



Whitepaper

The need for assessing & substantiating environmental impacts with EPDs



As the UK, like all global communities, grapples with the pressing challenges of environmental degradation and resource depletion, there is a growing imperative for our manufacturers, government, and consumers to understand and minimize the environmental impacts associated with the products they produce, regulate, and consume.

This pursuit of environmental sustainability has sparked a heightened demand for reliable and transparent information that can guide informed decision-making towards more environmentally conscious choices. For stakeholders in and customers of the UK lighting industry, the situation is no different. Manufacturers, designers, installers, specifiers – they are all looking for that holy grail of a single, understandable, and reliable method to guide their decisions.

However, quantifying and comparing the multifaceted environmental footprints of products across various impact categories, such as greenhouse gas emissions, water

pollution, land use, and resource depletion, poses a formidable challenge. The intricate web of supply chains, manufacturing processes, and disposal or re-use methods that underpin the lifecycle of a product makes it exceedingly difficult to accurately assess and compare the environmental implications of different products and their alternatives.

The need for assessing environmental impacts has indeed led to a proliferation of green labels, circularity scores, and sustainability rating methods aimed at simplifying the comparison of products. However, reducing the complex matter of evaluating various environmental impacts to a one-dimensional, simplified rating system or a single logo is problematic and can be misleading.

The European Union and many other countries are introducing stricter legislation related to Corporate Sustainability Reporting or Corporate Sustainability Due Diligence, requiring reporting to be created with the same scrutiny as companies' financial reports, to be audited by reputable accounting firms.

The EU's Green Claims Directive (GCD) requests (art. 8(2.d))¹ that environmental labelling schemes have been developed in consultancy with heterogeneous stakeholders. It also requires that traders who make explicit environmental claims carry out an assessment to substantiate these explicit environmental claims. In Article 3,1, the GCD states that this assessment shall (among other criteria)¹:

- a)** Specify if the claim is related to the whole product, part of a product or certain aspects of a product, or to all activities of a trader or a certain part or aspect of these activities, as relevant to the claim;
- b)** Rely on widely recognized scientific evidence, use accurate information and take into account relevant international standards;
- c)** Demonstrate that environmental impacts, environmental aspects or environmental performance that are subject to the claim are significant from a life-cycle perspective;

- d)** Where a claim is made on environmental performance, take into account all environmental aspects or environmental impacts which are significant to assessing the environmental performance.

While simplified ratings and labels may seem appealing for their ease of comparison, they may not meet the above criteria and they can be misleading and provide an incomplete or distorted picture of a product's or project's environmental performance. In the worst case, they put manufacturers at risk of greenwashing.

Addressing this challenge requires robust methodologies and standardized frameworks that can provide comprehensive, objective, and scientifically rigorous assessments of a product's environmental performance across its entire lifecycle. Life Cycle Assessments (LCAs) and Environmental Product Declarations (EPDs) have emerged as critical tools to meet this need, offering a systematic and holistic approach to evaluating and communicating the environmental impacts of products, from raw material extraction to manufacturing, distribution, use, and ultimately, disposal or recycling.

Addressing this challenge requires robust methodologies and standardized frameworks

Life Cycle Assessments and Environmental Product Declarations (LCA²/ EPD³)

A Life Cycle Assessment (LCA)² is a methodology that quantifies the environmental impact of a product or service throughout its entire life cycle, from raw material extraction to manufacturing, transportation and distribution, the use phase and the end-of-life: disposal recycling or reuse of the product. It considers factors like greenhouse gas emissions, energy use, acidification of soil and water, water consumption, ozone depletion and resource depletion.

An Environmental Product Declaration (EPD)³ is a third-party verified document that communicates the environmental performance of a product, based on an LCA study, following standards like ISO 14025⁴ and EN 15804⁵. EPDs provide transparent and comparable data, enabling informed decision-making for sustainable procurement and design.

