem like the obvious questions.

> “Colleague engagement at every level, is essential not just to deliver direct reduction in energy usage and carbon emissions, but also to support access to funding, buy-in for bigger projects and identify opportunities for improvement.

Are you involved in energy assessments, measurements and verification?

I find that having a robust measurement and verification in place is often the neglected part of a sustainability project development, so those who work with me know that this is likely to be one of the first questions that I would ask about any project. In my current role, I have worked with some internal and external stakeholders to develop an M&V standard, so it becomes an integral part of the project development. It is still work in progress, but we are certainly getting better at it.

What are your biggest achievements in your role?

I started my journey at Lloyds Banking Group just before the pandemic forced the country into lockdown, so it has been a tough year balancing work and childcare. I actually have never met in person most of the people that I work with. This makes me even prouder of the quantity and quality of the initiatives that we have collectively delivered over the last twelve months. One thing that I am particularly proud of is the work that we did to maintain momentum on innovation, standard implementation and compelling business cases, despite all the challenges. We have developed a working group across internal stakeholders and our supply chain that is open, accountable and where decisions are challenged in a constructive environment.

What are your thoughts on the link between sustainability and energy management?

I think the link between the two will certainly be different for different people, depending on which type of organisation they work for, the scale, the structure, etc. My

experience is very much about consumer side, large, multi-site, complex organisations.

I am quite clear that to become a successful Energy Manager in this type of environment, you need to know a bit of everything, from finance to procurement, construction, project management and technology. You are likely to become a specialist on a few subjects, but you will rely on the expertise of your network, supply chain and colleagues across the organisation for the specific skills and knowledge. This is even more the case if you are just an individual, or a small team, managing thousands of buildings and energy bills for millions of pounds.

It is becoming clearer to me that the sustainability manager role in this type of organisation is becoming a natural evolution of the energy manager, or at least an essential part of the role. As an Energy and Sustainability Manager, you now need to understand what the broader impact is of what you do and how it compliments to the overall strategy and the company's public commitments. So, you need to be able to evaluate where the limited resources available, both in human and financial capital, are better allocated.

To make these decisions, you need to have a broader view and understanding that goes beyond energy only. So perhaps, the more pressing priority will be reducing carbon emissions from refrigerants rather than installing a new BMS, or the colleague behaviour campaign should focus more on travel than energy reduction.

You will also need to broaden your internal and external network to ensure you can bring the people with the right skillset and knowledge into the conversation, and of course there will be new stakeholders that you didn't need to engage as much before like external communication teams or consultants that deliver carbon reporting calculations, etc. I found this transition very exciting, and certainly one of the reasons why I love this job so much – the continuous pace of change and evolution.

Author's Profile:

Matteo is a Sustainability Manager with an Engineering background, an MSc in Renewable Energy and Energy and Sustainability Management experience in some of the largest British energy consumers. He has joined Lloyds Banking Group from Vodafone UK, preceded by Sainsbury's where he played a key role in the achievement of the 2020 carbon reduction targets.

Energy Management Competencies - How much of an energy manager are you?

01 Technical and operational competencies

- Do you know where energy is generally consumed in different types of buildings within your remit?
- Do you know what type of major energy using equipment and systems are used in your business?
- Do you understand how energy consumption plays a role in the design, installation and commissioning of equipment, systems and buildings?
- Do you understand how good control systems and effective maintenance can be used to make equipment and systems efficient?

02 Energy assessments (finding energy savings opportunities), measurements and verification

- Do you understand basic metering types and the data they collect?
- Do you know how to carry out basic checks on bills and other recorded data to verify accuracy and repeatability?
- Do you know how to set targets in line with published guidelines?
- Are you able to explain reports against targets to a range of stakeholders?
- Are you able to compare energy assessment methods?

03 Behavioural change and motivation

- Are you able to identify changes required to improve energy performance?
- Are you able to develop structures and strategies for change to improve energy performance?
- Are you able to monitor and report on progress towards defined goals?

04 Regulatory & legal compliance and carbon management

- Do you understand key EU directives and UK legislation relevant to energy and climate change?
- Do you understand economic incentives that may encourage energy generation or efficiency?
- Are you able to anticipate broad changes that might affect long-term organisational plans?
- Do you know how to assess simple carbon footprints?
- Are you able to factor the cost of carbon into business cases?

05 Energy management strategy/plan

- Do you understand global energy trends and their impact on business operations?
- Are you able to determine suitable objectives and targets for improvement?
- Do you know how to develop a basic action plan around energy, carbon and water?
- Do you understand how success can be measured and verified?

