EU EPBD Requirements Enabled by DALI Lighting Control Systems

August 2025

Credit: Tridonic
Project: MET Building

Contents

Credit: zencontrol
Project: Louisa Martindale Building

1 Introduction

Buildings are the single largest energy consumers in Europe, accounting for around 40% of all energy consumption in the EU. With about 85% of all buildings in the EU having been built before 2000 and an estimated 75% of those having poor energy performance, stimulating a program of renovations is of utmost importance to achieving the EU's energy and climate goals.[1]

The new EU 'Energy Performance of Buildings Directive' is set to address this situation by mandating minimum energy efficiency requirements. This article expands on the role of lighting controls in the EU EPBD and sheds some light on how a lighting control system, based on DALI technology, can meet the EPBD Building and Control System requirements on all fronts.

[1] https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/energy-performance-buildings-directive_en

2 The Revised EU 'Energy Performance of Buildings Directive' 2024

In Spring 2024, the European Union introduced a new revised version of its 'Energy Performance of Buildings Directive' [2](EPBD). The main objective is to vastly reduce the EU building sector's carbon footprint, while encouraging the use of smart innovative technology to enhance air and environmental quality in indoor spaces. The updated Directive mandates minimum energy efficiency requirements for both renovations and new-build in residential and non-residential buildings and contains a timeline of energy saving targets. The revised EPBD requirements must be incorporated into the legislation of EU Member States by no later than Spring 2026.

2.1 Revised EPBD Requirements for Building Automation and Control Systems

Heating, space cooling, ventilation, built-in lighting, domestic hot water are classified as 'Technical Building Systems' ***(TBS)***, and all of them contribute to a building's energy consumption. Systems that manage and control these TBS functions are known as Building Automation and Control Systems ***(BACS)***. In order to manage and reduce their energy usage, the revised EPBD contains specific criteria for BACS.

A lighting control system managing built-in lighting qualifies as a BACS. This implies that a building may employ multiple BACS to handle various Technical Building Systems, rather than relying on a single system for all the TBS.

Credit: Helvar
Project: Pinsent Masons

[2] EU/2024/1275

2 The Revised EU 'Energy Performance of Buildings Directive' 2024

2.2 Revised EPBD BACS Requirements

Article 13 of the revised EPBD 2024 sets out the specific criteria that EU Member States must take into account, when setting their national requirements for optimizing the energy use of Technical Building Systems, in both existing and new-build, non-residential buildings.

Article 13, Section 10 is specifically focused on Building Automation and Control Systems and states that BACS shall be capable of:

(a) 'continuously monitoring, logging, analysing and allowing for adjusted energy use.'

(b) 'benchmarking the building's energy efficiency, detecting losses in efficiency of technical building systems, and informing the person responsible for the facilities or technical building management about opportunities for energy efficiency improvement.'

(c) 'allowing communication with connected technical building systems and other appliances inside the building, and being interoperable with Technical Building Systems across different types of proprietary technologies, devices and manufacturers'

(d) 'by 29 May 2026, monitoring of indoor environmental quality.'

Article 13, Section 12 describes the criteria and situations in which lighting controls will be mandated. The automatic lighting controls shall be suitably zoned and capable of occupancy detection and need to be implemented by:

- 2028 for non-residential buildings with an installed power of more than 290kW for heating or cooling and ventilation
- 2030 for non-residential buildings with an installed power of more than 70kW for heating or cooling and ventilation

Credit: Volvo Group Real Estate
Project: Battery Pack Factory

The Revised EU 'Energy Performance of Buildings Directive' 2024

2.3 EPBD Smart Readiness Indicator

The revised EPBD requires a tool to measure the uptake of smart building technologies. This is the Smart Readiness Indicator [3]***(SRI),*** which will be mandatory from 30th June 2027 and will provide a rating for a building's ability to:

- optimise energy efficiency performance and overall usage
- adapt its operation to changing occupants' needs
- react to signals from the energy grid with energy flexibility in mind

The SRI will implement a catalogue of smart-ready services across 9 technical domains, including heating, cooling, domestic hot water, ventilation, lighting, dynamic building envelope, electricity, electric vehicle charging, monitoring and control.

The smart lighting functionalities which are assessed by the SRI are:

- occupancy control for indoor lighting
- control artificial lighting power, based on daylight levels

[3] Energy EC Europa EU source

3 EPBD 2024 and Lighting Controls

A good lighting installation is important for visual comfort, productivity and the wellbeing of people working inside a building. Lighting can play a role in non-visual effects and the regulation of human circadian rhythms, enhancing mood and alertness during the day.

The choice of lighting system in a building can play a major role in supporting both new-build and refurbishment projects, in reducing their carbon footprint and complying with EPBD requirements. Installing LED luminaires equipped with lighting controls systems that automatically adjust lighting levels, based on occupancy or amount of light available during the day, can contribute significantly to energy savings and help reach sustainability targets.

