# How can product-level regulation effectively tackle embodied carbon?

Federica Pozzi & Michael Neaves | 07/02/2022

# ECOS – buildings and construction

- ECOS is an international NGO with a network of members and experts advocating for environmentally friendly technical standards, policies and legislation.

- Our vision: sustainable construction products should become the norm, with a sustained push in demand coming from buildings.

- ECOS is particularly active in this area for the central role that standards play, in CEN/TC 350 – Sustainability of Construction Works, as well as various product Technical Committees.

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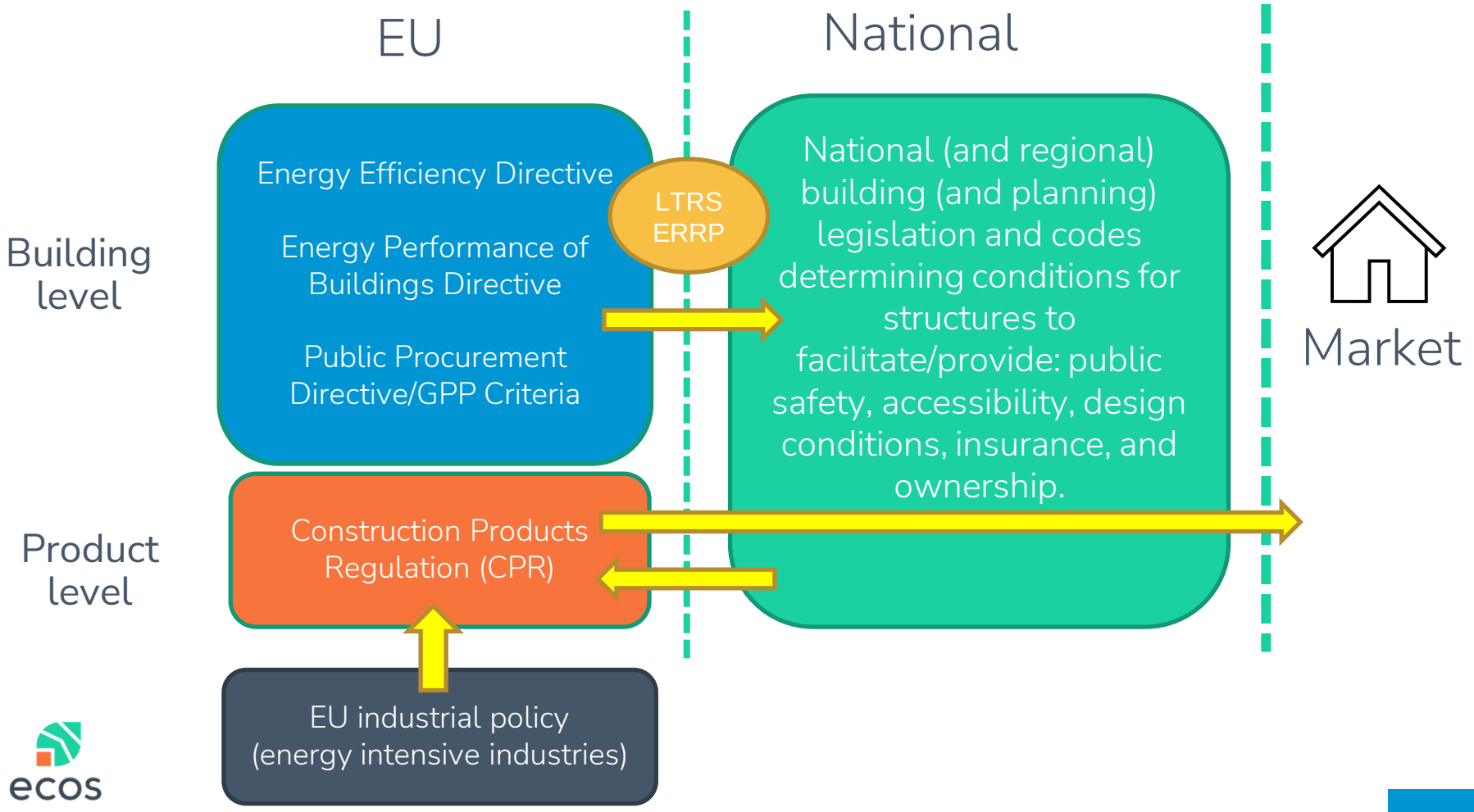
# Buildings and construction framework: unregulated embodied carbon

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# Rationale/approach to the CPR

- Tackling the building level alone is not enough
- Political momentum for sustainable products exists: SPI, CEAP
- EU leadership is key with varying MS advancement in this area
- Construction products can be more sustainable with equal performance, and legislation should exclude the worst products from the market
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# Overview of the CPR functioning

Requirements are set in overarching national legislation

achieve proper functioning of the internal market by declaring the performance of CP.