06 Waste management

- Do you understand the key challenges in dealing with waste streams?
- Do you understand financial advantages and opportunities of an organisation's waste stream?
- Do you understand the possible use of waste as a renewable resource via recycling?
- Do you know how to undertake a basic waste audit?

07 Procurement

- Do you understand what may drive energy prices in the UK?
- Are you able to carry out simple procurement actions?
- Do you have a basic understanding of electricity tariffs to allow best use of time of day charges?

08 Transport

- Do you understand the overall use of transport within an organisation?
- Do you understand what impact transport has on the organisation and potential ways to reduce its impact?

09 Water management

- Do you know how to undertake a basic water audit of a workplace, identify water using fixtures and fittings and suggest water efficient replacements?
- Are you able to identify water efficiency within processes?
- Do you understand the links between water and energy in a workplace?
- Are you able to develop behaviour change programmes and communications for water efficiency?

10 Information technology

- Do you understand where energy and water are used by ICT in a workplace?
- Are you able to estimate the carbon footprint of an organisation's ICT infrastructure including offsite services?

What Next?

If you have answered 'yes' to most of the above questions, then you may be eligible for the EMA Recognised Energy Manager status. Get in touch with the EMA to arrange the EMA Gap Analysis Interview and start the New Year with taking a step forward in your professional development.

If you have identified competencies where you may need up-skilling, then check out the courses the EMA offers in these areas. If you are unsure which areas to focus on, then also consider the EMA Gap Analysis Interview.

The EMA introduced the Knowledge and Skills Gap Analysis Interview to assess a professional's knowledge and skillset at any point in their career through an informal conversation based on a professional's experience achieved to date.

The interviewees receive a verbal and written feedback on how to develop their professional career further and, if necessary, are given advice and guidance on which areas of energy management to focus on in order to up-skill.

For more information or to arrange the EMA Gap Analysis Interview, please email jana.skodlova@theema.org.uk.

by The Energy Managers Association

Energy Management at the Cyngor Gwynedd Council

THE INDUSTRY INTERVIEW

In this regular feature, we focus on how organisations across different industries approach energy management.

In this issue, we have asked David Lewis, Energy Conservation, Repair and Maintenance Manager about energy management at Cyngor Gwynedd Council.

The Cyngor Gwynedd Council has a portfolio of about 1,000 sites with 500 buildings which includes schools, carehomes, leisure centres, offices as well as a number on municipal buildings. I have responsibility for 20 staff within the team, with three members dedicated to Energy Conservation while the remainder have different roles specific to Repair and Maintenance.

While there is the occasional conflict in wearing two hats so to speak, there is much synergy between energy and maintenance which offers the opportunity to put energy at the forefront of maintenance issues as opposed to changing like for like.

When Gwynedd Council embarked on its carbon reduction journey by establishing a Carbon Management Plan, the projects contained details of savings that can be achieved from buildings, fleet, street lighting and waste. While our team only have responsibility for buildings, the success of the plan was down to forming strong working relationships with the other stakeholders so that all the projects were working towards the common goal.

What does energy management mean at Cyngor Gwynedd Council?

Since the inception of the Carbon Management Plan in 2010 there have been hundreds of different projects ranging from insulating pipework in small boiler rooms to full lighting refurbishments, Gas CHP units and roof mounted solar schemes. Consequently, Energy Conservation has occurred in almost every building and involved many people who work within those buildings. This in essence is what energy management means within Gwynedd, in that everyone needs

to be involved. The Energy Team are there to facilitate but without the help of other stakeholders the plan would fail.

That is not to say that everything is working as it should, on the contrary, there is always room for improvement. However, there is a good top down support from the Chief Executive and Local Members and Heads of Service, which ultimately provide the resources to realise these plans, and the managers and buildings' users then have responsibility for sustaining the savings made. Nevertheless, it is one thing achieving savings, it is quite another thing maintaining them. By embedding Monitoring and Targeting (M&T) within the Council and working with site managers and staff we not only have a fantastic opportunity to maintain savings but also find further savings.

Have the Council's strategies been adapted to include focus on Net Zero policy?

Gwynedd Council declared a Climate Emergency in 2019 with the aim of becoming a Net Zero Council by 2030. Work is currently underway across all the different departments and services to meet this challenge. Our team is currently working with the Welsh Government's Energy Service and the Carbon Trust to develop a third Carbon Management Plan which ties into the overall Net Zero ambitions. As we move forward, all work and projects will need to adhere to these ambitions.

How does the Council deal with energy management?

