

Revision of the EPBD: achieving energy savings, comfort, and wellbeing through lighting

Introduction: combining health and comfort of citizens while achieving energy savings

In December 2020, the EU agreed to reduce greenhouse gas emissions by 55 % in 2030. As buildings use 40 % of energy and produce 36 % of greenhouse gasses in Europe, an earlier targeted review of the Energy Performance of Buildings Directive (EPBD) is needed to achieve those objectives.

Modernised lighting can significantly contribute to the energy savings in buildings, and thus also assist in the reduction of greenhouse gas emissions. Lighting accounts for around 20 % of the total cost-effective electrical energy savings potential in non-residential buildings: by including lighting systems in the EPBD, an additional 29 TWh/y can be saved by 2030 (up to 56 TWh/y in 2050).¹

The World Health Organisation estimates that people spend approximately 90 % of their time indoors in residential and non-residential buildings, and the Covid-19 crisis has highlighted the importance of indoor comfort and wellbeing. Beyond the energy savings, including lighting systems in the EPBD will also improve the visual comfort, wellbeing, and productivity of building users.

The energy savings and Indoor Environmental Quality (IEQ) benefits can only be achieved by following the Lighting System Design Process. This allows for tailoring the lighting systems to the specific building and user needs.

Our recommendations for new requirements

In the targeted revision of the EPBD, we recommend to:

Include requirements for the optimisation and utilisation of automatic lighting controls

LightingEurope proposes to optimise and utilise the guidance provided by existing standards (i.e., EN 12464-1), the experience of forming the Smart Readiness Indicator, while taking the latest technological developments into account. Therefore, we

¹ VITO et al. (commissioned by the European Commission), *Preparatory study on lighting systems 'ENER Lot 37'* (Brussels, 15 December 2016).

recommend including requirements in the EPBD for the optimisation and utilisation of automatic lighting control systems.

Include lighting inspection requirements

LightingEurope recommends adding lighting inspection requirements in the EPBD. A periodic assessment will have to be carried out to ensure the proper functioning of the lighting systems. Important inspection parameters and questions are how the building space is being utilised and whether the lighting system and application are still suitable (whether the light levels are sufficient to provide good quality lighting), and if the controls are still optimised for the space usage.

Include minimum requirements for Indoor Environmental Quality

We recommend the introduction of mandatory minimum requirements on IEQ. Instructions for lighting can be found in EN 12464-1. IEQ should also be referred to in the Commission guidelines on the cost-optimal calculation of energy performance in chapters 4.3, 6.1, and 6.5, and as part of an updated framework for the Energy Performance Certificates.

Although traditional electric lighting does wonders in terms of the visual, it simply lacks the intensity, timing, colour, dynamics, and other non-visual benefits that only natural light offers. This is where Human Centric Lighting (HCL) comes in. Using daylight as the baseline for quality lighting, HCL brings the benefits of natural light inside. More specifically, HCL supports the health, wellbeing, and performance of humans by combining the visual, biological, and emotional benefits of light.²

HCL provides the right light, at the right place and the right time for the activities we carry out every day. The benefits of HCL cover visual, biological, and emotional aspects. Within the HCL design process, lighting should address the core issues of safety, task requirements and occupant needs in a coherent and integrated manner. Within the framework of a Healthy Building, this means ensuring that the HCL system is dynamic, tuneable, and includes default lighting control settings.

The EPBD should not only set requirements for energy efficiency, but also for IEQ. And with the Renovation Wave Initiative, Europe is in a unique position to foster the uptake of IEQ and ensure long-term improvements in wellbeing and comfort for building users.

For more information, please refer to our [Position Paper on Healthy Buildings](#), our recommendations on the [Renovation Wave Initiative](#), and our [#BetterLighting Campaign](#). LightingEurope is also co-signatory to the ['Healthy Buildings for All' Manifesto](#).

Include UV-C disinfection technology

Next to lighting, disinfection is also part of IEQ. UV-C disinfection technology is an effective and energy efficient tool in combating micro-organisms and viruses, including SARS-CoV-2. UV-C is an established technology for disinfection.

LightingEurope calls on European policy makers to actively support and stimulate the uptake of UV-C disinfection technologies, in particular as part of building policies.³

² LightingEurope and IALD, Position Paper on Human Centric Lighting (Brussels: February 2017). <[www.lightingeurope.org/images/publications/position-papers/LightingEurope_and IALD_Position_Paper_on_Human_Centric_Lighting_- February 2017-modified version-v2.pdf](http://www.lightingeurope.org/images/publications/position-papers/LightingEurope_andIALD_Position_Paper_on_Human_Centric_Lighting_-February_2017-modified_version-v2.pdf)>.

