

Comments on the European Commission's Implementation Guidelines for the Energy Performance of Buildings Directive (EPBD)

Introduction

The central objective of the Energy Performance of Buildings Directive (EPBD) is to improve the energy efficiency of buildings across member states by promoting decarbonisation and modernisation of Europe's building stock.

Lighting plays an integral part in significantly reducing the energy consumption and operating costs of buildings, while effectively contributing to healthier indoor spaces. In Europe, lighting alone accounts for around 11% of household electricity use and 14% in commercial buildings¹. The good news? Efficient and intelligent lighting systems already exist. They offer cost-effective, immediate solutions to reduce energy consumption and cut CO₂ emissions. Many assume the transition to LED lighting is complete, but Europe is only halfway there. Going beyond LEDs, adding sensors and controls can yield up to 80% energy savings² compared to conventional lighting.

Given its central role in building renovation, lighting should be a key consideration in the implementation of the EPBD³. The lighting industry wishes to offer its support for an effective implementation of the Directive and would like to share its comments with this paper, following the publication of the European Commission guidelines in the summer 2025.

Automatic Lighting Controls

Our recommendations in a nutshell:

- For buildings where BACS are required, a lighting control system shall be used to control the "built-in lighting". A lighting control system is a BACS and must therefore comply with the requirements set for lighting controls and BACS in the EPBD.
- Occupancy detection is not sufficient to comply with the EPBD requirements. A lighting control system must be capable of communicating with other BACS and record and report data on energy use and system performance.
- Zones should be kept small and respond to the task performed in them.

¹ http://www.ecbcs.org/Data/publications/EBC_Annex_45_Guidebook.pdf

² Erhan E. Dikel, Guy R. Newsham, Henry Xue, Julio J. Valdés, Potential energy savings from high-resolution sensor controls for LED lighting, Energy and Buildings, Volume 158, 2018, Pages 43-53, ISSN 0378-7788, <https://doi.org/10.1016/j.enbuild.2017.09.048>.

³ See previous LightingEurope position on the EPBD implementation:
https://www.lightingeurope.org/index.php?option=com_content&view=article&id=733&catid=45

- Lighting controls using daylight sensing can positively influence a building's SRI score and contribute to further energy savings.

The explanation:

Under Article 2 of the EPBD, built-in lighting is classified as a *technical building system* (TBS), alongside other systems such as heating, cooling, and ventilation. The legislation also mandates the use of building automation and control systems (BACS) to ensure the economic, safe, and energy-efficient operation and management of these technical systems. For built-in lighting, the corresponding BACS is referred to as a *lighting control system*.

The EPBD explicitly requires Member States to establish regulations mandating the use of BACS in non-residential buildings, wherever their installation is technically and economically feasible. According to the European Commission's implementation guidelines, automatic lighting controls are generally considered technically and economically feasible for non-residential buildings.

The energy consumption of the heating, cooling, and air conditioning system establishes a threshold for the mandatory use of BACS in non-residential buildings. This threshold considers the total combined capacity of all systems present in a building. If combined HVAC systems are in place the threshold refers to the capacity of the complete system. If several systems are operating together in a building, the sum of the energy consumption of the individual units is used to calculate the total connected load for the building.

Lighting controls can be part of a centralised BACS, but due to the complexity and higher granularity of lighting installations in large non-residential buildings, e. g. adapted to potentially different visual tasks per zone, the built-in lighting system is often controlled by a separate BACS, the lighting control system.

Lighting controls are presented with a twofold set of operational requirements in the EPBD as determined by their operation as a BACS and their individual functionality within the TBS.

Article 13 stipulates that a BACS must be capable of continuously monitoring a building's energy use to enable timely adjustments that optimise efficiency. It should also provide information on the building's energy performance and identify efficiency deficits to support further improvements. In addition, a BACS must be able to communicate with connected technical building systems and other appliances within the building, ensuring interoperability across all TBS. Finally, it should also be capable of monitoring the building's indoor environmental quality.

Article 13 further specifies that lighting control systems must be suitably zoned and capable of detecting occupancy. The foundation for implementing these specific lighting requirements can be found in existing standards. The European Commission's implementation guidelines reference EN ISO 52120-1, which defines the requirements for occupancy detection. According to this standard, occupancy detection should be automatic and follow two options:

1. Auto on/dimmed off: the control system switches the luminaire(s) automatically on whenever the illuminated area is occupied, and automatically switches them to a state with dimmed status after the last occupancy in the illuminated area
2. Auto on/auto off: the control system switches the luminaire(s) automatically on whenever the illuminated area is occupied and automatically switches them entirely off when the area is totally vacated.

However, as lighting controls are also considered a BACS, occupancy detection alone is not sufficient to comply with the requirements outlined in the EPBD. The ability to communicate with other TBS is essential, not only because it is required by the EPBD, but even more so to enable zero-emission buildings to react to external signals and adjust its energy consumption accordingly. A lighting control system must be able to communicate its energy consumption to the building energy management system. A connected lighting system creates further benefits for maintenance and continuously improved operations, as diagnostic data can be gathered, which can facilitate a quicker response by the building management. A connected lighting control system can also provide crucial, more granular, and faster information on the status of the TBS. Since lighting control zones are typically smaller than HVAC zones, they allow for additional functionality such as occupancy mapping to enable space use optimisation.