Credit: Philips Dynalite
Project: Täby Centrum

4 How DALI Control Systems can help achieve EPBD targets

With the revised EPBD 2024 criteria, a lighting control system based on DALI technology meets the EPBD BACS requirements on all fronts:

Table 4.1

EPBD Article 13 Building Automation & Controls Systems	EPBD Criteria: BACS shall be capable of:	DALI Control Systems
Sub-section 10 (a)	'Continuously monitoring, logging, analysing and allowing for adjusted energy use'	Due to its dimming capabilities, DALI control systems can adjust the energy use as required
Sub-section 10 (b)	'Benchmarking the building's energy efficiency, detecting losses in efficiency of technical building systems, and informing the person responsible for the facilities or technical building management about opportunities for energy efficiency improvement.'	Due to its diagnostics and reporting capabilities, DALI systems are able to report energy use and many more features that enable benchmarking and improvement, since these are included in D4i certified drivers or available in DALI+ and DALI-2 certified drivers that have implemented DALI parts 251, 252 and 253.
Sub-section 10 (c)	'Allowing communication with connected Technical Building Systems and other appliances inside the building, and being interoperable with Technical Building Systems across different types of proprietary technologies, devices and manufacturers.'	The application controllers and gateways used in DALI lighting systems enable the system to communicate with other Technical Building Systems.
Sub-section 10 (d)	'By 29 May 2026, monitoring of Indoor Environmental Quality.'	DALI technology enables system integration of sensors in the system and so could enable monitoring of IEQ.
Sub-section 12	EPBD Criteria: 'Mandating Automatic Lighting Controls in non-residential buildings with combinations of heating, ventilation and air-conditioning systems over a certain power: > 290 kW will require lighting controls by 31st Dec 2027 > 70 kW will require lighting controls by 31st Dec 2029	
Sub-section 12	'The automatic lighting controls shall be suitably zoned and capable of occupancy detection.'	A wide range of DALI occupancy sensors are available in the market. Luminaire mounted sensors (D4i) are ideal for this application.

4 How DALI Control Systems can help achieve EPBD targets

4.1 DALI-2 certified products

The DALI-2 certification program ensures robust interoperability between different manufacturers' lighting control devices. With precise dimming, automated control, diagnostics and scene setting capabilities, DALI-2 certified control gear and control devices contribute towards reduced energy consumption and enhanced user comfort.

Wired DALI networks are often installed when older buildings undergo a major renovation. When the communication infrastructure for the building's built-in lighting system is carried out over a wired DALI network, DALI-2 certified products must be used.

4.2 DALI D4i certified products

Luminaires that contain DALI D4i certified drivers create a DALI network inside the luminaire, enabling plug-and-play connectivity for wireless communication devices, occupancy and light sensors. This can provide access to real-time luminaire data for energy monitoring and maintenance, supporting EPBD smart readiness indicator ratings.

By using D4i certified products, a wireless system can be created that is the ideal solution for renovation in projects where no existing DALI network is available. By replacing the non-dimmable luminaires with D4i certified luminaires, incorporating D4i wireless communication modules with sensors, a lighting network can be created that meets future EPBD requirements, without installing DALI wires.

Since D4i certified luminaires can be connected to various manufacturer brands of D4i wireless modules, the lighting controls supplier can be independent from the luminaire supplier, thereby enabling designers to specify the luminaire that fits the interior design and the building manager to choose the lighting control system.

4 How DALI Control Systems can help achieve EPBD targets

4.3 DALI+ certified products

DALI+ certified products provide a wireless or IP based lighting control solution, where the wireless technology is integrated in the luminaire driver. This makes it easy to install or retrofit lighting systems in both new build and building renovation projects, without extensive cabling.

DALI+ is based on the DALI protocol (IEC 62386), ensuring seamless interoperability between devices from different manufacturers, even when using different transport layers like Thread or over IP.

Another benefit of wireless technology for renovation or expansion of buildings with existing DALI installations, is that no translation of the DALI language to the new wireless language needs to take place. This simplifies renovations of buildings, making them easier and more cost effective, as existing DALI systems can be extended wirelessly without extra complexity, and without the need for a gateway or translator.

With the revised EPBD 2024 pushing for smarter, energy-efficient buildings, and lighting controls set to play their part, DALI systems with occupancy detection in every zone will meet the requirements for lighting controls. DALI-2, D4i, and DALI+ offer future-proof solutions for intelligent lighting control, each with its own set of advantages.

©DiiA(AK)002a EU EPBD Requirements Enabled by DALI Lighting Control Systems

The DALI Alliance is also known as the
Digital Illumination Interface Alliance (DiiA).

c/o ISTO, Inc.
371 Hoes Lane, Suite 200
Piscataway, NJ 08854 USA

Telephone: +1 732-465-5852

www.dali-alliance.org