

**On embodied carbon emissions and whole life carbon of
products in buildings:
the *Energy Performance Buildings Directive* (EPBD) and the
Construction Products Regulation (CPR) revisions**

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EUROPEAN ALLIANCE TO
SAVE ENERGY
Creating an Energy-Efficient Europe

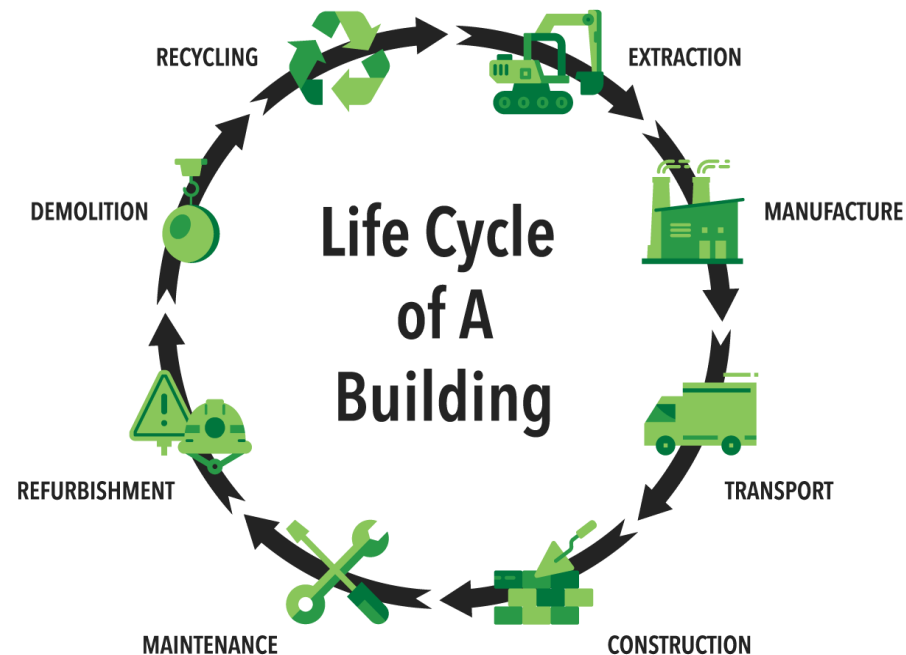


Definitions: embodied carbon emissions

What is embodied carbon?

Upfront **embodied carbon** refers to the emissions associated with all the activities of procuring, mining, harvesting raw materials, transforming these materials into construction products, transporting them to site and incorporating them into a building, and subsequently maintaining, replacing and removing and disposing at the end of their life.

<https://www.igbc.ie/what-is-embodied-carbon/>





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<https://www.worldgbc.org/embodied-carbon>

Through the **Advancing Net Zero** project, and in partnership with European Climate Foundation, Children's Investment Fund Foundation, C40 Cities and Ramboll, WorldGBC has developed a 'call to action' report focusing on these emissions, as part of a whole lifecycle approach, and the systemic changes needed to achieve full decarbonisation across the global buildings sector. Buildings are currently responsible for 39% of global energy related carbon emissions: 28% from operational emissions, from energy needed to heat, cool and power them, and the remaining 11% from materials and construction.

Towards the middle of the century, as the world's population approaches 10 billion, the global building stock is expected to double in size. Carbon emissions released before the built asset is used, what referred to as 'upfront carbon', will be responsible for half of the entire carbon footprint of new construction between now and 2050, threatening to consume a large part of our remaining carbon budget.

Therefore the built environment sector has a vital role to play in responding to the climate emergency, and addressing upfront carbon is a critical and urgent focus.

In **Bringing Embodied Carbon Upfront: Coordinated action for the building and construction sector to tackle embodied carbon**, World GBC has issued a bold new vision that:

- By 2030, all new buildings, infrastructure and renovations will have at least 40% less embodied carbon with significant upfront carbon reduction, and all new buildings are net zero operational carbon.
- By 2050, new buildings, infrastructure and renovations will have net zero embodied carbon, and all buildings, including existing buildings must be net zero operational carbon.