³ For more information, please refer to the LightingEurope Position Paper on the benefits of using UV-C disinfection to combat COVID-19 (Brussels, 14 September 2020). <www.lightingeurope.org/images/publications/position-papers/LightingEurope-

Include the Lighting System Design Process

Lighting systems and their benefits can only be achieved by including the Lighting Systems Design Process as an overarching system to ensure 1) energy efficiency, 2) the good functioning (inspection); and 3) an adequate IEQ during the stages of planning, design, installation, commissioning, inspection, and maintenance.

Our recommendations for setting terms and definitions

Built-in lighting

Article 2(3) confirms built-in lighting as a technical building system. Annex I.1 also states that built-in lighting shall be included in the building's energy performance calculation. This opens the potential for significant energy savings, as lighting accounts for around 20 % of the total cost-effective energy savings potential towards 2030.⁴

However, we think that more clarity is needed on the definition of built-in lighting to achieve that potential. Especially often-used terms, like 'fixed' and 'plugged' luminaires that come with built-in lighting, create confusion.

Different interpretations may hinder the level playing field. In particular, it is important that Member States do not underestimate the potential of a well-designed and advanced lighting system combined with the best lighting product for the different applications.

Therefore, LightingEurope proposes the following:⁵

"Built-in lighting" means luminaire(s) or equipment to provide illumination according to the lighting system design.

Lighting systems

LightingEurope is pleased to notice that in Annex I, Point 1 the energy performance of a building shall be expressed by a numeric indicator of primary energy use in kWh/ (m².y), which is in accordance with the Lighting Energy Numeric Indicator (LENI) as described in EN 15193-1:2017. The optimal usage of this calculation method is directed at lighting systems, which are described in EN 12665 as 'lighting equipment or lighting solution (lamps, ballast, luminaire and controls) required for the lighting scheme, its installation and operation during the life of the scheme'.⁶ However, the International Lighting Vocabulary (ILV) definition is planned to be adopted by this standard in the (near) future.

As such, LightingEurope would like to highlight that lighting systems are defined as:

[Position Paper on the benefits of using UV-C disinfection to combat COVID-19 - 20200914.pdf >](#).

⁴ European Commission, *Impact Assessment accompanying the proposal for a Directive on the energy performance of buildings* (Brussels, 30 November 2016).

⁵ LightingEurope, *Position Paper on the review of Directive 2010/31/EU on the energy performance of buildings: From energy efficiency to quality of light* (Brussels, 30 March 2017).

⁶ VITO et al. (commissioned by the European Commission), *Preparatory study on lighting systems 'ENER Lot 37'* (Brussels, 15 December 2016).

“Lighting system” is a system designed to provide lighting.⁷

Note 1 to entry: A lighting system can be dedicated to

- a. the support of one or more specified visual tasks under specified conditions considering other requirements such as human comfort, safety, the appearance of the surrounding environment and energy consumption;*
- b. the support of other than human tasks.*

Note 2 to entry: A lighting system can include a set of light sources, other physical components, communication protocols, user interfaces, software, and networks to provide control and monitoring functions.

Note 3 to entry: The light source(s) and the related equipment can be integrated in a single item, e.g., an LED module, a lamp, or a luminaire.

Note 4 to entry: A lighting system can be networked to provide central or remote control and monitoring functions.

Note 5 to entry: A lighting system can be connected to or integrated with other systems or devices.

(International Lighting Vocabulary (ILV) of the CIE)

Lighting System Design Process

Built-in lighting bases its potential on lighting systems and the way in which they are designed. As such, LightingEurope has mandated CEN/TC 169 on light and lighting to develop a Lighting Systems Design Process.

Lighting system designs are taken to be a product consisting of a set of documentation approved by the lighting system designer detailing the information used and the solution proposed for the project.

(CEN/TS 17165: Light and Lighting – Lighting System Design Process)

Currently, lighting system design is usually based on minimum quality parameters in application standards, such as described in EN 12464 (lighting at workplaces) or EN 12193 (lighting for sports).

Contact

For further information on this topic, please contact Marion Ebel, Senior Policy Manager (marion.ebel@lightingeurope.org), or Dominik Flikweert, Senior Policy Officer (dominik.flikweert@lightingeurope.org).

LightingEurope is the voice of the lighting industry, based in Brussels and representing 30 companies and national associations. Together these members account for over 1,000 European companies, a majority of which are small or medium-sized. They

⁷ Please note that the IEC also has a definition for ‘systems’ (IEV 192-01-03).

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.