The work of the team is based on reducing energy consumption by ensuring that energy is used in the most efficient manner and only when needed. All members of the team are responsible for regular monitoring and targeting to identify waste or increased consumption. We have implemented two Carbon Management Plans since 2010 which have seen the Council invest in a raft of projects across multi disciplines. One of the most successful being a lighting upgrade programme initiated in 2011 where T5 lamps and electronic starters were installed in existing fittings, achieving similar efficiencies to LED at a time when LEDs were not economically viable. In addition, we strive to raise awareness of personal action by council staff, teachers and pupils, regular checking of the correct operation of plant, site surveys and installing efficient equipment. The goal is to embed Carbon Reduction throughout the Council so that everyone takes responsibility for reducing emissions in their day to day activities. We are some way off this however, as we move towards Carbon Zero it will not be achieved without everyone's help.

What areas of every day's business are most challenging in terms of energy management?

The most challenging aspect is people, or more specifically changing people's behaviour. On the whole, Energy Conservation is quite straightforward especially if you have money for projects and staff resources to monitor the energy used. At Gwynedd, we have been fortunate that the members have voted to invest in Energy Conservation, and we have a team that is actively managing the energy consumption. We actively monitor our energy utilising Monitoring and Targeting

software however, it is a constant battle to maintain the savings we have achieved due to how the buildings are run day to day. The bane of every Energy Manager's life is of course the people who will constantly leave lights and equipment on and who do not actively carry out the no cost measures. The situation is much better than it was 10 years ago, however there is still much to do. Over the past few years, we have moved away from staff training in order to focus on being proactive with M&T. This approach might be challenged however, while it is acknowledged that we need to do more with behaviour change (and we have plans utilising the Nudge theory and community based social marketing principles) we do have good control on the buildings. We are confident of this because we report to the Cabinet on a monthly basis utilising data from the M&T system which is drawn from our AMR following a comprehensive installation programme that has resulted in 96% of electricity and 71% of gas usage being monitored on a half hourly basis.

10 years which was a combination of utilising internal reserves, repair and maintenance capital budgets, Salix funding and Welsh Government Invest to Save loans. To date the annual revenue savings are £1.2m which has led to current cumulative savings of approximately £4m.

> "I have deliberately mentioned proven to highlight that there is a myriad of software solutions which claim all sorts, but will not actually 'do what it says on the tin' so please do your research.

How is energy management viewed by the Council's stakeholders?

All stakeholders within the Council are actively engaged in the common goal. This is largely down to the savings we have achieved which in addition to carbon savings has achieved significant revenue savings. Approximately £7m has been invested in carbon reduction projects over the past

The Council's Energy Management Team won the EMA Public Sector Energy Management Team 2020 category last year. Are there any tips that you could give to other teams on delivering energy management as part of a team?

While it is nice to have large scale renewable projects such as solar farms (I presume so as we have none in Gwynedd!) you cannot overstress the importance of good old-fashioned energy management. You can make significant savings at low or no cost by actively managing your energy consumption with M&T and web browsers on your heating controls.

Many of our projects have been basic, such as insulation, draught proofing, boiler and control refurbishment and lighting upgrades. Whilst Gwynedd Council have spent not an insignificant amount of money this is however, over a 10-year period and in a portfolio of about 500 buildings and our fleet, street lighting and waste operations. However, none of this is possible without good data, as Peter Drucker said: "if you can't measure it, you can't manage it", therefore the best tip is to invest in a good proven M&T software. I have deliberately mentioned proven to highlight that there is a myriad of software solutions which claim all sorts, but will not actually 'do what it says on the tin' so please do your research.

How has Covid-19 affected the energy management at the Council?

As with many other activities Energy Management has taken a backseat so to speak due to Covid. However, we have still been

actively managing our energy by utilising the half hourly data and using web browsers to control the numerous buildings within the portfolio. It is of course a challenging time and can be very frustrating leaving equipment on 24/7 and windows open. Nevertheless, I am hopeful that this will be just a bump in the road of our carbon reduction journey.

What is in the pipeline for the future?

Working on finding projects for Carbon Management Plan 3 which is increasingly becoming more challenging. However, I am always hopeful of new technologies helping us achieve our goals. This plan will be part of the overall strategy of working towards Net Zero by 2030.

Energy purchasing is a key role for the team in both reducing the council's energy costs and also in enabling data collection and analysis. Having used the traditional large basket arrangements for many years Gwynedd Council decided to launch their own OJEU compliant Dynamic Purchasing System (DPS) to compete with the existing energy procurement frameworks available on the market. Gwynedd's DPS is available to all public bodies in England, Wales and Scotland and it is unique because it invites 16 approved energy suppliers to compete in a live reverse auction.