Member States' building legislation and codes

EU Commission | CEN | Manufacturers

Construction Products Regulation (CPR) | Harmonised Standards | Declaration of performance | Product

Basic work requirements of Construction works

CE marking

Mandate → EN XXX — Annex with list of essential characteristics → Performance of at least one essential characteristics

Laying down harmonized conditions for the marketing of construction products

Contains many different requirements and test methods for the intended use beside the listed essential characteristics

NPD (No Performance Determined) can be used for essential characteristics

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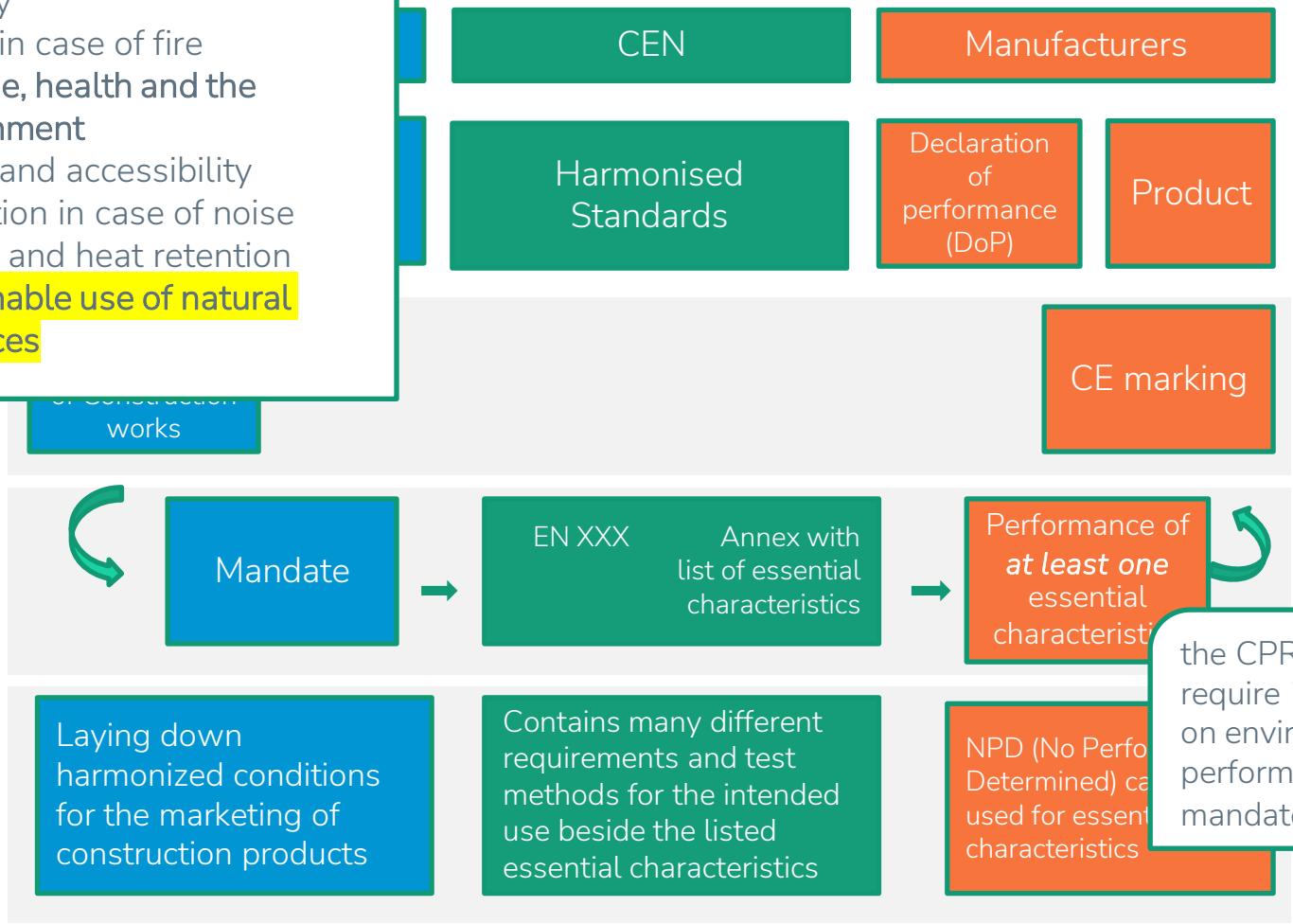
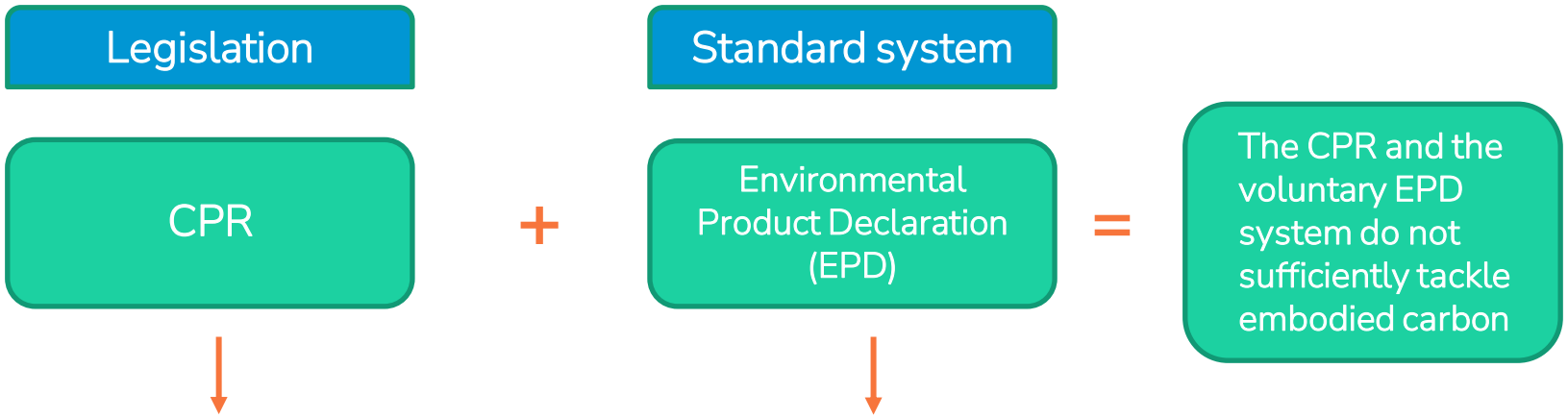
# Overview of the CPR functioning (2)

