



LIGHTINGEUROPE
THE VOICE OF THE LIGHTING INDUSTRY

EUROPEAN LIGHTING FORUM

**LightingEurope's Technical
Memorandum on specific
rules for life cycle
assessment of control gears**

10 October 2025

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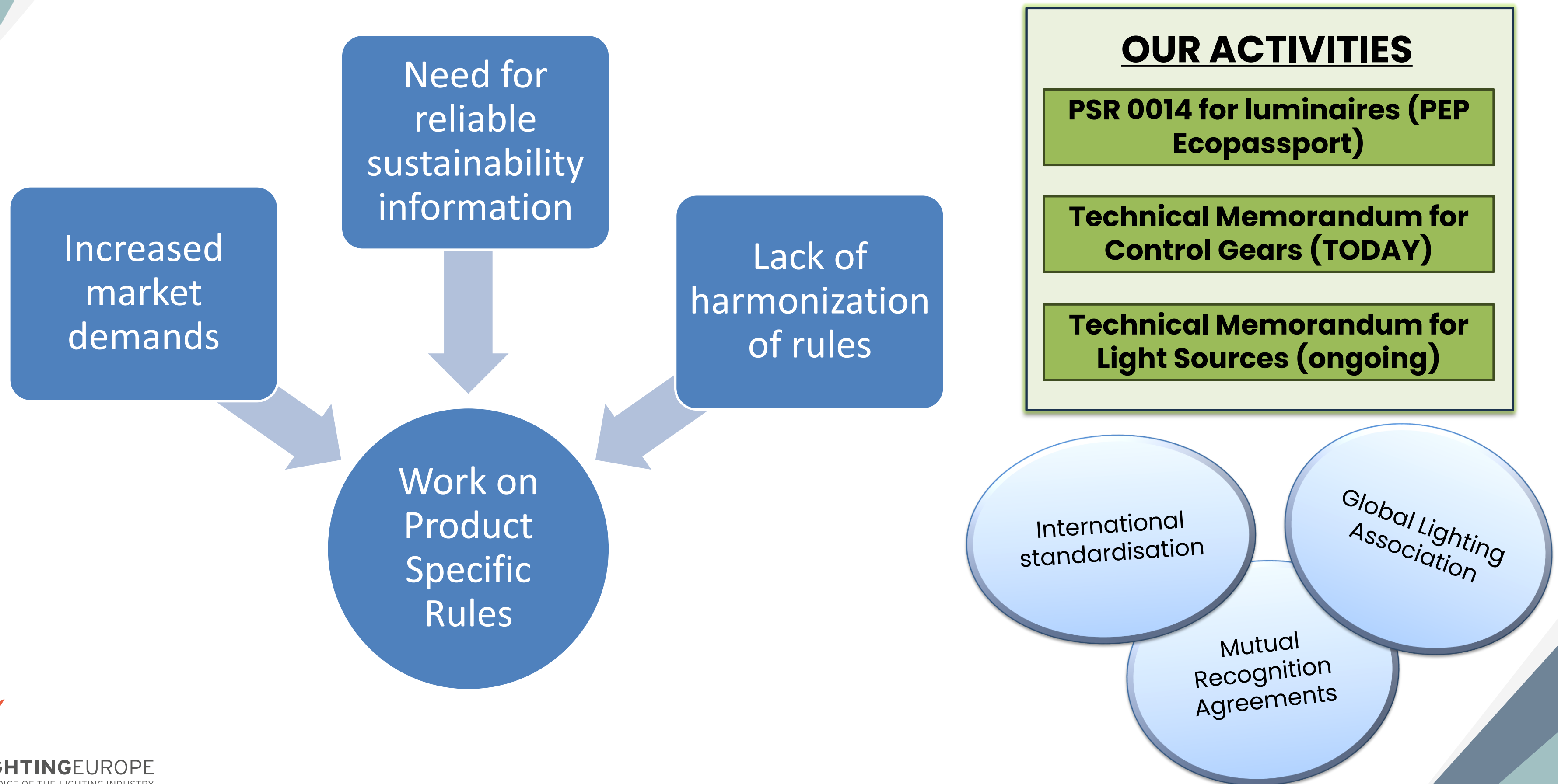


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Why is LightingEurope developing rules for LCAs?



LightingEurope driving harmonized LCA rules for the lighting sector



Our speaker today

Dee Denteneer

Dee Denteneer is Director of Standards and Regulation in Signify. He is a member of the Working Group Sustainability in LightingEurope, and the Chair of the task force Product Specific Rules, elaborating rules, requirements, and guidelines for conducting life cycle assessments of lighting products.

Dee is also a member of the COTEC of the PEP Association, and a member of the TEWOG of Ecoplatform.