The benefits of LCAs and EPDs include identifying environmental hotspots, supporting eco-design, substantiating environmental claims, achieving green building certifications and complying with regulations. Manufacturers can use EPDs to differentiate and improve their products, while architects and designers can select more sustainable materials based on EPD data.

To create an EPD, an LCA study must first be conducted following ISO 14040/14044⁶ standards. Manufacturers must provide information on the types and quantities of raw materials, energy sources (e.g., electricity, fossil fuels) and other resources used throughout the product's lifecycle; data on the emissions to air, water, and soil, as well as solid and liquid waste generated during each lifecycle stage; information on the distances and modes of transportation (e.g., truck, rail, ship) used for raw material acquisition, product distribution, and end-of-life management; descriptions of the manufacturing processes; and information on the energy consumption during the product's use phase and data on the disposal, recycling, or reuse methods.

The LCA results are then compiled into an EPD according to product category rules, verified by a third party, and published on an EPD program operator's platform. There are various software tools and databases available to streamline this process across various industries, and some recent developments will be specifically supporting the lighting industry.





“But EPDs are so complex”

While EPDs require a significant amount of data gathering and analysis, this level of complexity is unavoidable and ultimately beneficial for promoting transparency and driving sustainable practices in the lighting industry.

The comprehensive nature of EPDs stems from the need to accurately capture the environmental impacts of a product across its entire lifecycle, from raw material extraction to end-of-life disposal or recycling. This holistic approach is crucial because environmental impacts can occur at various stages and can vary significantly depending on the materials, processes, and transportation methods involved. Oversimplifying or omitting critical data points would undermine the credibility of any claims or assessment methods, potentially leading to greenwashing or misinformed decision-making.

Moreover, the rigorous data requirements for EPDs are necessary to ensure consistency, comparability, and transparency across different products and industries.

By adhering to internationally recognized standards and methodologies, EPDs provide a common language and framework for evaluating and communicating environmental performance, enabling stakeholders in the lighting industry to make informed choices based on reliable and verifiable information.

While the data gathering process for EPDs may initially be resource-intensive, particularly for manufacturers with complex supply chains or product portfolios, it is a worthwhile and inevitable investment for lighting companies that genuinely prioritize sustainability. By thoroughly understanding the environmental impacts associated with their products, manufacturers can identify hotspots, implement targeted improvements, and demonstrate their commitment to environmental stewardship.

Additionally, as more manufacturing companies in our industry adopt EPDs, the availability of industry-specific data and tools will continue to grow, streamlining the process and reducing the associated costs and efforts over time.

Harmonization of EPD methods for lighting products

Today, dedicated EPD methods (Product Specific Rules) are available for luminaires. Industry convergence is taking place and globally, international standardization of the methodology is on its way in IEC TC347. The numbers of available EPDs in our industry are ramping up and the industry can take learnings from these and simplify methods along the way.

EPDs of luminaires are now more comparable, e.g. the Product Specific Rules (PSR) of PEP Ecopassport PSR0014⁸ contain a functional unit based on lifetime and lumen output.

They further clearly define measurement methods for key lighting parameters and they prescribe how to calculate the benefits of connected luminaires. Also, this method enables certification of product families, which drastically reduces cost and effort for the industry. Further work on enhanced EPD methods for LED drivers is also being undertaken by LightingEurope.





What about TM65⁹ and TM66¹⁰?

As a steppingstone towards full EPDs, the UK's Chartered Institution of Building Services Engineers (CIBSE) developed a Technical Memorandum in 2021: TM65⁹, "Embodied carbon in building services: A calculation methodology", which basically is a narrowed-down EPD focusing on carbon footprint only. TM65 simplifies but builds on international ISO standards that have been developed by experts over the years. As such, it is a half-way step towards a practice where full EPDs are being created to demonstrate all environmental impacts of products throughout their lifecycle. By TM65, the UK lighting industry

is being pointed towards more robust and complete calculation methods. It should also be noted that TM65 states that if a product EPD exists then the TM65 assessment does not need to be applied.

