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The Building Performance Series

DECODING BUILDING PERFORMANCE ENGINEERING

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THE BEST RETROFIT LIGHTING SOLUTIONS



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DECODING BUILDING PERFORMANCE ENGINEERING

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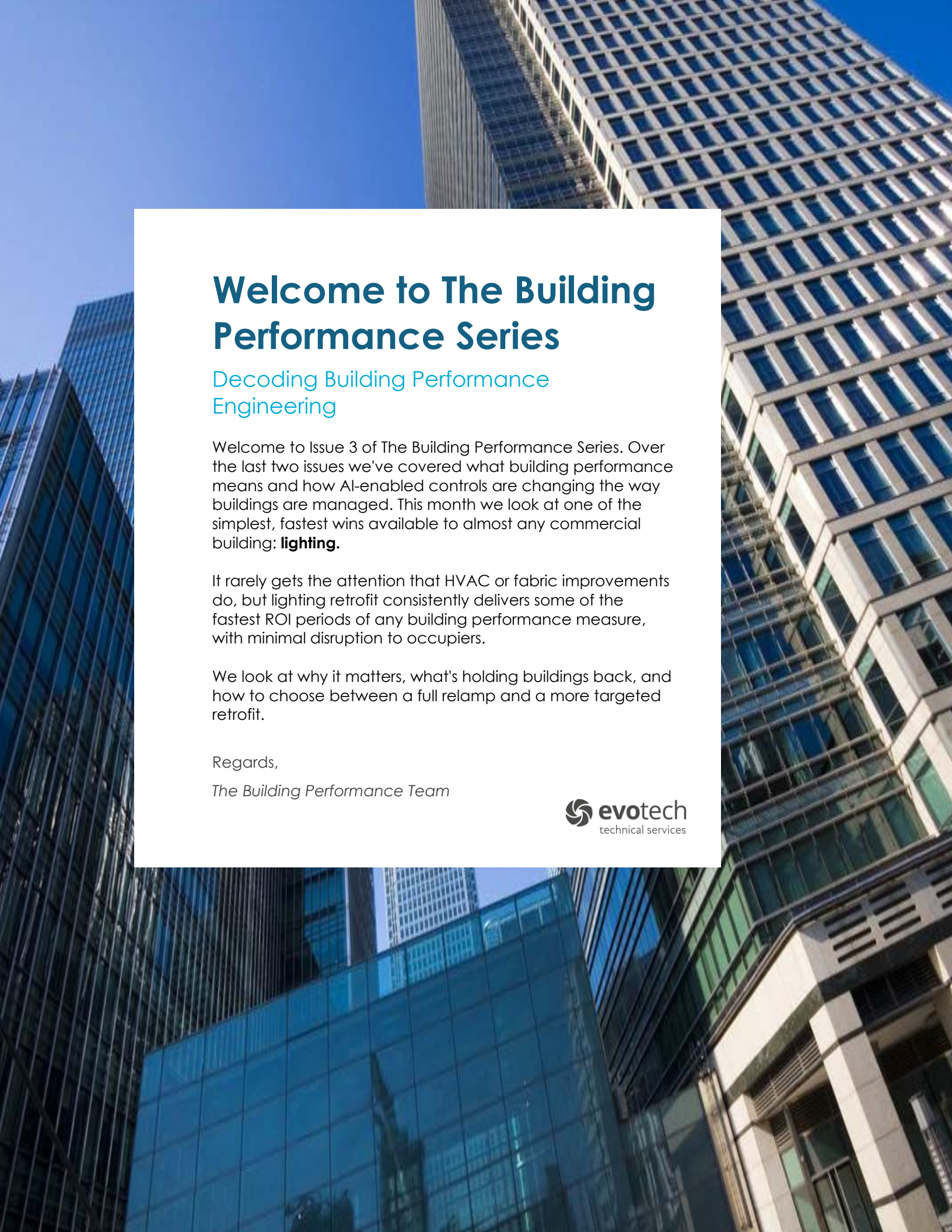
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Welcome to The Building Performance Series

Decoding Building Performance Engineering

Welcome to Issue 3 of The Building Performance Series. Over the last two issues we've covered what building performance means and how AI-enabled controls are changing the way buildings are managed. This month we look at one of the simplest, fastest wins available to almost any commercial building: **lighting.**

It rarely gets the attention that HVAC or fabric improvements do, but lighting retrofit consistently delivers some of the fastest ROI periods of any building performance measure, with minimal disruption to occupiers.

We look at why it matters, what's holding buildings back, and how to choose between a full relamp and a more targeted retrofit.