Harmonizing the EPD practice in the lighting industry

Specific rules for life cycle assessment of control gears for light sources

Dee Denteneer
Chair of Task Force PSR for lighting

Agenda

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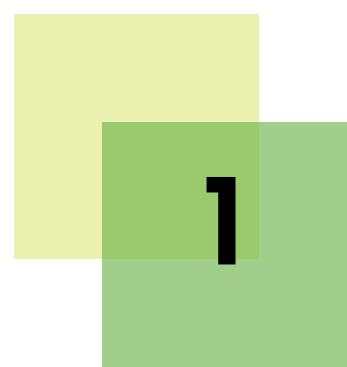
Background:
PSR for lighting products

2

Specific rules for life cycle
assessment of control gears for
light sources

3

Relevance to Industry and
Applicants



Background: PSR for lighting products



Background: LCAs and EPDs

A Life Cycle Assessment (LCA) is a **methodology** for assessing environmental impacts associated with all the stages of the life cycle of a product or service

A typical life cycle of a manufactured product includes raw material extraction & processing (cradle), transportation, manufacturing, distribution, product use, and end-of-life treatment (grave)

The results of an LCA can be presented in an EPD



An Environmental Product Declaration (EPD) is a **standardized & verified document** that summarizes the environmental performance of a product's life cycle

EPDs are produced based on LCA methodology and provide a quantitative basis for comparing the environmental impacts of products and services

An EPD is generated according to specific standards, called PCRs and PSRs



LEDVANCE
DAMP PROOF GEN 2 SENSOR
 Reference product:
 DP S 1500 46W 840 IP65 GY



Registration number	LEDV-0025-V01-01-EN	Drafting rules	PEP-PCR-ED4-EN-2021-09-06
Verifier accreditation number	VH08	Supplemented by	PSR-0014-ED2.0-EN-2023-07-10
Date of issue	09-2024	Validity period	5 years
EPD prepared by	LEDVANCE GmbH	Editorial	
Independent verification of the declaration and data in compliance with ISO 14025: 2006			
Internal			
The PEP review was conducted by a panel of experts chaired by Julia Orsini (Damen)			
PEP are compliant with XP C09-100-1-2016 or EN 16890:2019			
The elements of the present PEP cannot be compared with elements from another program.			
Disclosed in compliance with ISO 14025: 2006 + Environmental labels and declarations. Type III environmental declarations.			

Background: EPDs, A growing trend in the lighting industry

In (customer) demand: Are the most universally recognized and/or increasingly required by the market

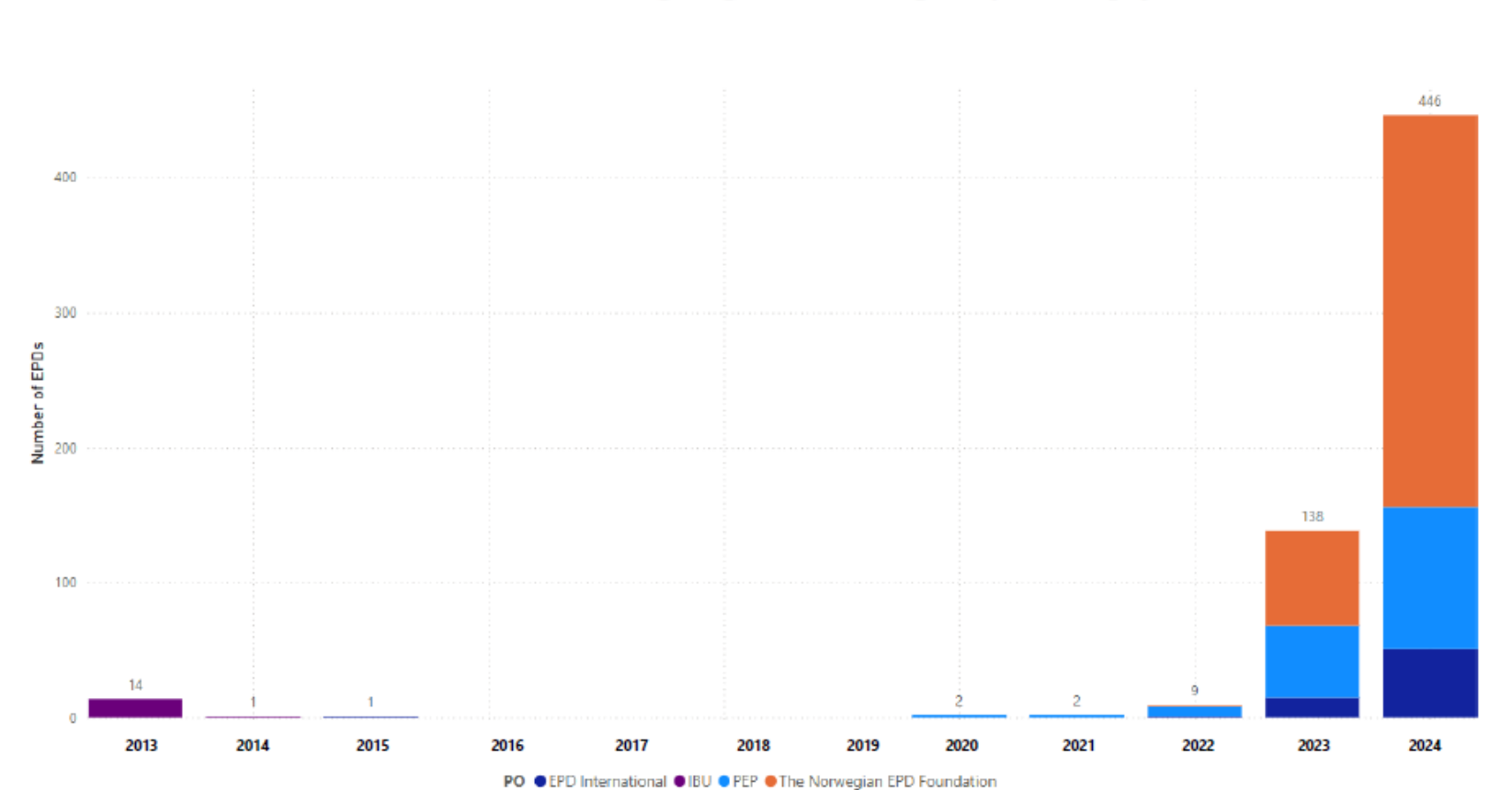
Regulation: Expectation that publication of life-cycle based impact data may become a legally binding requirement

