Towards circular buildings

Reduce materials intensity for the building industry
One of the 3 major trends on the building market
Did you know?

✓ Urban population will be multiplied by 2 in the next 30 years
✓ 40% of raw material is used today to manufacture building products and components
✓ China used more cement in the three years 2011-2013 than the USA used in the whole 20th Century
✓ Most of the growth in building and construction will happen in emerging markets
What do we have to deal with?

# 40% of solid waste streams in developed countries from construction and demolition

# Increasing resource extraction & scarcity

# Loss of biodiversity

# GHG emissions

# Waste stockpiles

# Land degradation
Circularity is about...

# RECYCLED CONTENT - RENEWABLE RAW MATERIALS

# C&D WASTE MANAGEMENT & RECYCLING

# DURABILITY - REPAIR – REMANUFACTURE - REUSE

# BANNED LANDFILLING

# RESPONSIBLE SOURCING & INDUSTRIAL ECOLOGY
Low productivity and minimal improvements

- Building industry has difficulties to change its habits and modernize its processes
- Digital tools far from ubiquitously used, lagging other industries
- Materials use date limited => IEA 2° material demand analysis on-going + EU – JRC initiative now starting to consolidate data and make broadly available

Productivity in Europe
1995 = base 100

Source: OECD
Heavily specified industry

![Graph showing the relationship between sustainability performance and the number of buildings. The x-axis represents sustainability performance, ranging from 0 to ++++. The y-axis represents the number of buildings. The graph shows a transition from minimum legal requirements to voluntary labels. The terms "push" and "pull" are used to describe the shift.]

- GPP (Green Public Procurement)
- CODE
- REGULATION
- BREEAM
- greenstar
- HQE
- DGNB
- WELL

[Logos for various sustainability standards and labels are included.]
Demand for circularity in building labels

- **Zero waste** jobsites
- **recyclable** construction products
- products with a high(er) **recycled content**
- products containing no **hazardous substances**
Policy developments - examples

Italian Decree on Green Public Procurement of construction works (January 2016) defines minimum sustainability criteria, in particular a minimum % of recycled content in materials and a minimum % of recyclable materials in the construction work.

Construction is one of the 5 economic sectors selected by the government of the Netherlands to switch to a circular economy: by 2050 buildings and other structures must be built, (re)used, maintained and demolished sustainably. They must be energy neutral and made of sustainable materials.
In order to ensure proper application of the waste hierarchy, as of 2030, restrictions on landfilling to all waste that is suitable for recycling and other material or energy recovery.

Member States shall take measures to promote selective demolition in order to enable removal and safe handling of hazardous substances and facilitate reuse and high quality recycling by selective removal of materials, and to ensure the establishment of sorting systems for construction and demolition waste;
By 31 December 2024, the Commission shall consider the setting of preparing for reuse and recycling targets for construction and demolition waste and its material-specific fractions.
Customers need information…

“The new is unique in the Netherlands: the first built example of a purely sustainable and circular design.”
A tool: life cycle analysis for product, systems and buildings

- Standardized methodologies (EN15804 and ISO 21930)
- LCA results published in an EPD and third party verified
- 3 benefits
  - Objective communication
  - Comparison science based
  - Improvement of products (eco-innovation)
Innovation is happening along points of the value chain
The Saint-Gobain approach

Ressource policy

Sustainable habitat

<table>
<thead>
<tr>
<th>Pillars and working axes</th>
<th>Indicators</th>
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<td>Advocating for sustainable construction</td>
<td>Leading by example</td>
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<td>Setting the ambition level &amp; engaging with trendsetters</td>
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<td>Developing &amp; distributing sustainable solutions</td>
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<td>Contributing to a resource-efficient economy</td>
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<td>Raising awareness</td>
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<tr>
<td>Number of Multi-Comfort projects</td>
<td>1</td>
</tr>
<tr>
<td>Number of CARE A buildings</td>
<td>2</td>
</tr>
<tr>
<td>Member of the Green Building Council [Yes / No]</td>
<td>3</td>
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<tr>
<td>Existence of an advocacy plan identifying key issues and priorities</td>
<td>4</td>
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<tr>
<td>Number of people trained to Eco-Innovation</td>
<td>5</td>
</tr>
<tr>
<td>% of portfolios (based on turnover) analyzed with 360° tool</td>
<td>6</td>
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<tr>
<td>Number of Eco-Innovation pilot projects</td>
<td>7</td>
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<tr>
<td>Existence of a transversal Construction &amp; Demolition waste project</td>
<td>8</td>
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<tr>
<td>% of products (based on turnover) covered by verified EPDs</td>
<td>9</td>
</tr>
<tr>
<td>LCA (Life Cycle Assessment) resources (number of Saint-Gobain employees in FTE)</td>
<td>10</td>
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</tbody>
</table>
Gypsum and the circular economy

Among the 60 plasterboard factories currently in operation in 2017, **33 are recycling more than 80%** of their gypsum waste.

**21 factories from 12 different countries** are using external gypsum recycle content (construction and/or demolition/deconstruction) into their plasterboard process.

- **Construction waste**: also called pre-consumer waste. It is usually the first waste to be recycled since it is easier to sort and less polluted.
- **Demolition/deconstruction waste**: also called post-consumer waste. It is highly important to consider traceability and contamination before re-introducing it back into the process.

Among the 12 countries, **9 countries** are proposing a recycling service to their customers.
Local recycling landscape

RECYCLING LANDSCAPE IN SPAIN

RAW MATERIALS
- Opposite quantity
- Quantity per year: 0
- Price: 0
- Reaction: 0

MANUFACTURING
- Production site
- Processing: Site, reprocessing abilities

LOGISTICS
- # Linear Gypsum Waste Journey

INSTALLATION
- PB Construction waste: 5-10% of PB on-site
- Main contractor is the one managing the gypsum waste in 86% of tracked projects
- Projects do selective sorting of waste but the big majority does not sort GBW

BUILDING LIFETIME
- LEEDs or BREEAM more and more applied. Around 10% of projects tracked by CDM are certified

END-OF-LIFE
- Demolition inventory is mandatory for non-residential buildings with a volume > 1000 m² but is not respected

RECYCLING
- Plico® is reprocessing the external waste itself

LANDFILL

ALTERNATIVE ROUTES:
- Agriculture, Cement
Glas and the circular economy

- Increase of 20 to 30% of cullet usage reduces energy consumption by 3%.
- The usage of 1t of cullet avoids the emission of 0.25 t of CO₂.

Flat Glas

- Glas collected from various sources

Glasswool

- Cullet
Marketplaces for materials and products from deconstruction

“A digital marketplace for material reuse. Aims to connect people who are demolishing buildings with designers who want to reuse materials.”

« première marketplace consacrée au réemploi des matériaux de construction »
Leasing

Through leasing Desso offers a full service to its customers including installation, cleaning, maintenance and eventually removal. Instead of owning the carpet, customers view it as a service provided by Desso, who will then take back the carpet at the end of its life for recycling. Via this leasing construction collection of old carpet products is more easy and positively contributes to closing the loop.
The BAMB project
Conclusion
B&C is at the edge of a revolution