1. Mechanical resistance and stability
2. Safety in case of fire
3. **Hygiene, health and the environment**
4. Safety and accessibility
5. Protection in case of noise
6. Energy and heat retention
7. **Sustainable use of natural resources**




the CPR <u>does not</u> require information on environmental performance on a mandatory basis.

# The CPR's approach to embodied carbon




Does NOT set requirements on:

- information disclosure on environmental performance, including embodied carbon
- Performance (i.e., thresholds on embodied carbon)

- **Voluntary tool,** based on LCA methodology
- Developed by and for the industry to provide information on life-cycle impacts of CP
- EN 15804 provides the core rules for developing EPDs, upon which Product Category rules (cPCR) are standardized and applied to cover product-specific aspects.

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# The EPD system: example

| DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES |
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | MND | MND | MND | MND | MNR | MNR | MNR | MND | MND | MND | MND | X | MND | X |

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 metric to Hot-rolled steel sheet piling

| Parameter | Unit | A1-A3 | C3 | D |
|---|---|---|---|---|
| Global warming potential | [kg $CO_2$-Eq.] | 9.37E+2 | 2.03E+0 | -2.34E+2 |
| Depletion potential of the stratospheric ozone layer | [kg CFC11-Eq.] | 5.21E-7 | 1.22E-9 | -1.30E-7 |
| Acidification potential of land and water | [kg $SO_2$-Eq.] | 2.44E+0 | 5.30E-3 | -9.92E-1 |
| Eutrophication potential | [kg $(PO_4)^{3-}$-Eq.] | 2.15E-1 | 6.99E-4 | -8.37E-2 |
| Formation potential of tropospheric ozone photochemical oxidants | [kg ethene-Eq.] | 3.22E-1 | 4.89E-4 | -1.36E-1 |
| Abiotic depletion potential for non-fossil resources | [kg Sb-Eq.] | 2.62E-4 | 6.22E-7 | -6.73E-5 |
| Abiotic depletion potential for fossil resources | [MJ] | 8.68E+3 | 2.27E+1 | -3.07E+3 |

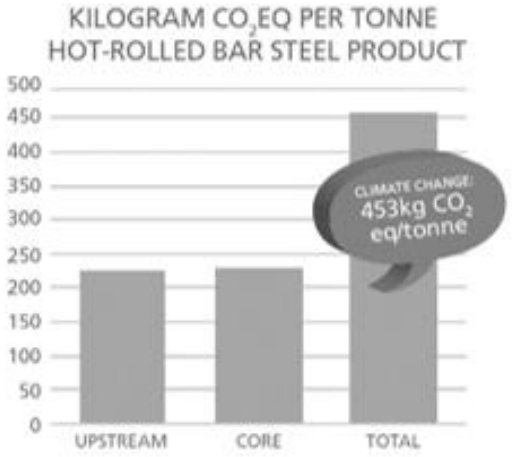


Figure 2: [Left] - Detailed EPD for hot-rolled steel sheet piling; [Right] - Graphic EPD for hot-rolled bar steel product (EN 15804 + EN 17662)

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# Opportunities to regulate the embodied impacts of construction

**Product level**

- Proposal for a revised CPR expected on 30 March 2022.
- Horizontal Sustainable Products Initiative (SPI) expected on 30 March 2022.

**Building level**

- EPBD driven decarbonisation of building lifecycle GWP/WLC
- GPP criteria/PP Directive
- Future Sustainable Building Initiative/Framework

**End-of-life/Waste**

- Revision of the WFD (upcoming in 2023/24)



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# What the EPBD needs from the CPR

1. Accurate, reliable, and intelligible environmental performance information for sustainability assessment standards used to measures and evaluate WLC (EN 15978 → LEVEL(s) → EPBD)

2. Comprehensive information on product/material characteristics and performance to best inform better design and construction to determine most sustainable option to fulfill functional requirements

3. Information relevant for handling of products to foster circularity and reduce WLC of future buildings by better informing the deconstruction process to deliver products for, reuse, and material for high-quality/value recycling for use in other products