Scientifically sound:

- based on open standards,
- leveraging experience from other industries,
- covering all life cycle stages, and
- verified by experts

Improve products and services: use LCAs and EPDs to make sustainable decisions

FIGURE 1: Number of EPDs for Lighting Products (2013-2024) in Europe jurisdiction



Source: Authors of this paper. The dataset is compiled from verified EPDs published by the four major POs, as reported by ECO-platform.

From: Vilena and Crapa (2025): EPDs, Challenges and opportunities in the European Lighting Sector



Background: EPDs, A growing trend in the lighting industry

In (customer) demand: Are the most universally recognized and/or increasingly required by the market

Regulation: Expectation that cycle based impact data is a binding requirement

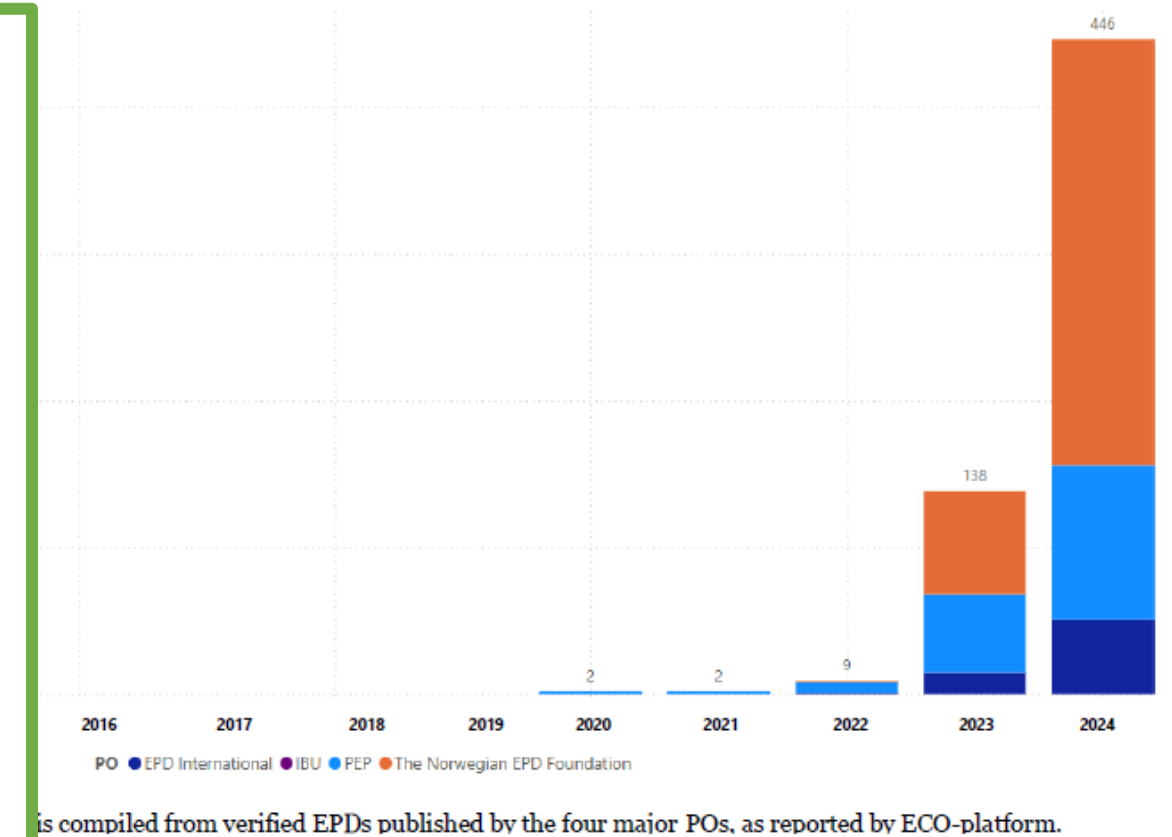
Scientifically sound:

