Ready for low-carbon and circular markets of construction products?

Workshop at Legambiente & KyotoClub

Thursday, May 19th 2022
Circular economy and the link to embodied carbon

- **From the CLIMATE perspective**
  1) *We cannot keep extracting raw-materials*
     - There is not enough raw-materials for the economic growth
  2) *We must use less energy in the re-production to lower CO2*
     - Typically, recycled materials use less energy/CO2 when re-producing

- **From the INDUSTRY Perspective**
  1) *Circular economy can lower costs of production*
     - It is about avoiding raw-material shortages and inflation on products/materials
  2) *Lowest CO2-footprints ensures a competitive market position*
     - When declaring carbon footprint of products, the greenest products will win when there is
       new demands for sustainability in regulation and public procurement
Products’ life-cycle footprint
- Definition

Our Products: Life Cycle Analysis

For this part of the footprint, we looked at each product’s “life” from beginning to end and left nothing out. Our materials are by and large much more sustainable than fossil fuel alternatives, but the bulk of our impact still comes from them. That is why finding the best, most sustainable materials to make our products from will always be a top priority for us.
What is embodied carbon
- Definition
Embodied carbon in buildings
- When we see embodied emissions in a buildings lifetime

- Embodied carbon from renovation/maintenance (~15yrs)
- Operational carbon decreases as grid decarbonizes by 2050
As buildings become more energy efficient – the share of embodied carbon goes up.

In the most energy efficient buildings, embodied carbon is estimated to form up to 90% of a building’s total emissions.

We expect embodied carbon emissions to increase when more homes are renovated (EU’s Renovation Wave).
It is about saving the planet
- Business as usual is not enough

- The European Green Deal - it is about saving the planet!
  - Europe has to be climate-neutral by 2050
  - This means that **all** sectors and **all** industries must deliver climate-neutrality by 2050

- Buildings - it is about 36% of the EU’s CO2 emissions!
  - Buildings account for 50% of all raw-material extraction
  - Buildings account for 30% of all generated wasted across sectors and industries
  - Embodied carbon is between 10-20% of buildings’ CO2
  - Embodied emissions must decrease by 40% to fulfill the 2050-goal
**Embodied carbon in materials**
- Footprint of production of construction products

<table>
<thead>
<tr>
<th>Material</th>
<th>Million ton CO₂e</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>0,95</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>1540</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>2750</td>
<td>Royal Institution of Chartered Surveyors</td>
</tr>
<tr>
<td>Timber</td>
<td>69,4</td>
<td></td>
</tr>
<tr>
<td>Brick</td>
<td>1560</td>
<td></td>
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</tbody>
</table>
What is embodied carbon
- How do we account for it on the buildings level

EN 15978 System Boundary

Product Stage (A1 - A3)
A1: Raw Materials Extraction
A2: Transport
A3: Manufacturing

Construction Stage (A4 - A5)
A4: Transport
A5: Construction & Installation

Use (B1 - B7)
B1: Use
B2: Maintenance
B3: Repair
B4: Replacement
B5: Refurbishment
B6: Operational Energy (HVAC, Hot Water & Lighting)
B6: Operational Water

End of Life (C1 - C4)
C1: De-construction / Demolition
C2: Transport
C3: Waste Processing
C4: Disposal

Benefits and Loads Beyond the Building Life Cycle (D)
Reuse
Recovery
Recycling
Exported Energy

Transport of Construction Labour

Cradle to gate
Cradle to practical completion (handover)
Cradle to grave
Cradle to grave including benefits and loads beyond the system boundary
Getting Europe moving
- ‘Business as usual’ is not enough

- EU countries are moving - it is about saving the planet
  - France, Germany, Netherlands, Sweden, Finland and Denmark are measuring the CO2 footprint of buildings and products
  - 5 of these countries have maximum values for the CO2-footprint of buildings
  - These are countries buying Italian construction products!

- EU-legislation – getting all of Europe moving
  - Revision of the Construction Product Regulation (CPR)
  - New Ecodesign Regulation (ESPR)
Getting Europe moving
- Potential regulation to bring down embodied carbon

- Building regulation
  - Whole-life carbon regulation of buildings – not just operational energy!
  - Whole-life carbon regulates both operational- and embodied carbon
  - Maximum values in the EPBD

- Product regulation
  - Regulating the CO2 / energy footprint of products (CPR & ESPR)
  - Creating carbon transparency and requirements (CPR & ESPR)
  - Requirements and threshold values for products’ carbon, recyclability, reusability and repairability (ESPR)
  - Common EU-databases for construction product declarations can create a market of low-carbon products (CPR)
EU-level regulation must be supported by national governments / MEPs / ministries

- Avoid having too many different national regulations and models to ensure good market conditions and exports
- EU-level thresholds to ensure that national industries do not lose competitiveness
- EU-regulation must build on European standards

Incentivize due-diligence for low-carbon products and buildings

- Support transformation of industries and product innovation with lower CO2-footprint
- Public procurement to boost demand-side policies for low-carbon products

Increase knowledge, implement and participate in developing European standards

- EN 15978 – for assessments of buildings CO2
- EN 15804 – Environmental Product Declarations
- NEW standards on circular economy in buildings are being developed now!

(CEN TC 350 SC1) // Ente Italiano di Normazione (www.uni.com & Committee lead Birgitte Ostertag, bo@ds.dk)