Regards,

The Building Performance Team

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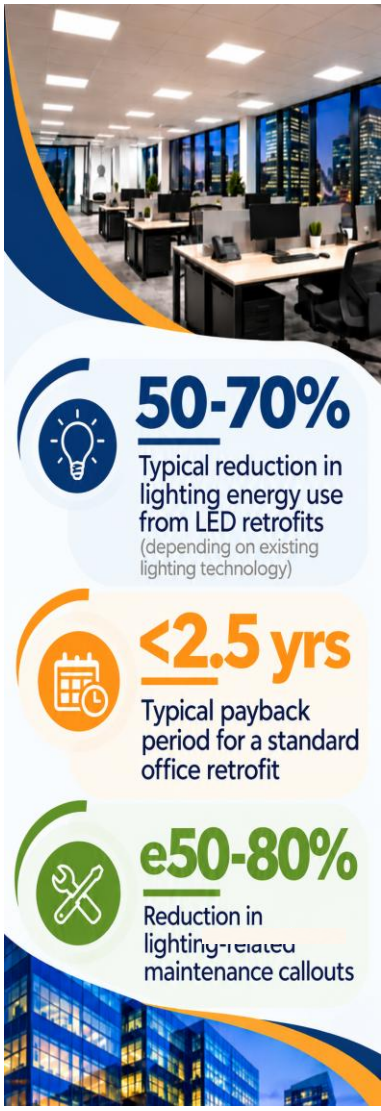


1. Why Lighting Is the Retrofit You're Not Doing

Lighting is one of the few building performance measures that is genuinely simple: swap old fittings for new, and the savings start immediately.

Lighting typically accounts for a meaningful share of a commercial building's electricity use, and in older buildings running fluorescent or halogen fittings, that share is often far higher than it needs to be. Unlike HVAC or fabric work, a lighting retrofit rarely requires system downtime, specialist commissioning, or significant disruption to occupiers.

The technology has also matured to the point where LED is now the default choice on cost grounds alone, before energy savings or maintenance reduction are even considered. What was once a sustainability nice-to-have is now simply the cheaper way to light a building.



2. Why Does It Matter Now?

The Financial Case

LED fittings typically use a fraction of the energy of the fluorescent and halogen fittings they replace, whilst lasting significantly longer - which means both an energy saving and a reduction in maintenance and replacement costs. For many buildings, lighting retrofit offers one of the shortest payback periods of any available upgrade.

The Regulatory Case

As covered in Issue 1, EPC B by 2031 will require meaningful investment in the UK's older commercial stock. Lighting is rarely enough on its own to move a building's rating, but as one
of the lowest-cost, fastest-implemented measures available, it is a sensible first step in any wider compliance programme.

The Market Case

Occupiers increasingly notice, and ask about, the quality and efficiency of the lighting in the space they're taking on. Modern LED lighting with good colour rendering is a straightforward, visible improvement to occupier experience, alongside the less visible energy and carbon benefits.



3. The Challenge Facing Facilities Managers Today

Working Around Occupied Space

Unlike a vacant refurbishment, most lighting retrofits happen in buildings that are still occupied and trading. Planning installation around working hours, minimising disruption to tenants, and sequencing floor by floor all add complexity that a simple swap-it-out job description doesn't capture.

Mixed and Ageing Fittings

Many buildings have accumulated a mix of fitting types and ages over successive tenant fit-outs, making a like-for-like specification harder than it first appears. A proper survey, rather than an assumption based on a sample of fittings, is usually the difference between a smooth retrofit and one that runs into surprises.

Underestimating Controls

It's common to focus entirely on the fittings and treat controls as an afterthought. In practice, good controls - occupancy sensing, daylight linking, zoning - often contribute as much to the savings case as the LED fittings themselves, and are frequently the difference between a good retrofit and a great one.

4. Why Move Now? The Case for Acting

The Return On Investment Window Is Attractive

Few building performance measures offer as short and predictable a payback period as lighting retrofit. Waiting doesn't reduce the cost of doing the work - it simply delays the point at which the savings start.

Compliance Deadlines Are Real

As with the wider EPC B pathway covered in Issue 1, lighting retrofit is a low-cost, low-disruption way to start building compliance credentials now, ahead of the deadlines that will affect the whole of the UK's commercial stock.

Technology Has Never Been More Accessible

Modern LED fittings and smart controls are now a mainstream, well-understood specification, not an emerging or unproven technology. The barrier to getting started is lower than it has ever been.



5. Tip of the Month: Lighting Controls That Pay for Themselves Within a Year

New fittings get most of the attention, but in my experience it's the controls that make the biggest difference to how much a lighting retrofit actually saves once it's up and running.

1. Occupancy Sensing in Low-Use Areas

Corridors, stairwells, toilets and meeting rooms are rarely occupied continuously, yet lighting in these areas is often left running to a fixed schedule. Simple occupancy sensing in these zones is one of the fastest-paying additions to any retrofit.