- based on open standards
- leveraging experience from other sectors
- covering all life cycle stages
- verified by experts

Improve products and services: use LCAs and EPDs to make sustainable decisions

LightingEurope has been quick to realize the importance of EPDs and provided several LCA and EPD trainings to its members. These trainings may be consulted by LE Members for (much) more background.

FIGURE 1: Number of EPDs for Lighting Products (2013-2024) in Europe jurisdiction



From: Vilena and Crapa (2025): EPDs, Challenges and opportunities in the European Lighting Sector



Background – PSR for luminaires

Identified concern: lack of harmonization of LCA/EPD practice in the lighting industry

To address: LightingEurope collaborated with PEP Ecopassport and supported the review of the PEP PSR 0014 for luminaires

The result: PEP PSR 0014 ed 2.0 Product Specific Rules for luminaires published in 2023

- To date: > 200 PEPs for Luminaires published by PEP by > 20 manufacturers
- Promotion of PSR 0014 (also to other POs)
- IEC standardization running, PSR 0014 methodology published as IEC PAS and IEC 63627 committee draft for luminaires prepared

Background – PSR for lighting components

Additional needs were identified for rules, requirements, and guidelines to conduct a LCA for core luminaire components, namely the light source and the control gear for the light source

- **Light source:** lamps, LED modules
- **Control gear:** a unit inserted between the power supply and at least one light source, which serves to supply the light source(s) with its (their) rated voltage or rated current

Relevant to create EPDs for light sources and the control gears for the light source, as well as to support the creation of EPDs for luminaires*

* Identified as key components see e.g. LED prof review 2020

Background – PSR for lighting components, status

A Technical Memorandum “Specific rules for life cycle assessment of control gears for light sources” has been completed. The drafting process included a review by LightingEurope members and major Programme Operators.

A Technical Memorandum “Specific rules for life cycle assessment of light sources” is being developed.

These Technical Memoranda are developed independent of any core PCR

- To allow usage with different core PCRs (EN 15804, EN 50693, ..)
- For submission to IEC standardization
- To allow adoption by all interested POs



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Specific rules for life cycle assessment of control gears for light sources