The auction technology is proven to force the suppliers to reduce their margins to win the business which typically results in more than 5% savings when benchmarked against other framework offers. The auction also offers a log on facility, so all bids are fully auditable and transparent. Because the DPS is dynamic authorities can also bespeak their contract terms, bill validation requirements, data collection services and their reporting requirements. The overall result is more choice, full transparency, significant savings, and a broader suite of value-added data management services. To request a free no obligation auction trial please feel free to contact **Ynni@gwynedd.llyw.cymru.**

Summary

- Last year figures (2019/20) reported a 46.6% reduction in overall carbon emissions which break down as follows:

  Buildings - 51%
  Streetlighting - 76%
  Waste - 57%
  Fleet - 23%
  Business Travel - 6%

- Approximately £7m has been invested in carbon reduction projects over the past 10 years which was a combination of utilising internal reserves, repair and maintenance capital budgets, Salix funding and Welsh Government Invest to Save loans.
- To date the annual revenue savings are £1.2m which has let to current cumulative savings of approximately £4m.

Author's profile:

David has over 10 years' experience in energy management in the public sector preceded by a further 20 years of experience in building services and M&E design. He holds a BA in Business and Management degree from Bangor University, Diploma in Energy Management from the Energy Institute and a HND in Building Studies from the University of Glamorgan.

Improve energy efficiency and save money with an energy management system

HOW CAN AN ENERGY MANAGEMENT SYSTEM BENEFIT YOU?

- **Save money** - an estimated £2 billion (10%) of central government funds is spent each year on energy
- Align with the government's **net-zero emissions target for 2050**
- Instils energy management in **organizational decision making**
- A single route to compliance for the **Energy Savings Opportunity Scheme (ESOS)**, such as for the education sector

Contact SGS today for a quote and begin your journey to energy management

+44 (0)1276 697715

uk.nowisthetime@sgs.com

www.sgs.co.uk/50001

by Neil Bradley, Stuart McLeod and Bobby McHale

Energy Efficiency Opportunities in Lighting and Lighting Controls

Eliminating energy waste through energy efficiency is something that everyone who looks after energy in their organisation or for their clients is striving for. When it comes to different technologies, there is an endless list of options to consider at every stage. We will be looking at different technologies in each issue of The EMA Magazine this year and asking those with experience in these areas for their thoughts and useful tips.

In this issue, we will focus on Energy Efficiency Opportunities in Lighting and Lighting Controls. The quality of artificial light is a significant influencer on productivity and wellbeing within the workplace. At the same time lighting can be a large contributor to a company's energy cost and significantly, also one of the areas generating most waste. We have asked three energy management professionals who gave their views in this area.

Neil Bradley, Energy and Environment Engineer at Cardiff Metropolitan University

Cardiff Metropolitan University is home to just over 1,100 staff, around 11,000 students and 54 buildings. It consists of offices, teaching spaces, laboratories, sports facilities, and residential blocks. Across the academic estate alone, there are around 10,000 light fittings - or 10,000 energy saving opportunities, as I view them.

Our motto is 'the most valuable possession is knowledge.' And this accurately reflects my path of continual learning to achieve energy efficient lighting across the University. Although this is unlikely to steal-the-show for pioneering building innovation, it's a critical path towards decarbonising our buildings.

I have found, time and time again, that collaboration, stakeholder engagement and importantly, challenging industry norms, is crucial to achieving the right solution.

With this in mind, this article tries to cover some of the key, and perhaps less obvious, energy efficiency opportunities available in delivering cost effective retrofit LED lighting improvements. These stem from the lessons I have learned on my journey so far – one that continues to challenge me!

The most surprising energy efficiency opportunity

Don't always follow the guidelines to the letter. I am going to start by controversially veering off the beaten track. Lighting designs are typically created using popular software systems such as Dialux or Relux. This modelling software for lighting upgrades provides a useful tool and starting point for developing an initial lighting design for a specific area or building... but it should be used with caution. Under current guidelines, the requirement for high task illuminance uniformity factors (e.g. 0.6 - 0.8) and targeted illuminance levels often results, in my experience, in 'excess illumination' of spaces resulting in wasted energy. This inevitably translates into additional costs associated with surplus LED fittings, controls integration and wiring.