Definitions: whole life carbon of products in buildings

Whole Life-Cycle Carbon (WLC) emissions are the carbon emissions resulting from the construction and the use of a building over its entire life, including its demolition and disposal. They capture a building's operational carbon emissions from both regulated and unregulated energy use, as well as its embodied carbon emissions, i.e. those associated with raw material extraction, manufacture and transport of building materials, construction and the emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal. A WLC assessment provides a true picture of a building's carbon impact on the environment. The World Green Building Council estimates that, globally, construction accounts for 11% of carbon emissions¹. Key players in the construction industry, from developers to engineers and architects, must play their part in responding to the climate emergency by designing and building according to WLC principles.

Whole Life-Cycle Carbon Assessments guidance - Pre-consultation draft

https://www.london.gov.uk/sites/default/files/wlc_guidance_april_2020.pdf

05 April 2022 –

EEB Position Paper on the EPBD 2010/31/EU proposal

https://eeb.org/wp-content/uploads/2022/04/EEB-POSITION-PAPER_EPBD_executive-summary.pdf

Executive Summary

The European Environmental Bureau (EEB) welcomes that reducing greenhouse gas emissions from buildings is part of the performance of buildings in the European Commission's proposal for the Energy Performance of Buildings Directive (EPBD). The building stock's impact on achieving a climate-neutral Europe by 2050 is crucial, and a clear roadmap should be defined toward its decarbonisation. However, the current proposal fails to this end as it does not establish a blueprint to reduce both 50% direct CO2 emissions and 60% indirect power generation emissions generated by buildings by 2030, to achieve a reduction of net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels¹ and other intermediary milestones aligned with the Paris agreement. Moreover, the performance of buildings should include an effective reduction in both embodied and operational emissions. Still, the current proposal focuses on the operational phase of buildings and only sets targets for Whole Life Carbon (WLC) reporting. In order to halve buildings emissions by 2030, embodied carbon, which mainly comes from the material used in new construction and energy renovation processes, must be reduced by at least 40%.

The EPBD is the main EU policy that could address the reduction of GHG emissions at the building level. Hence, the EPBD revision should integrate a WLC approach that could effectively decarbonise the building stock and, for this purpose, the EEB calls for EU institutions and Member States to:

- Establish a **regulatory framework** such as the revision of the Zero Emissions Buildings definition, buildings requirements and a timeline to guarantee that the **1.5 degrees are not exceeded**, including a low carbon implementation of the **Renovation Wave** via 'headline' targets across the lifecycle of buildings.
- Establish an **ambitious Whole Life Carbon (Lifecycle Global Warming Potential) roadmap**, requirements for setting targets, benchmarks, and limits to reduce embodied and operational emissions by 2030. **Reporting on WLC** should be mandatory for all new public and large non-residential buildings and major renovations by 2024 and for all buildings by 2027. **Setting benchmarks and limits on WLC** should be established by 2026, ensuring its implementation by 2028.
- Include a dedicated article for instruments and **strategies that contribute to reducing Whole Life Carbon emissions**, such as circularity, sufficiency and the use of low carbon and natural-based materials. The **circular economy and sufficiency approaches** should be integrated within the EPBD, setting targets and establishing requirements for their implementation by 2025.
- Ensure the decarbonisation of the operational phase of buildings, including a deadline **to phase out fossil fuels from heating and cooling** systems across the EU by 2025.