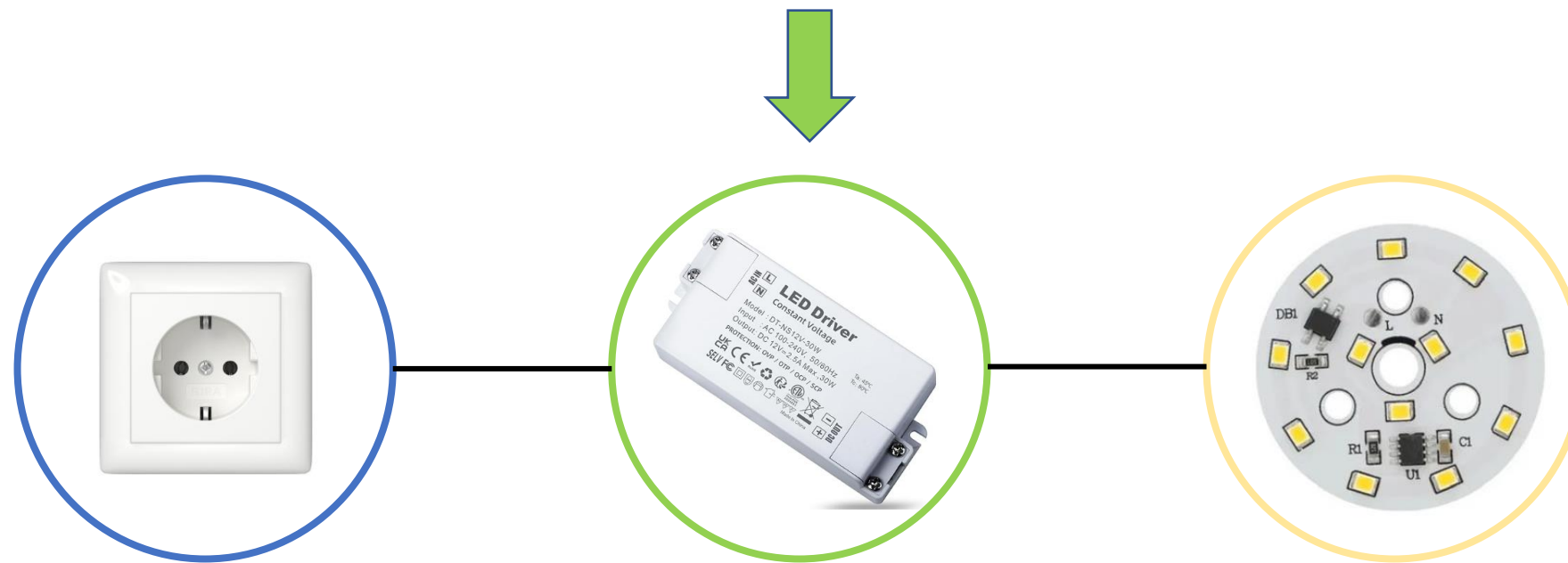


Specific rules for control gears for light sources

To develop the “Specific rules for life cycle assessment of control gears for light sources” some general design criteria were followed

- Usable in conjunction with the most relevant core PCRs
- Meeting the requirements on PSRs as set in these core PCRs
 - Focus on Scope, Functional Unit, Declared Unit, and use scenario
- Consistency with the approach in PSR 0014
- Mandating the listing of the technical data required to prepare the EPD, taken from the technical data sheet

Specific rules for control gears – scope



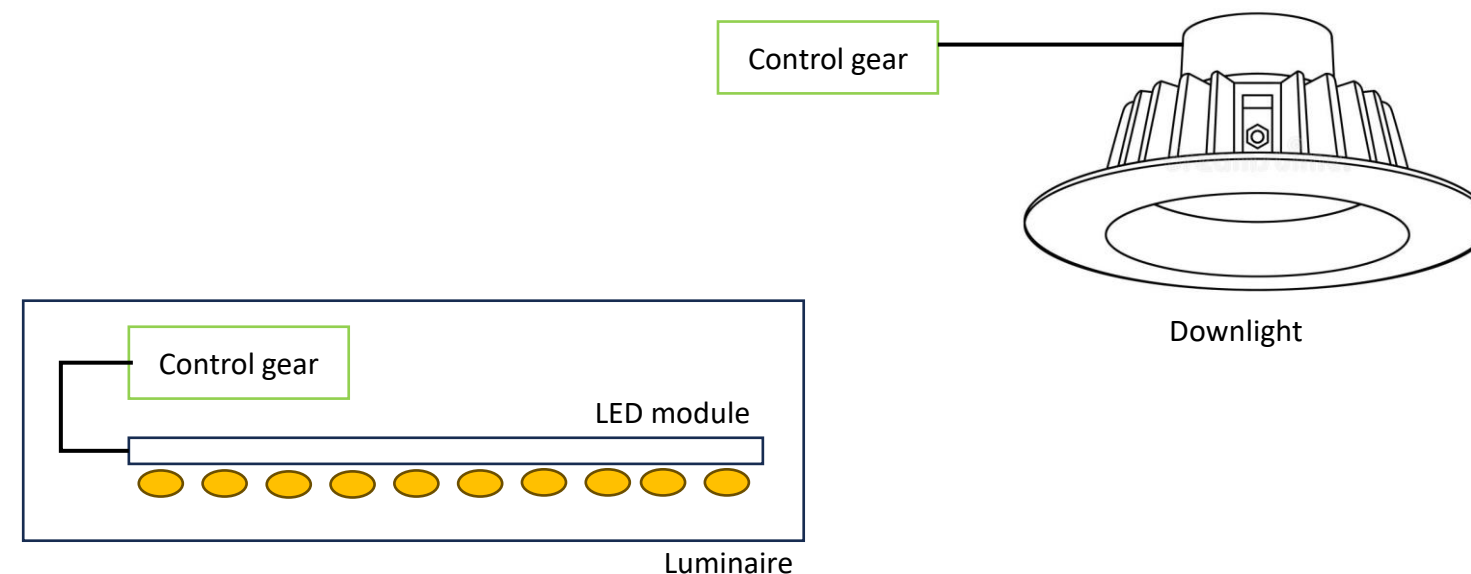
CONTROL GEAR – CONTROLGEAR

A control gear for a light source according to this document is a unit inserted between the power supply and at least one light source, which serves to supply the light source(s) with its (their) rated voltage or rated current, and which can consist of one or more separate components.