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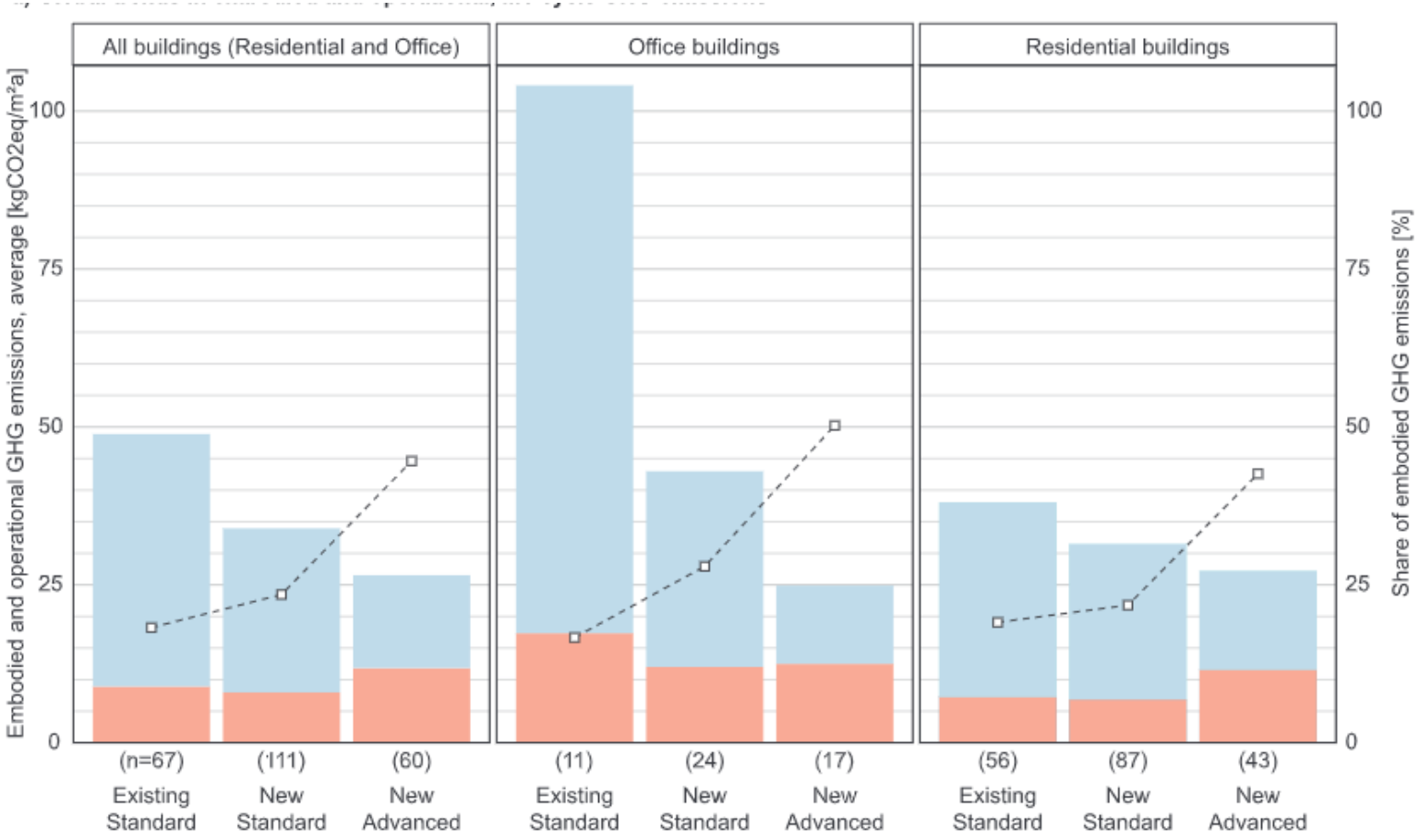
# Shift of emissions




Röck, M., Saade, M.R.M., Balouktsi, M., Rasmussen, F.N., Birgisdottir, H., Frischknecht, R., Habert, G., Lützkendorf, T. and Passer, A., 2020. Embodied GHG emissions of buildings–The hidden challenge for effective climate change mitigation. *Applied Energy*, *258*, p.114107.