Furthermore, while daylight sensing control systems are not explicitly mandated by the EPBD, daylight control capability is going to be part of the Smart Readiness Indicator (SRI) assessment. The SRI is expected to be introduced as a mandatory tool to assess the capabilities of a building's TBS. During such an assessment, a lighting control system with occupancy detection and daylight sensing abilities will receive a higher score and positively contribute to the overall SRI rating of the building. The inclusion of daylight sensing control systems should be considered, also beyond the scope of the SRI, as they can deliver significant energy savings.

Additionally, effective zoning can contribute significantly to energy savings and improved indoor environmental quality in a building. The highest contributions to energy savings, indoor environmental quality, and responsiveness of the light to the tasks performed in each zone will be achieved by small lighting zones designed to correspond to the visual requirements of each zone.

Finally, proper verification and commissioning procedures are essential to ensure the correct installation and operation of lighting systems. Lighting control systems should be recommissioned regularly, as changes in the use or layout of a building or its indoor spaces may cause the system not to ideally respond to the new circumstances.

Indoor Environmental Quality

Our recommendations in a nutshell:

- Member States should include a broad definition of IEQ in their national legislation, including lighting. Recommendations for the required lighting of workplaces are covered by the European standard EN 12464-1.
- The standard EN 16798-1 is currently under general revision and the implementation of the EPBD should follow the latest version of the standard.

The explanation:

The inclusion of Indoor Environmental Quality (IEQ) in the revised EPBD marks a significant shift in scope and impact of the legislation.

Lighting contributes to healthier indoor spaces by providing visual comfort. Adequate illumination levels and proper distribution of light reduce glare and uniform workplace illumination reduces inappropriate shadows, promoting comfortable vision. This ensures that occupants can perform tasks without straining their eyes, which is crucial for optimizing productivity and overall well-being. Good lighting helps occupants navigate

spaces safely, identify potential hazards, and maintain security. Moreover, lighting plays a vital role in effects by regulating human circadian rhythms and affecting mood. Daylight or lighting that has a similar dynamic light spectrum than daylight can synchronize our internal body clocks, therefore promoting better sleep patterns and enhancing mood and alertness during the day. On the other hand, poor lighting quality can lead to headaches, eye strain, and fatigue, negatively impacting occupants' well-being and productivity.

To grasp the benefits of lighting systems, the Lighting Systems Design Process must be considered to ensure the energy efficiency the proper functioning (inspection), and a high level of IEQ designed and maintained throughout life.

In the EPBD, Article 5 on IEQ requirements and Article 2 defining IEQ allow for a broad interpretation of its scope. LightingEurope strongly encourages Member States to adopt this wider approach by including lighting among the IEQ parameters, as also highlighted in the European Commission's guidelines. The guidelines recommend implementing light levels as specified in EN 12464-1.

When assessing relevant parameters for IEQ, LightingEurope would also like to stress that the relevant standard referred to in the Commission's implementation guideline (EN 16798-1) is currently under revision. A major change in content of the standard is to be expected affecting each TBS. Therefore, any implementation based on the standard should refer to the latest revised version of EN 16798-1, and the corresponding new section on lighting.

Finally, the European Commission's implementation guidelines also refer to the Thermal, Acoustic, Indoor air, and Luminous (TAIL) rating scheme as a framework for assessing IEQ. Although lighting is included within the scope of IEQ parameters in TAIL, it is important to note that the scheme was developed without input from lighting experts. Therefore, lighting experts should be consulted if the TAIL framework is used to assess IEQ indicators.

Recap of our recommendations

To ensure an optimal implementation of the EPBD that maximises the contributions of lighting systems and controls for building owner, managers, and occupants, LightingEurope issues the following remarks and recommendations:

- For buildings where BACS are required, a lighting control system shall be used to control the “built-in lighting”. A lighting control system is a BACS and must therefore comply with the requirements set for lighting controls and BACS in the EPBD.
- Occupancy detection is not sufficient to comply with the EPBD requirements. A lighting control system must be capable of communicating with other BACS and record and report data on energy use and system performance.
- Zones should be kept small and respond to the task performed in them.
- Lighting controls using daylight sensing can positively influence a building's SRI score and contribute to further energy savings.
- Member States should include a broad definition of IEQ in their legislation, including lighting. Recommendations for the required lighting of workplaces are covered by the European standard EN 12464-1.
- The standard EN 16798-1 is currently under general revision and the implementation of the EPBD should follow the latest version of the standard.

Contact

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LightingEurope is the voice of the lighting industry, based in Brussels and representing 32 companies and national associations. Together these members account for over 1,000 European companies, a majority of which are small or medium-sized. They represent a total European workforce of over 100,000 people and an annual turnover exceeding 20 billion euro. LightingEurope is committed to promoting efficient lighting that benefits human comfort, safety and wellbeing, and the environment. LightingEurope advocates a positive business and regulatory environment to foster fair competition and growth for the European lighting industry. More information is available at www.lightingeurope.org.