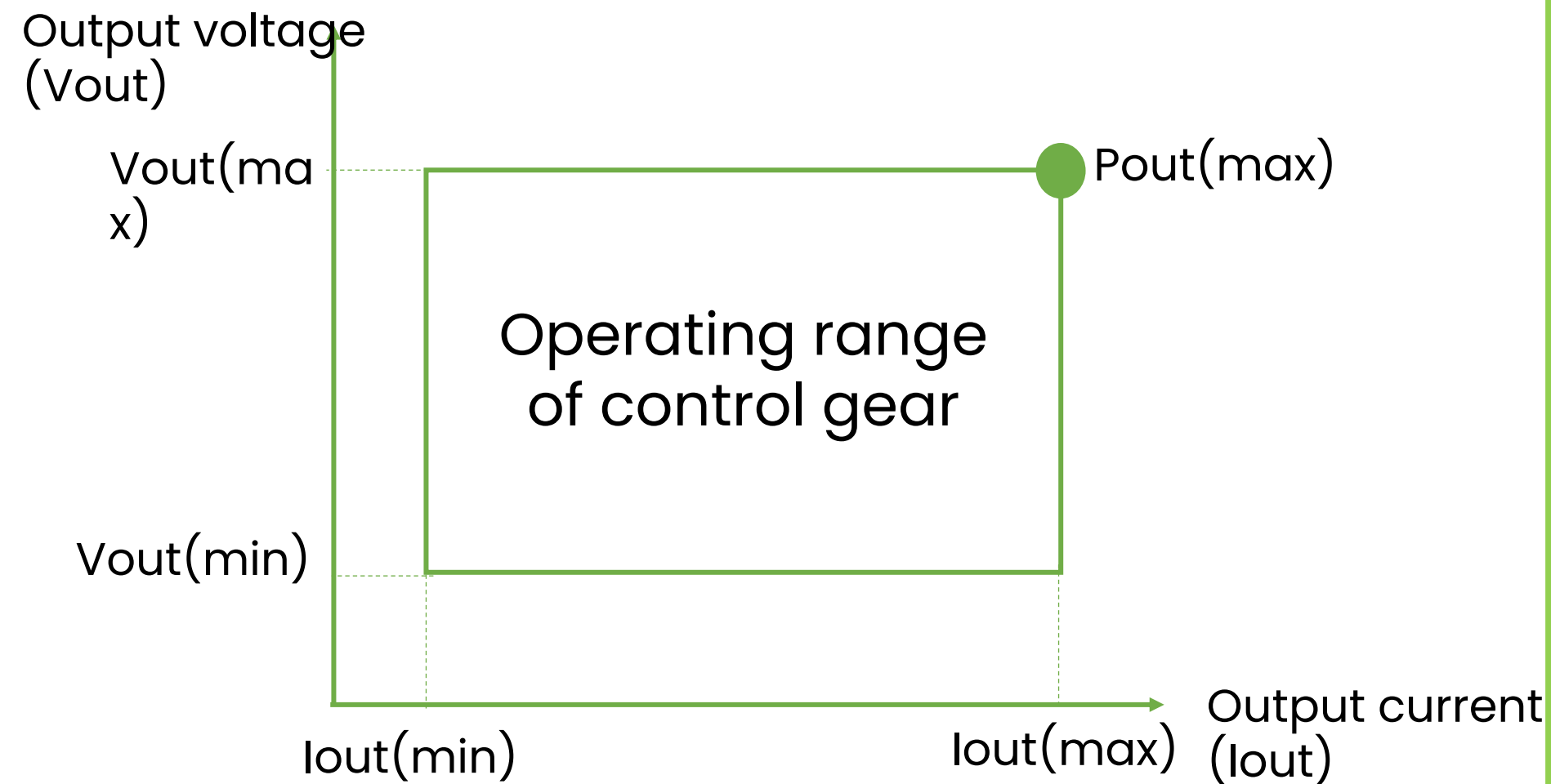
NOTE:

A control gear can be integral to a luminaire or located remotely from a luminaire (e.g. downlight).

Control gears that are totally integrated in a light source are not within the scope of this technical memorandum.



Specific rules for control gears – Determination of power



The output voltage (V_{out}) and output current (I_{out}) can be programmed to the required value inside the operating range:

$$P_{out} = V_{out} \times I_{out}$$

$$P_{out(max)} = V_{out(max)} \times I_{out(max)}$$

where,

P_{out} = power supplied to light source

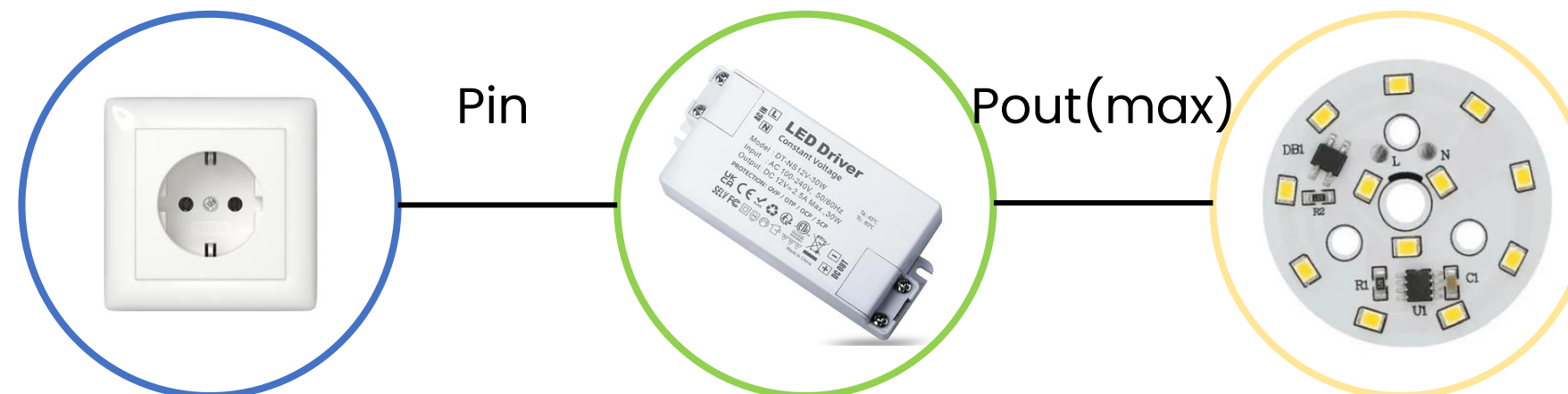
$P_{out(max)}$ = maximum power supplied to light source, and

P_{in} = input power required to deliver

$P_{out(max)}$ to the light source,

and P_{in} and P_{out} are related by the control gear efficiency

Example of a 'programmable window' control gear $\eta_{cg} = P_{out} / P_{in}$



Specific rules for control gears – Lifetime

The assigned lifetime of the control gear is the life expectancy as declared by the manufacturers according to the operating conditions of use provided by them, depending on maximum power provided to the light source and operating temperature.

It shall be declared in xx.xxx hours of operation and failure rate x.x% at xx.xxx hours. The reference conditions shall be specified in the technical data sheet.

The conversion of hours of operation into years of operation shall be calculated considering 8760 hours per year.

The assigned lifetime must be justified in the LCA report.

Functional unit

“Provide **10 W** of power to a light source during a reference lifetime of **35,000 hours**”

Declared unit

“A control gear providing its **maximum power** of XXX W to a light source during its **assigned lifetime** of YY years”

Environmental impacts of FU (10 W over 35,000 hours) =
Environmental impacts of the DU x (10 W / maximum output power of the reference product in Watt) x (35,000 / Assigned product lifetime of the reference product in hours)

Development scenarios – Use stage

B1 Use or application of the installed product	The specific rules of the present technical memorandum do not define elements to declare in B1
B2 Maintenance	The specific rules of the present technical memorandum do not define elements to declare in B2.
B3 Repair	The specific rules of the present technical memorandum do not define elements to declare in B3.
B4 Replacement	The specific rules of the present technical memorandum do not define elements to declare in B4.
B5 Restoration	The specific rules of the present technical memorandum do not define elements to declare in B5.
B6 Energy needs during use phase	Energy consumption of the reference product applying the use scenario as defined by the present technical memorandum. See 3.3.4.1 Energy consumption scenario
B7 Water needs during use phase	The specific rules of the present technical memorandum do not define elements to declare in B7



Energy needs are the only module considered to be relevant for the use stage

Specific rules for control gears – Energy consumption

The final **energy consumption C** of a **dimmable control gear** over its assigned lifetime, expressed *in kilowatt-hours (kWh)*, is calculated as follows:

$$C = P_{in} \times \text{Assigned lifetime} \times \text{Theoretical energy saving coefficient} / 1000$$

where,

P_{in} = Input power required to deliver the **maximum power** to the light source in Watt

Dimming function	Control gear capable of communicating with an external Light Management System	Description
Autonomous time-based dimming	No	Control gear whose power is varied autonomously based on the daytime
Dimmable control gear	Yes	Control gears with a control interface that can be connected to a light management system allowing daylight control and presence detection. The control interface may be either wired (e.g. DALI) or wireless (e.g. Zigbee).