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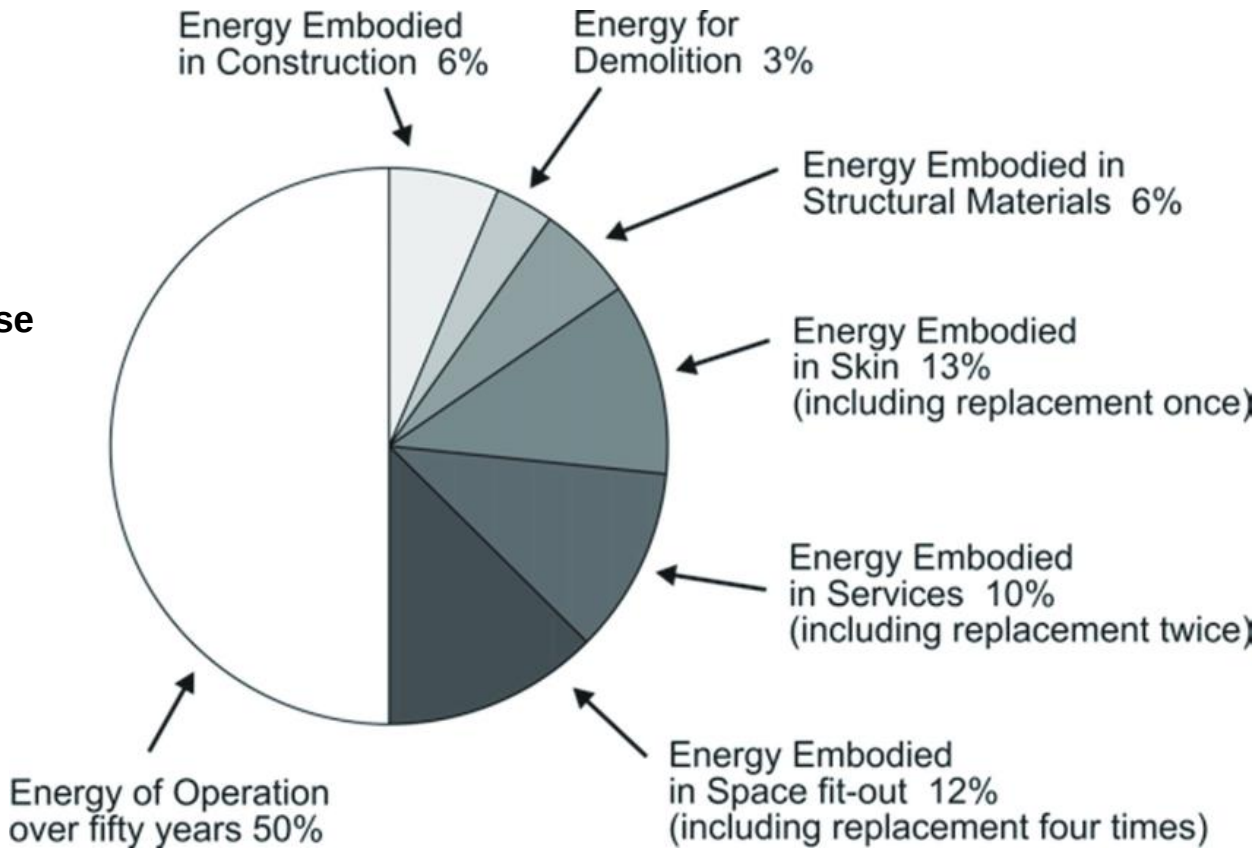
# The energy performance of a building is a lifecycle issue, operation is half the story...

**Total life cycle energy use over the 50-year life of a typical office building**

**(Swift et al. 2015)**



# What the EPBD can do on embodied carbon

- Whole Life Carbon (Lifecycle Global Warming Potential)
  - Measurement and evaluation requirements – strengthen and accelerate
    - Mandate use of common product information resource
  - Benchmarks, thresholds, and limits for WLC – initial provisions/timeline
  - Establish a cap on embodied carbon for new buildings and renovation
- Net-Zero Emissions Buildings
  - Define in legislation Net-Zero [lifecycle] Emissions buildings including a harmonised methodology
  - Establish requirements for broad range of building typologies to achieve this by 2045 according to the harmonised methodology
- Strategies for reducing WLC should be integrated into a dedicated article linked to the proposed Annex III requiring consideration of circularity, use of low-carbon materials, and renovation as an alternative to new construction

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# What can be expected from the revision?

Proposal expectations

Policy targets

Information

- Strengthened information disclosure requirements
- EPD as a mandatory instrument.

- environmental information disclosure requirements within the CPR, through a harmonized assessment.
- product-related information

# What can be expected from the revision? (2)

| Proposal expectations | Policy targets |
| --- | --- |
| **Product requirements** | |
| • some requirements on circularity. | • Construction product requirements, including max. embodied carbon thresholds |
| **Governance** | |
| • No changes to the existing system, strong focus on MS evolutions. | • Shift to an eco-design type of approach |

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# ECOS actions

| Stage | Timeline | Activity/outreach |
|---|---|---|
| Preparatory work | February/March 2022 | • Policy brief on CPR alignment with the SPI<br>• Outreach to EC (DG GROW-Construction Unit) and SPI Units |
| Reaction to CPR legislative proposal | 31 March 2022 – May 2022 | • Coordination of response to proposal with partner organisations<br>• Continued outreach to EC, and Member State representatives |
| Co-decision | June-October 2022 | • Meeting with relevant MEPs<br>• Outreach with relevant MS representative, potentially through national partners |

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# Thank you

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