

**FEATURE**  
*Looking Back*

The EMA Magazine  
**50<sup>th</sup>**  
EDITION

In 2021, we explored energy efficiency opportunities in lighting and controls, highlighting how lighting quality affects productivity and wellbeing while also representing a major area of energy consumption and waste. Four years on, Neil Bradley revisits the insights to see which strategies have stood the test of time, which have evolved and how the practical experiences have shaped current approaches.



Neil Bradley, Sustainability and Energy Manager at University of South Wales



# Energy Efficiency Opportunities in Lighting and Lighting Controls – Four Years On

**THE MOST SURPRISING ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *Don't always follow the guidelines to the letter.*

*Lighting design software is a useful starting point, but following guidelines too rigidly can result in over-illumination, wasted energy, unnecessary cost and poor visual quality. High illuminance and uniformity targets often fail to reflect how modern spaces are actually used, particularly where many tasks are self-illuminated by screens. By considering how a space is used, including daylight, existing lighting, surface reflectance and desired ambience, you can create more dynamic lighting schemes that reduce energy demand while lowering capital, installation and maintenance costs.*

**Four Years On:** Stand firm. I have completed many lighting

installations and the most successful projects have always started with a lighting design that evolves into a solution that works for a particular type of space. And this can only be achieved by reviewing the space in detail, considering ambient lighting (if there is any), how the space is used, wall colours, ceiling heights, types of ceilings (grids, concrete), any exposed equipment on the ceilings that may impact the lighting scheme, such as AHUs, HRUs, AC, etc., the types of LED lamps proposed, controls and the desired illuminance for that area.

**THE NO COST ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *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).*

**Four Years On:** Stand firm. Speaking with stakeholders is absolutely key to ensuring an outcome that is not only successful from a lighting upgrade and cost perspective but also meets the expectations of the people that use the space day after day. Their user experiences will provide you with invaluable information that can help shape the lighting design and equally they also feel a sense of belonging and are more likely to buy into the scheme once its complete. Although this process can result in mixed opinions and views, and it's often impossible to please everyone (particularly in transient areas such as teaching spaces), in my experience it helps to develop a consistent approach to

lighting and ultimately a blueprint that can be replicated elsewhere. This also means that users become familiar with how to use lighting in different areas.

### **THE LOW COST ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *Join the dots.*

*I used an example of lighting retrofits which all required upgrading integrated emergency fittings, which was costly, space-constrained and had limited testing flexibility. I mentioned that we switched to standalone DOT LED emergency downlights, which were smaller, more energy-efficient, cheaper to install and easier to test during the day without disrupting normal lighting. This approach simplified replacements, reduced labour and capital costs, and made specification, installation and snagging easier, particularly in spaces with mixed luminaires.*

**Four Years On:** Stand firm. I would like to think that DOT LEDs have become consistently adopted in modern lighting schemes as a more cost effective and simpler way to integrate emergency lighting into upgrade projects. Accepted, like many things it's not a one size fits all and there are still some instances in which integrated fittings may still provide a better solution.

Recently, I have found a lack of clarity around how emergency lighting is tested, whether via integrated test switches on room switch plates (using fish keys), automated emergency lighting, which raise questions over responsibility for reviewing results, or via combined test switches often

located at distribution boards, usually in cupboards or risers. Where spaces are used frequently and/or daily it's not always easy to arrange an emergency lighting test procedure, so this needs some



thought and planning at design stage to ensure the solution installed can deliver, and the emergency lighting is adequately maintained.

### **THE MOST COMMON ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *Audit, sleep, repeat.* Conducting an initial audit of existing lighting schemes is essential for developing a strong business case, prioritising work, preparing tender information and understanding current systems. It also supports funding applications and ensures accurate planning. Revisiting each installation helps identify lighting types, controls, wiring and components, preventing surprises during upgrades, and maximising energy, cost and carbon savings.