Table 4 - Most common dimming functions

Theoretical energy saving coefficient



0.75



0.50

Theoretical energy saving coefficients are in line with those defined in PSR0014

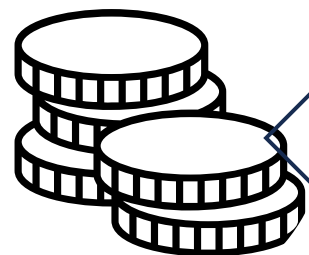


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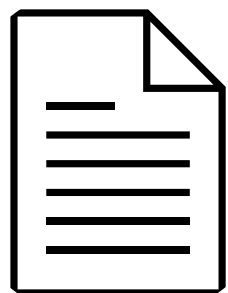
Relevance to Industry and Applicants



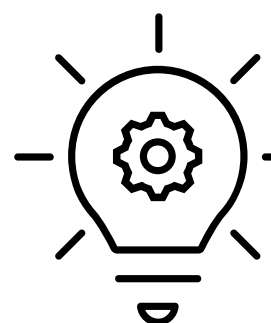
Key take-aways



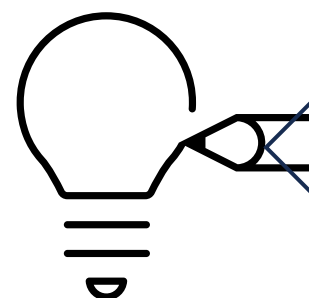
Lighting is a relevant market with an annual turnover of over 15 billion EUR



EPDs are becoming increasingly more important to the lighting industry

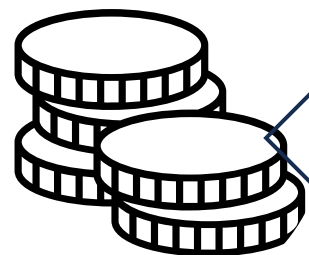


Lighting component EPDs will be a strong enabler for luminaire EPDs

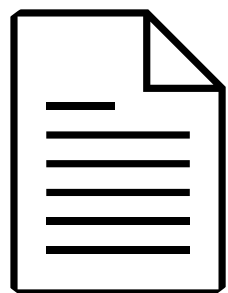


Harmonization will further improve the uptake of EPDs

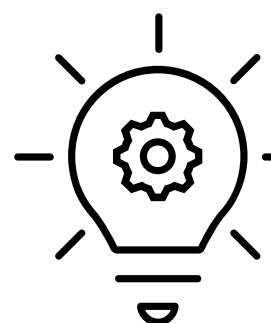
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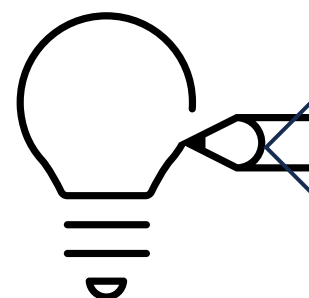
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EPDs are becoming increasingly more important to the lighting industry



Lighting component EPDs will be a strong enabler for luminaire EPDs



Harmonization will further improve the uptake of EPDs

Manufacturers are strongly encouraged to consider **the Specific rules for life cycle assessment of control gears for light sources** for their EPDs, and to push their suppliers (PO or SW) to implement these rules.

The rules are freely available to any and all LCA Program Operators and Standards Development Organizations (SDOs without limitations,





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THANK YOU



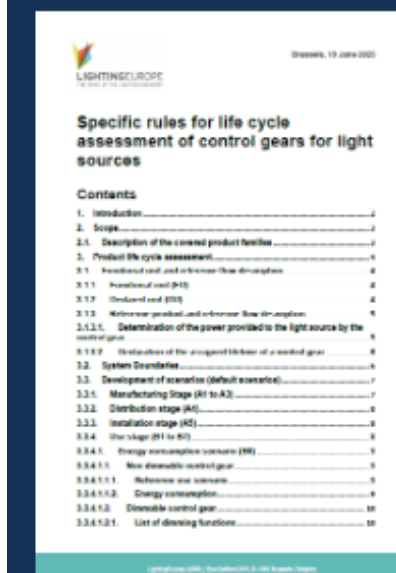
Guidelines

Specific rules for life cycle assessment of control gears for light sources

- The Technical Memorandum can be **freely downloaded** from the LightingEurope website
- We encourage to integrate these definitions and scenarios into its documents and to explicitly reference – in the manner they deem most appropriate – the LightingEurope Technical Memorandum
- LightingEurope invites **feedback** and **questions** from all interested organisations

DOWNLOAD CENTER

This set of rules is intended for performing a life cycle assessment of control gears for light sources. The rules complement existing core Product Category Rules and can be integrated into rules from various Programme Operators or Standards Development Organizations.



Specific rules for life cycle assessment of control gears for light sources

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Click here to download:

Specific rules for life cycle assessment of control gears for light sources



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Q&A Session

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THANK YOU

Teresa Selvaggio

Director of Public Affairs

Simon Wessels

Policy Officer



teresa.selvaggio@lightingeurope.org

simon.wessels@lightingeurope.org



+32 495 18 56 26

+32 455 1004 88



www.lightingeurope.org



205 rue Belliard, 1040 Brussels, Belgium

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