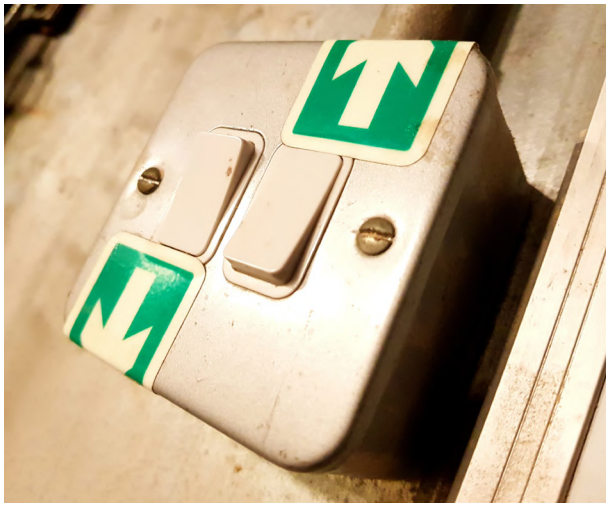
This task-based approach together with high uniformity factors can result in a lighting scheme that lacks contrast or ambience. And also provides too much light (and glare) in office and learning environments where many tasks are now self-illuminating via PCs. This not only adds to the expense of the installation but also increases the energy demand.

My advice is don't be afraid to challenge the lighting designs based on your knowledge of how you would like an entire space to be illuminated. Apply your own knowledge of that space and how it is used - how the existing lights perform, daylight influence and the aspect, the heights of the ceilings, the colour of the walls and desks and the levels of reflectance - rather than relying solely on the software to dictate this based on formulas. If you focus on achieving more dynamic lighting schemes which aim to create ambient lighting suited to the tasks undertaken, this not only delivers savings in energy

from streamlining the installation, but reduces capital expense, labour and maintenance.

As an example, we recently undertook a full refurbishment in one of our existing buildings. Within a large open-plan area the lighting design stipulated that a total of 16qty, 25W suspended downlights should be installed to achieve the desired illuminance levels. This was to compliment the continuous perimeter lighting installed all the way round the space.

Although there was an absence of adequate daylight, I had concerns regarding the quantity of fittings and the logistics of installing them in, and between, the existing suspended architectural ceiling panels. I requested a trial install of 1 fitting in situ and it was decided (following consultation with stakeholders) that based on the general use of the space, the presence of large touch screens on the walls, PCs and the existing perimeter lighting, a total of 4 downlights was sufficient to create a more dynamic, learning environment. This resulted in cost savings on the project budget and the avoidance of re-stocking charges for the return of surplus light fittings to the supplier.



The no cost energy efficiency opportunity

Engage with your stakeholders. Although not always essential in many lighting upgrades, this particularly applies in buildings with multi-use areas where lighting requires a flexibility of control to achieve the correct illuminance for specific activities (e.g. sports halls, bars, hospitality areas etc).

Recently, the aging BMS controlled lighting system in the University's sports arena was becoming increasingly unreliable, leading to operational challenges for staff. Engagement with stakeholders revealed that lighting requirements had evolved over the years and the inherent complexity of the existing system was now unfit for purpose, too time consuming to operate and confusing. It was agreed that a simple wall mounted multi-gang, switch plate would be preferred, removing any obvious points of failure (no software requirements), with labelled switch banks that were simple to operate.

This engagement with the building users resulted in a controls lighting upgrade investment that cost a fraction of the like-for-like BMS, software and controller driven solution. It also achieved a reduction in energy from improved bank switching (where applicable) and prevented overnight wasted energy from lights remaining on. Having local control also provides the staff with an enhanced responsibility and ownership for the area. This ensures that the close down procedure includes switching off the lighting in the main arena, providing further cost savings.

In conjunction with these works, discussions also led to the appraisal of the existing light fittings and ultimately the disconnection of 35 highbay flood lights at 2kw each. These were installed as part of the construction of the building back in 1999 but were no longer needed based on current day to day activities and events.

As part of energy monitoring regimes, energy metering on the building main electric meter serves to flag up any issue with lights remaining on which are then communicated to staff.

The low cost energy efficiency opportunity

Join the dots. Until recently, all lighting retrofits I have undertaken have required upgrades to the existing emergency lighting. This has been courtesy of integrated emergency light fittings which require the replacement of the fitting and the integrated emergency luminaire and battery packs.

This is not only expensive but limits the location of the emergency fittings based on the luminaire locations in the ceiling. I have since moved to separating the emergency light (and in some cases separating the emergency wiring circuit) from the luminaires

in all upgrades. Instead, we now install DOT LED emergency non-maintained downlights consuming only 3W in operation and powered by AA batteries in comparison to the standard 'size D' batteries used in integrated luminaires. This, in itself drastically reduces the footprint of the battery pack, which may be beneficial if there is limited space above the ceiling. These unobtrusive, flush mounted fittings are very small and discreet, more energy efficient, simpler and cheaper to install and work equally well in plasterboard ceilings and suspended ceiling types. They are also considerably cheaper to purchase and provide the added flexibility for routine testing in daytime hours.