Introduction to the CPR

- Aim and content



Background

- ❑ **It started out with a CPD - a directive in 1989**
 - but the directive created too big diversity in standards, performances and safety of products
- ❑ **In 2013 it became a regulation – meaning immediate binding legal force and effect to all member states**
 - CPR is instead building upon European harmonized standards, developed in CEN, mainly by industry representatives and engineers
 - Only 12 new/revised standards (out of approx. 600) have been issued since the CPR adoption

What the CPR does

- ❑ **Ensures reliable information on construction products related to the products' performance**
- ❑ **Defines harmonized criteria for products within product categories**
 - ❑ **Defines harmonized conditions for the marketing of products**
- ❑ **Defines harmonized assessment methods, technical specifications and technical language**

Introduction to the CPR

- Target groups



□ **Product manufacturers**

– *using the common technical language in declaring the performance of products*

□ **National authorities**

– *using the common language specifying requirements in building regulations*

□ **Architects, engineers & builders**

– *when choosing the most suitable products for their construction works in accordance with legislation*

Introduction to the CPR

- functions of the CPR



❑ **Placing products on the European market**

– *requirements for putting a construction product on the European market*

❑ **Construction works**

– *for requirements in the buildings and civil engineering works*

❑ **Performance of a construction product**

– *Performance related to the categories or characteristics of products*

❑ **Essential characteristics**

– *setting out categories linked to the basic requirements*

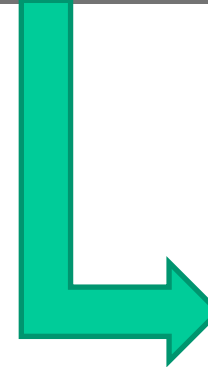
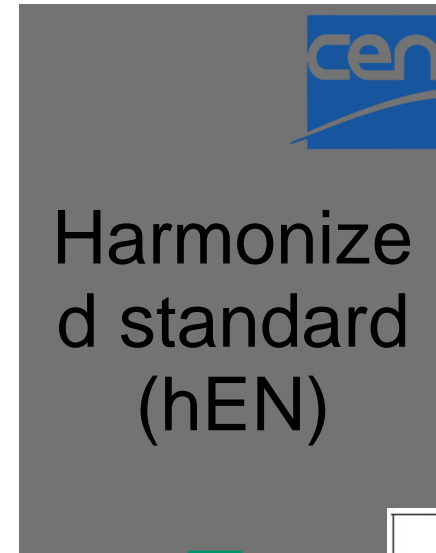
❑ **Basic requirements**


– *Constituting the basis for standardization mandates and harmonized technical specification (mechanical resistance, safety, health, noise, environment, energy and use of natural resources)*

Introduction to the CPR

- functions of the CPR

- ❑ As of 2013, when a construction product – covered by harmonized standards – is placed on the EU market – then it must be CE labeled
- ❑ The CE (Conformity European) labeling of products must be in conformity with harmonized standards
- ❑ Manufacturers are required to draw-up a Declaration of Performance (DoPs) on products' characteristics
- ❑ Manufacturers become responsible for the products' compliance to product requirements when launching their hEN-covered products to the market
- ❑ No other national labels can approve product characteristics' conformity