"Creating a Circular Economy in the Lighting Industry" is the title of another Technical Memorandum TM66¹⁰ published by CIBSE / SLL (Society of Light and Lighting) in 2021, providing information and guidance to the industry on circular economy principles. For lighting products, TM66 is supported by a Circular Economy Assessment Method (CEAM), which, according to the publishers, "turns a complex subject into an easy-to-understand star rating, giving manufacturers and specifiers targeted, useable, independent metrics to compare products and strive for improvement".

The CEAM-Make tool contains a list of 66 questions for manufacturers, subdivided into four categories: product design, manufacturing, materials and ecosystem. Based on the responses to the questions, the tool calculates a ratings for these categories and these are added into an overall product score for a luminaire indicating a red, orange, yellow or green category – the latter category covering scores between 2.5 and 4.0, reflecting "excellent circularity". A higher score is meant to indicate a higher level of circularity, so a score of 2.8 should indicate better circularity of the product, than one of 2.6.

With the aim to advance circular economy practices in the lighting industry, the Lighting Industry Association (LIA) have launched the CIBSE TM66 Assured Product Verification Scheme in 2023, a scheme through which manufacturers can have their TM66-CEAM-Make self-assessment, checked and certified by the LIA.

TM66 was created to address an immediate need that was emerging in the lighting industry. Manufacturers were seeking ways to make their products more sustainable, create circular designs, explore re-manufacturing and substantiate their green claims. Likewise, customers and specifiers were seeking independent evidence of claims made, and a simple scoring system to compare at least some of such product claims was more than welcome. The TM66-CEAM tool was filling a gap.

Around 2021, when TM66 was published, full Life Cycle Assessment Assessments (LCAs) or Environmental Product Declarations (EPDs) were hardly being asked for in the industry.

We believe TM66-CEAM-Make lacks the completeness of scope, the accuracy and scientific underpinning that regulators will mandate

Also, at that time, no dedicated EPD methods (Product Category Rules) for luminaires had yet been developed and adopted by the broader lighting industry. Also, the EU Green Deal was announced, but details on the EU's ambitious legislative proposals had yet to made public, and reasonable anti-greenwashing criteria, such as those from the Green Claims Directive as listed above, had not yet been published.

Today, TM66-CEAM does not seem to stand the scrutiny test of such criteria. It does not build on internationally accepted standards and many concepts are intuitive instead of accurately defined. We have found the questions and answers of the tool to be containing many undefined terms, leaving room for interpretation and, in the worst case, for greenwashing. Also, several questions assign higher scores to practices that might in fact have adverse effects on the environment, because not all environmental aspects are considered. We believe TM66-CEAM-Make lacks the completeness of scope, the accuracy and scientific underpinning that regulators will mandate, and that the industry should strive for in the years to come.

The time is now, for the UK lighting industry to raise its ambition and embrace EPD methods tailored for the industry that will better stand the test of time.



EPDs

are advancing evidence-based sustainable innovation within Signify, providing a quantified footprint which acts as a baseline for further improvements in next generation product iterations.

Signify has released 2,000 EPDs covering 70,000 product variations

Signify has recently announced the results of a substantial drive to create Environmental Product Declarations. As a result of this effort, it has released 2,000 EPDs, covering more than 70,000 product variations around the world, which were created considering the methodology underlying PSR0014⁸. Local Authorities and Municipalities, businesses, and individuals are increasingly looking for fast, effective ways to reduce their environmental footprint. EPDs quantify products' environmental impact over their full life cycle, empowering customers to make informed decisions on lighting investments. In addition to driving greater transparency for customers, EPDs are advancing evidence-based sustainable innovation within Signify, providing a quantified footprint which acts as a baseline for further improvements in next generation product iterations.

References

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- 6) ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines / ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework
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