As University spaces are occupied for long periods during the day, with traditional integrated emergency lighting (which switch off all luminaires when the test is carried out) the programme of routine emergency light testing would have to be undertaken at night. With the DOT LED luminaires, as standalone fittings they can be tested at any time without disruption to the lighting in the space as they do not impact on the operation of the lighting scheme in anyway. This has also generated savings in reduced labour costs.

Ultimately, if a luminaire now fails it can be replaced independently of the emergency lighting (that was previously integrated into the fitting) at a much lower cost. If you have a range of luminaires from different manufacturers in the same space, this type of system makes replacing them much simpler.

Lastly, in my experience I have found that for capital works, this type of emergency lighting system is simpler to specify in lighting designs and easier to review and cross reference during installation and snagging as the DOT LED fittings are easily identifiable.

The most common energy efficiency opportunity

Audit, sleep, repeat. It might sound obvious but carrying out an initial audit of the existing lighting schemes within your organisation is integral to developing a robust business case, prioritising programmes of work, completing the relevant information required for tendering lighting projects and understanding the types of lighting systems you have in place.

In addition, this information is integral to applications for loan finance schemes such as Salix. Yes, it can be time consuming and if your organisation is large, your building stock diverse and widespread, in many cases you will discover a plethora of different lighting installations.

At this point, when it comes to carrying out the work, revisit each installation to fully understand the type of lighting, controls, wiring and components used to prevent any surprises during the install stage. This information is critical for establishing the proposed upgrade solution that delivers the greatest benefits in energy, cost and carbon and ultimately repayment periods on the investment.

A common issue we have in relation to upgrading old downlights in plasterboard ceilings - found typically in lecture theatres and large teaching spaces - are that existing fluorescent lamps and halogen lamps are considerably larger in diameter than the modern LED equivalent at the required lumen output.

Ceiling hole diameters of circa 240mm are not uncommon and this provides a challenge in finding a suitable LED alternative. Fortunately, we are able to manufacture bespoke laser cut infill rings onsite through our Art and Design Laboratory to act as a reducer to provide a fixing which overcomes this.

The most overlooked energy efficiency opportunity

You can't rely on people switching the lights off. Develop a controls specification and strategy and stick to it. The integration of controls to

lighting systems are not new, but in my experience can sometimes be considered as a 'nice to have' rather than a critical system element for providing flexible lighting solutions that save energy whilst prolonging the life of the luminaires.

Lighting controls may be perceived as a complex, unwanted addition to a lighting scheme. However, modern systems are quite the contrary. University spaces are often re-modelled to accommodate new courses or teaching requirements and I increasingly specify prefabricated plug and play-lighting connection and control systems (such as Flex 7 or Klik). These have the added benefit of speed and ease of installation of both LED fittings and sensors and go hand-in-hand with the flexibility to adapt to future building needs.

Similarly, traditional plug and play sensors have now evolved to offer improved functionality and DALI integration similar to networked intelligent control systems but in a simpler, more affordable package. Albeit without some of the bells and whistles.

Virtually all of the University's lighting systems are controlled by standalone ceiling mounted sensors that can be modified by a handheld infra-red programming tool. This innovation allows the adjustment of sensitivity, delay on-and-off times, daylight integration, testing, DALI, dimming and so on, without the network expense. This has proven invaluable when office or teaching spaces are repurposed or change occupation and different lighting requirements are provided or simply to make day to day adjustments.

Top tip

Don't be afraid to ask for help. In a world of increasing automation and the emergence of IoT, don't lose sight of the basic function of an energy efficient lighting system and how it operates. Fundamentally, any lighting system will only be as effective as the installation allows.

As energy managers, we are motivated by delivering savings, achieving the highest lumen output for the lowest circuit watt (lm/cctW) and maximising efficiencies through integrated controls systems. However, our judgements and rationale can often be clouded by the above and at the expense of what can realistically be achieved.

Developing good working relationships with project managers, electricians and wholesalers, building managers and staff provide key sounding boards for overcoming challenges, seeking cost effective solutions, fostering collective ownership of the project and ultimately delivering the most energy efficient solution.

I have regularly found that it is not uncommon for a lighting design on paper to be fraught with unforeseen practical challenges on-the-ground. However, in my experience, learning to ask for help and listening to others cultivates a collaborative ethos within the team to overcome the challenges presented.

Ultimately, the knowledge and combined experience of the electricians and wholesalers are invaluable to achieving the end result.