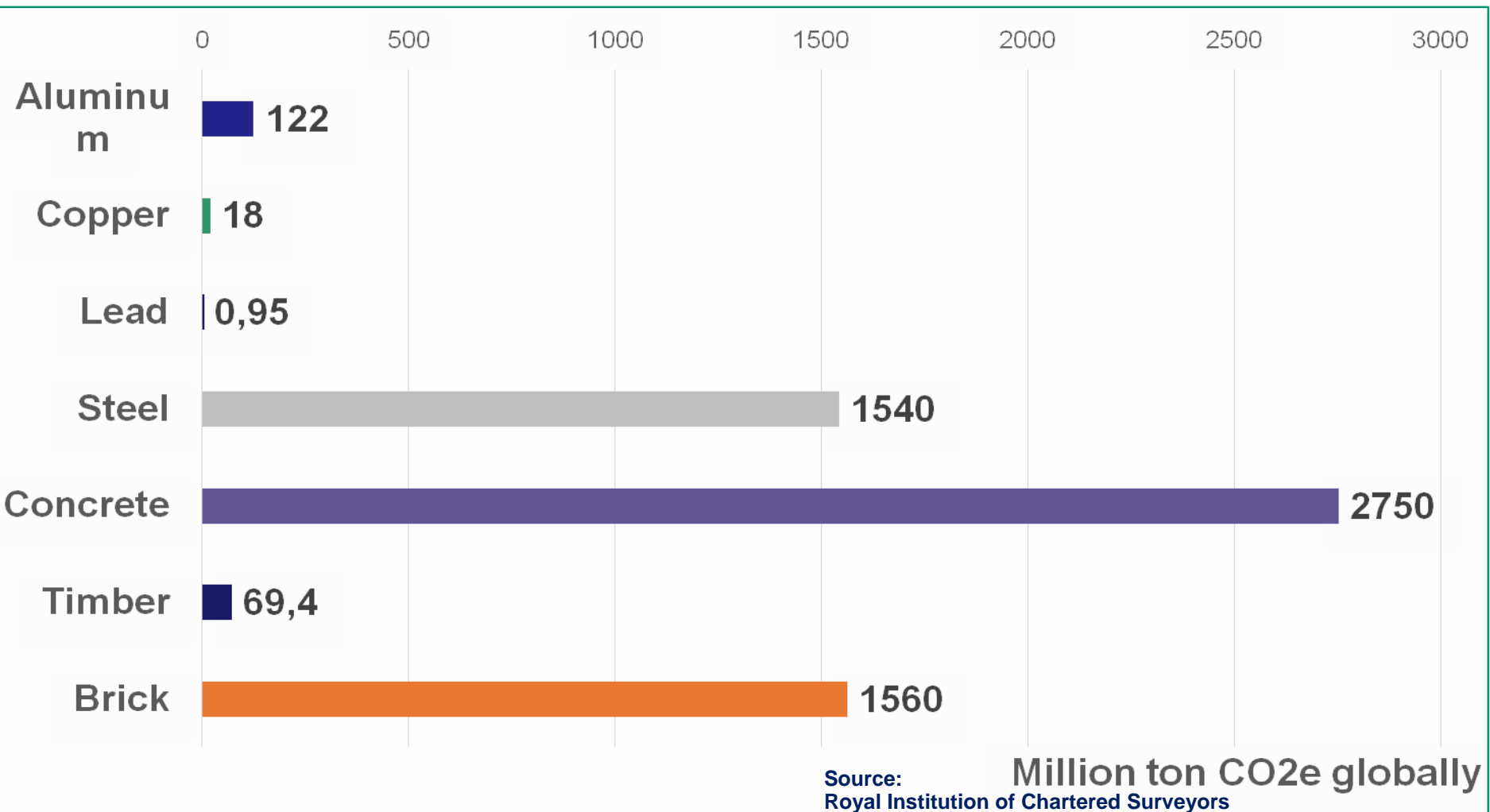


 0836	
AnyCo Ltd 13	
0836-CPR-00234 EN 13245-2 : 2008 PVC-U profiles for the external wall/ceiling finishes	
Reaction to fire (Class + indication of mounting and fixing method)	C-s3, d0/AVG
Release of dangerous substances	NPD
Mechanical resistance (Impact resistance code)	[23.05]
Resistance to fixings	See installation instructions
Durability (Tensile-impact strength code)	[A.12]



Create low-carbon markets

- Footprint of production of construction products covered by hENs



Potentials & Barriers

Getting an EU regulation model

Structural barrier no. 1: Diverse approaches

- ❑ For the moment we only have a few countries regulating WLC
- ❑ The countries that regulate WLC don't have the same regulatory models:
 - ✓ LCA assessments
 - ✓ Progressive or dynamic threshold values
 - ✓ Specific embodied emission requirements
- ❑ The EU Commission's proposal for a revised EPBD will only lead to WLC reporting as of 2030



E3G



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Foundation



Potentials & Barriers

- Getting an EU regulation model

Structural barrier no. 2: Diverse buildings

- We have diversity in the EU building stock
- We don't have a baseline for where the different building types are on a WLC scale
- But.....maybe we have sufficient data and cases to start regulating WLC for new buildings?



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Thank you for your attention !



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