2. Daylight Linking Near Windows

Perimeter lighting near windows can often be dimmed or switched off entirely for large parts of the day without anyone noticing. Daylight-linked controls do this automatically, and are a straightforward addition where fittings are already being replaced.

> ***The fittings get you halfway there. The controls get you the rest of the way.***

3. Don't Skip Commissioning

Controls that are installed but never properly commissioned rarely deliver their full savings potential. Building in time to test and tune sensor sensitivity and timeout settings after installation is worth the extra time it takes.

6. LED Retrofit vs Full Relamp: Choosing the Right Approach for Your Building

Not every building needs the same solution, and getting this choice right early avoids paying twice.

Retrofit Lamps and Drivers

Replacing lamps and drivers within existing fittings is the fastest, least disruptive option, and can often be done without touching the ceiling grid or existing wiring.

It's a sensible choice where existing fittings are in good physical condition and a quick win is the priority.

Full Fitting Replacement

Where fittings are old, damaged, or simply the wrong type for a modern LED source, a full replacement usually delivers better light quality, better controls integration, and a longer service life - at a higher upfront cost than a simple retrofit.

Making the Decision

The right answer depends on the condition of the existing installation, how long the fittings have left in their service life, and whether the building is due any wider refurbishment where lighting could be bundled in.

A proper survey, rather than a general assumption, is the right starting point.



In The News...

7. UK Government Consults on Tightened Non-Domestic Lighting Standards

The Government's Future Buildings Standard introduces tighter energy efficiency requirements for lighting in new and refurbished non-domestic buildings, supporting lower energy consumption, reduced carbon emissions and improved building performance.

What's Changing?

The original consultation proposed increasing minimum lighting efficiency standards:

- **General internal lighting:** From 95 to 105 lumens per circuit watt (lm/W)
- **Display lighting:** From 80 to 95 lm/W

The changes also place greater emphasis on efficient lighting design and appropriate controls, including occupancy sensors, daylight dimming and zoning.

Key Dates

24 March 2027: Main Building Regulations changes take effect, subject to transitional arrangements

24 September 2027: Specified provisions take effect for higher-risk buildings

What Does This Mean for Building Owners and Managing Agents?

The changes apply principally to new buildings and qualifying work to existing properties. There is no requirement to immediately replace all existing lighting installations.

However, owners and managing agents should consider:

- **Asset condition:** Identify ageing fluorescent and inefficient lighting systems
- **Compliance:** Ensure new lighting installations meet applicable efficiency and design requirements
- **Lifecycle planning:** Incorporate LED upgrades into planned maintenance and refurbishment programmes
- **Smart controls:** Use occupancy detection, daylight dimming and zoning to reduce unnecessary consumption
- **Energy performance:** Assess potential savings, carbon reductions and improvements to EPC ratings

Looking Ahead

Lighting upgrades also support wider energy efficiency objectives, including the Government's proposed EPC B requirement from 2031 for privately rented non-domestic buildings over 1,000 m², subject to legislation.

Building owners and managing agents should review existing lighting assets now, using condition surveys and energy data to prioritise improvements. Whether retrofitting LED tubes or installing complete LED luminaires, the focus should be on long-term efficiency, compliance and building performance.



MAINTENANCE MATTERS

Welcome to our new section dedicated to the practical side of building maintenance and compliance. Each month we'll explore industry developments, evolving standards and practical advice to help building owners and facilities managers maintain safe, reliable and compliant buildings.



8. Emergency Lighting: Will It Work When Needed?

Testing, battery condition and common defects - and why changes to building layouts could compromise emergency escape lighting.

Emergency lighting is a critical life safety system, designed to illuminate escape routes, exits and essential safety equipment when normal lighting fails. However, a system that appears to be working during a routine inspection may not necessarily provide adequate illumination for the duration of an emergency.

> ***"A fitting that illuminates during a short monthly test may still fail during an extended power outage if its battery has deteriorated."***

Regular testing and maintenance are essential, particularly as batteries deteriorate, fittings age and building layouts change.

Testing Beyond the Basics

Under BS 5266-1:2025 and BS EN 50172:2024, emergency lighting systems should undergo regular inspections and testing, including:

- **Monthly functional tests:** Confirming that luminaires operate when the normal lighting supply is interrupted
- **Annual full-duration tests:** Verifying that batteries can maintain illumination for the required period, typically three hours
- **Periodic light-level verification:** Measuring actual illumination levels at intervals not exceeding five years, in accordance with the updated guidance
- **Maintenance records:** Documenting test results, identified defects and completed remedial work

A fitting that illuminates during a short monthly test may still fail during an extended power outage if its battery has deteriorated.

Common Defects to Look Out For

Typical issues include failing batteries, defective charging circuits, damaged luminaires, discoloured diffusers, obscured exit signs and inadequate illumination. Even where fittings operate correctly, their positioning may no longer provide sufficient coverage.