Stuart McLeod, Project Manager at Oaksmere Design

The most surprising energy efficiency opportunity

Save yourself from surprises further down the line, by ensuring all unserviceable fittings at the time of survey have been documented, along with the wattages of fittings currently installed. Project teams often operate independently from maintenance teams, particularly when maintenance is outsourced to an outside agency. Not only will you not realise the benefit of replacing an unserviceable fitting with a serviceable LED, but replacement fittings may be more efficient than those originally specified for the building.

While it is best practice to survey in person, pressures to achieve short paybacks may mean that shorter surveys are carried out that rely on original drawings that do not truly reflect reality. Situations may also arise, where it is not clear who is responsible for certain aspects of lighting, this is particularly true of retail parks that have undergone changes in ownership and building upgrades over the years. In this instance, it is particularly important to ensure all lighting fed from the site is captured during the survey so that opportunities are not missed.

Finally, when replacing fittings operated by a local switch with integrated microwave sensors, you need to consider factors such as glass panels and the volume of traffic passing the room. If the sensors are overly sensitive, you may end up with the lighting illuminated almost permanently and therefore consuming more energy than it was previously.

The no cost energy efficiency opportunity

Engagement with onsite management teams and building occupants. Engagement from the start of the project and in the weeks following project completion helps to identify and rectify issues. Operational teams have the most intimate knowledge of their workplace and are likely to identify problems and potential solutions that project teams are unaware of. Early engagement also helps to minimise any disruption that can occur while contractors are on site and helps to communicate the expected cost minimising and productivity benefits that are often a feature of improved work environments.

The low cost energy efficiency opportunity

When carrying out an LED upgrade, be sure to fully assess the current lighting arrangement. For example, as operational patterns change over time, a site could start seeing more activity during a night shift and therefore need improved lighting levels in a previously unused area. If the configuration is not set up for

this, members of staff may need to override lighting to carry out their work safely and effectively. If this is picked up early, it might be possible to move additional existing fittings on to the 24hr circuit so that it is no longer necessary to override the lighting. While this will marginally increase consumption, there will be a net benefit from removing the requirement to override the lighting in the first place. In this instance there would be a marginal increase in labour to change fittings from one circuit to another, but it would not incur the cost of additional fittings. Likewise, the same exercise could be carried out at a site that is not currently undergoing an upgrade, but again the cost incurred would be for labour rather than new fittings and additional wiring.

The most common energy efficiency opportunity

As lighting quality deteriorates over time and LED technology improves, it may be possible to achieve required lux levels with fewer fittings, although the cost of other components such as a replacement ceiling tiles need to be considered. Similarly, can microwave sensors be fitted in rooms that are currently operated via a local switch that is often left on?

The most overlooked energy efficiency opportunity

While current and ongoing maintenance costs are not always included in simple payback calculations, there are nonetheless indirect benefits that arise from newly installed lighting in the years immediately following an upgrade to lighting or controls.

Tracking these benefits, such as those that arise from a reallocation of maintenance resources to other building services, would help to understand more fully the benefits of lighting upgrades.

Finally, while most project and energy managers will anticipate unforeseen problems, they are by their very nature unknowns. Therefore, contingency plans must be in place for dealing with issues, such as faulty emergency lighting, damaged electrical circuits or ceiling tiles, which can increase costs without providing additional savings.

Top tip

While achieving energy savings is often at the forefront of decision making, lighting in buildings is provided to perform a function for the building's occupants therefore, this must be at the centre of decision making. If the lighting configuration does not perform for the building's occupants, this will inevitably lead to conflict and possibly energy wasting behaviours.

Bobby McHale, Estates and Facilities Data Analyst at Manchester University NHS Foundation Trust

The no cost energy efficiency opportunity

Behaviour Change. Staff behaviours can have a large impact on energy consumption, behaviour change can save energy from lighting through education and persuasion. This can be done through stickers and posters around fittings, or communication between peers of the benefits.

At Manchester University NHS Foundation Trust (MFT) we have a staff engagement programme called Green Rewards, and through small incentives of points and prizes over 750 staff members have actively reported switching off lights and equipment in their workspaces, a useful nudge for positive energy saving habits. A study titled "Intervening to change behaviour and save energy in the workplace: A systematic review of available evidence" prompted results showing the latter reduced the percentage of lighting being left on from 51% to 17% - saving power through persuasion!

The most common energy efficiency opportunity

LED lighting upgrade. Lighting technology has progressed rapidly over the past decade, with Light Emitting Diode (LED) lighting at the forefront of this. LEDs can save between 25% and 80% on electricity consumption, they provide high quality light and less maintenance due to a much longer life span.

Remember it is important to undertake a lumen method calculation beforehand, lighting systems tend to be excessive, a lumen calculation will most likely allow for a reduction in the number of fittings. With prices coming down and return on investments decreasing, they are becoming a no brainer.