**Four Years On:** Stand firm. Very little remains unchanged in a vibrant Higher Education environment and we find our buildings and spaces are often modified, extended or adapted to meet existing or new course requirements. This means that often the existing lighting scheme will no longer be fit for purpose. Therefore, this advice applies to both upgrading old

inefficient lighting to LED and also modifying existing LED schemes to better suit newly constructed teaching or working environments. Although this might sound obvious, it's also worth noting that an audit should not simply involve a review of the lighting requirements but also a thorough understanding of the existing wiring, dimming drivers (if present), switches, test switches and PIRs to ensure any new LED fittings or features are compatible with existing wiring systems.

### **THE MOST OVERLOOKED ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *You can't rely on people switching the lights off.*

*Developing and adhering to a lighting controls specification is essential for energy savings, flexibility, and prolonging luminaire life. Modern plug-and-play systems simplify installation and adaptation, allowing easy adjustment of sensors, dimming, and daylight integration without costly networks. These systems are particularly valuable in university spaces where layouts and usage frequently change.*

**Four Years On:** Stand firm. As much as I would like to rethink this tip, unfortunately it still stands that people generally don't switch lights off when they leave rooms (with some exceptions!). This is more prevalent in multi-use spaces where individual staff don't have ownership and students are moving between these areas frequently, but it's also common in some larger open plan offices, lecture halls and in particular corridors, bathrooms and lobbies. The integration of PIR controlled lighting or a combination

of PIR and switch controlled lighting should be integral to every installation. This not only saves energy but prolongs the life of the fittings and also provides finer control options such as daylight dimming, where ambient light levels are high, a more natural 'daylight' feel to spaces which people enjoy and the assurance that the lights will switch off after a predetermined time when occupants leave. In my experience, upgrading the LED fittings is often the priority but controls can be overlooked and it does add additional expense, but the savings generated usually result in reasonable paybacks.

#### TOP TIP

**2021 Advice:** *Don't be afraid to ask for help.*

*Even with advanced automation and IoT, an energy-efficient lighting system is only as effective as its installation allows. Focusing solely on theoretical efficiency can overlook practical limitations. Building strong relationships with project managers, electricians, wholesalers and staff provides critical insight, cost-effective solutions and collective ownership.*

*Asking for help and listening to others fosters collaboration, helping overcome unforeseen challenges and leveraging practical experience to achieve the best energy-efficient outcomes.*

**Four Years On:** Stand firm (with a small caveat). Lighting technology, like many other electrical and mechanical services continues to evolve very quickly with more efficient and ever impressive technologies available. It's important to understand where the industry is heading and not lose sight of new opportunities that may deliver significant savings. Collaboration with external and internal stakeholders can definitely help foster this.

But, don't lose sight of the end goal and, in particular, the expectations of the users you are dealing with. This is a little old school but I still stand by the mantra of 'if it's not broken don't fix it' as we are creatures of habit. Consultants and lighting engineers will be at the cutting edge of new lighting developments and will no doubt be keen to sell you the newest,

most impressive solution but this is not always the most practical. You have to consider the ongoing maintenance of lighting systems, the availability of replacement LED fittings and parts, and the management of the controls system ideally without external input. Lighting doesn't need to be complicated and more often than not, in my experience, staff don't have the time or inclination to learn about complicated lighting controls within their busy day to day lives. They are more than happy with a simple solution that just works.

#### Author's profile:

Neil is a Sustainability and Energy Manager with over 14 years' experience in higher education and the public sector. He specialises in lighting design, BMS upgrades, carbon footprinting and project management, and is experienced in developing and implementing sustainability strategies that reduce environmental impact, promoting social responsibility, and driving positive change through strong stakeholder engagement.



## FEATURE

### Looking Back

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In 2021, we examined how improving HVAC energy efficiency can unlock significant savings, often through simple, low-cost changes. Sam Arje now revisits his original guidance to reflect on which recommendations have stood the test of time, and to share insights gained from four years of hands-on experience in making buildings smarter, greener and more energy efficient.



Sam Arje, Senior Energy Consultant at TEAM Energy



# Energy Efficiency Opportunities in HVAC – Four Years On

## THE MOST SURPRISING ENERGY EFFICIENCY OPPORTUNITY

**2021 Advice:** *Avoiding conflict between heating and cooling units is critical when improving the energy efficiency of a building.*

*To ensure this, a dead band of at least 3°C must be set. This dead band represents a comfortable building temperature for staff when neither cooling nor heating is required. Many buildings have just 1°C between the two, which is not enough to guarantee that both heating and cooling are not operating simultaneously.*

**Four Years On:** Establishing an adequate deadband is still essential for preventing heating and cooling systems from competing with one another. A minimum 3°C separation continues to be a practical and effective way to ensure that neither system activates unnecessarily, protecting both energy performance and occupant comfort.