When Buildings Change, Lighting Must Be Reviewed

Office refurbishments, new partitions, changes in occupancy and alterations to escape routes can all affect emergency lighting provision. A newly installed partition could obstruct an existing luminaire, whilst a relocated doorway or revised escape route may introduce areas requiring additional illumination or directional signage. Emergency lighting should therefore be reviewed whenever building layouts or escape arrangements change, rather than waiting for the next scheduled inspection.

Maintenance Matters

Effective emergency lighting maintenance is about more than confirming that fittings switch on. It means ensuring the system provides adequate illumination, for the required duration, in the locations where people need it.

For facilities managers and building owners, combining routine testing with proactive maintenance and periodic reviews helps ensure emergency lighting remains fit for purpose – and ready when it matters most.



9. Designing Smarter Lighting Controls

Getting the balance right between energy efficiency, occupant comfort and operational flexibility

Effective lighting control is about more than switching lights on and off. A well-designed system should respond to occupancy, maximise natural daylight and maintain appropriate lighting levels without unnecessary energy consumption.

The key is to establish the control philosophy at the design stage, rather than treating controls as an addition once the luminaires have been specified. Here are seven technical considerations worth addressing.

1. Occupancy Detection: Select the Right Technology
Passive infrared (PIR) sensors rely on detecting changes in infrared radiation and require suitable lines of sight. Microwave detectors can detect movement through some lightweight partitions, potentially causing unwanted switching.

Consider absence detection (manual-on, automatic-off) in cellular offices and meeting rooms. It prevents lighting being activated unnecessarily and can offer better energy performance than automatic-on presence detection.

2. Daylight Dimming: Understand the Daylight Gradient
Daylight availability reduces as distance from the building façade increases. Applying identical dimming levels across an entire office can result in excessive lighting near windows or insufficient illumination deeper into the space.

Arrange daylight-linked control zones broadly parallel to the façade and calibrate photocells against measured working-plane illuminance. Avoid positioning sensors where direct sunlight or reflections from luminaires distort readings.

3. Zoning: Design Around Actual Occupancy
Lighting circuits should reflect how spaces are occupied, not simply follow electrical distribution or ceiling layouts.

In open-plan offices, use smaller control zones with individually addressable luminaires where practical. DALI-2 systems can provide flexibility to reconfigure control groups as office layouts change, without extensive rewiring, provided the installation has been designed accordingly.

4. Manual Overrides: Avoid Control Conflict
Occupants need appropriate control, particularly where different tasks require different lighting conditions.

Programme local overrides with defined timeout or reset arrangements. A common operational problem is lighting being manually overridden to 100% output and remaining there indefinitely, effectively defeating the energy-saving strategy.



5. Maintained Illuminance: Avoid Over lighting
LED installations are frequently designed with an allowance for light output depreciation and dirt accumulation. This can result in excessive initial illuminance and unnecessary energy consumption.

Where suitable, incorporate constant illuminance control to reduce initial output whilst maintaining the design illuminance as the installation ages. Verify performance against the relevant maintained illuminance requirements, rather than relying solely on manufacturers' nominal output figures.

6. Sensor Settings: Fine-Tune the Response
Poorly configured sensors can undermine an otherwise sound design. Short timeout periods may cause nuisance switching, whilst excessively long delays waste energy.

Set occupancy time delays according to the activity and sensor coverage. Introduce appropriate daylight dimming response times and hysteresis to prevent visible fluctuations or repeated switching during changing daylight conditions.

7. Commissioning: Validate the Design in Practice
Correct commissioning is essential. Factory-default settings rarely reflect the specific characteristics of an occupied building. Test sensor coverage under representative occupancy conditions, verify daylight calibration at the working plane and check manual override behaviour. Record control groups, setpoints, timeout periods and operating sequences so that facilities teams can maintain and optimise performance over time. Ensure normal lighting controls do not compromise emergency lighting operation.

Key Takeaway
The best lighting control strategy is not necessarily the most sophisticated. It is the one that delivers the required lighting quality, responds reliably to occupancy and daylight, and remains straightforward to operate and maintain.

Design should follow the principles established in CIBSE/SLL Lighting Guide LG14: Control of Electric Lighting, with particular attention to control philosophy, human interaction and commissioning.

A lighting control system only saves energy when its design, commissioning and ongoing operation work together.



NEXT ISSUE | Issue 04 | December 2026

Reducing Energy Waste Over the Christmas Shutdown

In Issue 4 we look at the simple shutdown checklist that stops a building wasting energy over the festive break, and how to avoid the restart problems that can undo those savings in January.

- The shutdown checklist - Ten systems to isolate before you lock up
- Mike's tips: Avoiding frozen pipes and restart failures in January
- In the news: Winter energy pricing update - what it means for commercial budgets

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