The most overlooked energy efficiency opportunity

Ensuring external lighting controls are appropriate and well maintained. Most external lighting systems will include light level sensors as to ensure energy is not wasted in broad daylight, an often overlooked aspect of these systems would be the maintenance of the sensors. External sensors, and sensors located in areas like car parks can quickly become soiled by exhaust fumes and leaves or damaged due to battling the elements. This would result in a lower level of light being detected meaning the control thinks it's darker than it is and therefore switches the light on. A programme of maintenance and cleaning of these sensors will allow them to work as they should and save energy.

The most surprising energy efficiency opportunity

Lights which aren't just lights. With the introduction of smart lighting in recent years, light fittings are becoming more intelligent with integrated occupancy and even temperature sensors. These extra sensors, and the ability to communicate with other building services such as a building management system allows for extra energy savings through other energy profiles such as heating and cooling.

The low cost energy efficiency opportunity

Incorporating a daylight sensor with existing occupancy sensors. With many organisations requiring certain lux levels to comply with the relevant standards, lighting designs can be created under the impression there is no natural light available. In a hospital corridor for example, adequate lighting levels is required 24/7. With frequent footfall, occupancy sensors alone would mean lighting being on at all times in areas where natural daylight would suffice. A project completed at Manchester University NHS Foundation Trust (MFT) produced results of 70% energy reduction through LED and occupancy sensors, whilst these are positive results it was found that this reduction increased to 91% with the installation of a daylight sensor alongside it. It is important to always maximise the opportunities.

Top tip

Shout about your results. Staff are more interested than ever in how they can 'do their bit', communications around the positive results of interventions displayed in everyday terms such as cost savings will raise awareness and involvement; resulting in further energy savings.

by Wilson Power Solutions

Tier 2 EU Ecodesign Regulation for Transformer Losses

2.9% of all electricity generated across Europe and the UK is wasted through transformer losses.

This amounts to 93TWh which is equivalent to the electricity consumed in Denmark over three years. The EU Eco Design regulation for transformer losses Tier 2 will take effect this year replacing Tier 1 regulation. Tier 2 specifications aspire to reduce the energy wasted through transformers by 10% compared to Tier 1 (2015) levels.

Form the 1st July 2021, all transformers installed in the UK will have to follow strict Tier 2 loss specifications to reduce energy waste. There will be a few cases of concession where Tier 1 is allowed if there are weight, space and financial constraints.

Wilson Power Solutions has introduced Wilson T2 Ecotrans, a distribution transformer with CRGO metal core to comply with Tier 2 requirements. Our second complying product, WILSON e3 Ultra Low Loss transformer far exceeds Tier 2 requirements. Made with an amorphous metal core, it sets the bar for Tier 3 and allows for further carbon and energy savings.

We put together a Frequently Asked Questions document to help you navigate through the regulatory changes. The document covers details about timelines, existing Tier 1 stock, refurbished and hire transformers, exemption cases and more. It could be found on our website in the Downloads section www.wilsonpowersolutions.co.uk/downloads. Moreover, we are hosting a webinar on 16th Feb to walk you through the changes.

To book your seat at our Tier 2 webinar, please email our Energy Policy Manager, Ayah Alfawaris at **ayah@wilsonpowersolutions.co.uk**

THE EMA MAGAZINE

Thank You

TO OUR 2020 CONTRIBUTORS


Andrew Creamer


Kirsty Rice


Paul Graham


Stuart McLeod


Astley Fenwick


Sarah Jolliffe


Parthena Exizidou


Beatriz Valdes


Ben Burggraaf


Caroline Holman


Chris Norburn


Dan Fernbank


Dewi Day


Daniel Shanley


Anita Leite


Ethan O'Brien


Gillian Brown


Jack Gale


Jessica Foster


John Kyffin-Hughes


Lee Preston


Leigh Hitchens


Lisa Pardini


Martin Gannon

Jonathan Bassett

Mark Taylor

Matteo Deidda

Dr Andrew Lewry

Nasrin Khanom

Michael Blades

Julia Blackwell

Gabriel Hurtado González

Mohammad Rafique

Julie Smith

Paul Eggleton

Paul Luxton

Justyna Clarke

Terry Coyle

Phil Moran

Rhea Campbell-Smith

Peter Lindersen

Risa Wilkinson

Jonathon Candy

Claire McGeechan

Rustin Cooper

Sasaenia Paul Oluwabunmi

Penelope Guarnay

Alan Ford

Andrew MacBride

Michael Ayres

Wendi Wheeler

Vikas Ahuja

Scott Armstrong

Become a Contributor

Click Here