If anything, experience over the past four years has reinforced how important a proper deadband is for avoiding short cycling. When the gap between heating and cooling setpoints is too narrow, equipment can switch on and off in rapid succession, running for only a few minutes at a time. This prevents the system from completing a full heating or cooling cycle, increases wear on components and wastes energy without delivering meaningful temperature control.

## THE NO COST ENERGY EFFICIENCY OPPORTUNITY

**2021 Advice:** *Educating the workforce to understand the importance of energy efficiency. Beyond improving HVAC energy efficiency, this encourages colleagues to think more sustainably and use systems more carefully. While the immediate benefit is cost savings for the business, these savings can be reinvested elsewhere. It*

*also demonstrates the company's commitment to energy management and sustainability, enhancing its reputation with customers, suppliers and future employees. Most importantly, reducing energy use lowers carbon emissions, supporting the organisational and national Net Zero targets and improving local environmental outcomes.*

**Four Years On:** Educating the workforce about energy efficiency is still one of the most powerful tools an organisation has. If anything, the importance of this has only grown. A well-informed workforce doesn't just support HVAC efficiency; it contributes to a broader cultural shift toward sustainable thinking, which influences everyday behaviours and long-term decision-making. While the immediate gains often show up as cost savings for the business, those savings ultimately create more flexibility and resilience across the organisation.

What has changed over the past four years is the external pressure. A company's reputation around energy management and carbon reduction is now more critical than ever. Many potential clients will no longer work with organisations that cannot demonstrate credible environmental commitments. With the increasing focus on Scope 3 emissions, businesses are being pushed to scrutinise their entire supply chain, meaning they can only meet their own carbon goals by partnering with suppliers who are on a similar path toward reduction.

If I were giving this advice today, I would place far greater emphasis on using data to drive engagement and accountability. Modern systems provide a wealth of information that can highlight outliers, inefficiencies and behavioural patterns. Sharing this insight with teams encourages questions, sparks curiosity and helps people understand the real-world impact of their actions.

### **THE LOW COST ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *The nature of a business will determine how its building is used and the ideal temperature it should operate at. Managing temperature based on building use reduces waste, costs, carbon emissions and improves comfort. Centralised HVAC control is therefore more effective than user-controlled systems, with access limited via codes or keys. A Building Management System (BMS)*

*can further improve efficiency by monitoring humidity and ventilation and enabling time- and day-based scheduling. Zonal controls can increase impact in buildings with varied uses, while placebo controls can maintain user satisfaction without affecting optimal HVAC settings.*

**Four Years On:** Looking back at the original advice, the core message still stands strong: centralised control of HVAC systems remains one of the most effective ways to reduce energy waste, cut costs and maintain consistent comfort levels across a building. The principles



of zoning, restricting user access to controls, and using a BMS to optimise temperature, humidity and ventilation are just as relevant today - if not more so, given rising energy prices and increasing pressure to reduce carbon emissions.

However, experience over the past four years has highlighted an important nuance that I would emphasise much more strongly today. During several audits, I've encountered buildings equipped with sophisticated, often expensive, BMS systems that were effectively bypassed because the controls had been switched to a manual

mode. In many cases, this was done to address a temporary issue, perhaps a repair, a fault or a one off operational need, but the system was never returned to Auto afterwards. As a result, the BMS's intelligence, scheduling and optimisation capabilities were completely unused, leaving the building running inefficiently despite having the right technology in place. Ensuring your BMS system is set up correctly and working in the way it is intended to is vital.

### **THE MOST COMMON ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *A physical inspection of areas around the building will help you understand whether your HVAC system is operating in the best circumstances.*

*Whatever type of building you have, conditioned air is precious so take measures to ensure that roof, wall and floor insulation is up to standard. Pipes, ducts and outlets are also usual suspects for energy loss that can get overlooked. Gaps in windows and doors need to be repaired to improve HVAC efficiency and ensure that external doors are not left open. Where doors are operated by motion sensors, adjust the settings to limit the time they are open for. And, most obvious of all, encourage staff to not be tempted to open windows when the heating is on.*

**Four Years On:** Conducting regular physical inspections remains a fundamental part of ensuring an HVAC system can operate efficiently. The basics still matter, protecting conditioned air by maintaining good insulation, checking pipework

and ducting for losses, repairing gaps around windows and doors, and managing how long automated doors remain open all continue to have a direct impact on performance.

If anything, the past four years have reinforced how easily these simple issues can be overlooked. Even the most advanced HVAC system will struggle to deliver efficiency if the building envelope is compromised or if staff habits work against it. Encouraging people not to open windows when heating is running may seem obvious, but it remains one of the most common sources of unnecessary energy loss.

### **THE MOST OVERLOOKED ENERGY EFFICIENCY OPPORTUNITY**

**2021 Advice:** *It is easy to forget the thermostatic settings that run in the background.*

*Check that they are still suitable for the building's operating hours and occupation levels. These are changes that have affected most organisations in the current climate. If there is a control panel, use it as it is meant to be used; adjust time bands, ensure the settings are adapting for seasonality, building use and UK time zone changes. Also check that the dates and times are correct on all control panels. Additionally, check the building's temperature sensors, establish that they are calibrated and operating correctly so that the internal heating system switches on and off to suit your organisation's operating hours. Also check that the sensors are located appropriately, particularly if there have been any changes to the building layouts.*

**Four Years On:** Regularly reviewing thermostatic settings is still essential, and in many cases, it has become even more important. Over

the past four years, shifts in working patterns, fluctuating occupancy levels and changes to building use have made it clear that background settings cannot simply be left untouched. When schedules, time bands or seasonal adjustments are not updated, HVAC systems often run unnecessarily, wasting energy and increasing costs.

What I would emphasise more strongly today is the need for routine verification rather than occasional checks. Ensuring that control panels are set to the correct date, time and time zone, and that they reflect actual operating hours, is a simple step that continues to be overlooked. Likewise, temperature sensors must be calibrated, functioned correctly and positioned appropriately, especially if layouts, partitions or usage patterns have changed.

### **TOP TIP**

**2021 Advice:** *Engaging and influencing staff to form sustainable and efficient habits can make a big impact on your building's overall energy consumption.*

*It is impossible to keep everyone perfectly comfortable, and individual adjustments reduce overall comfort and efficiency. Encouraging behaviour change, flexible dress codes and layered clothing can support the energy strategy. Investing in training to raise energy awareness and influence habits will also help reduce wasted energy.*

**Four Years On:** Encouraging staff to adopt sustainable habits is still one of the most effective ways to reduce unnecessary energy use, particularly when it comes to HVAC systems. The challenge of keeping every individual perfectly comfortable hasn't changed and allowing

everyone to adjust settings to suit their personal preferences still leads to inefficiency and discomfort for the wider group.

What has evolved over the past four years is the recognition that behavioural change is not just helpful, it is essential. With rising energy costs, increased scrutiny of organisational sustainability and a stronger focus on carbon reduction, staff engagement now plays a central role in meeting environmental goals. Encouraging appropriate dress, promoting the use of layers and helping people understand how their actions affect the building's performance remain practical and effective strategies.

If anything, I would place even greater emphasis on structured training and ongoing communication. People approach energy use differently, and without clear guidance, many simply don't realise the impact of their choices. Regular awareness sessions, visible reminders, and data-driven feedback can help colleagues understand why certain controls are restricted and how their behaviour contributes to the organisation's wider energy strategy.

### **Author's profile:**

Sam is a Senior Energy Consultant and Approved EnCO Practitioner at TEAM Energy. He is an experienced energy project manager with a passion for sustainability, driving down energy consumption and reducing carbon emissions. Sam's primary responsibility is to support TEAM's customers with energy analysis, energy surveys, energy efficiency training, complying with the Energy Savings Opportunity Scheme (ESOS) and identification and implementation support.