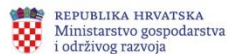




CIRCULAR ECONOMY
APPROACHES IN
SOLID WASTE
MANAGEMENT



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REGIONAL WORKSHOPS ON CIRCULAR ECONOMY APPROACHES WITH FOCUS ON CONSTRUCTION SECTOR

CONCEPT, BARRIERS, AND ENABLING CONDITIONS FOR THE IMPLEMENTATION OF CIRCULAR DESIGN OF BUILDINGS

Concept of circular design

Buildings to be:

- **Modular and Demountable** – easy separation aimed at reusing materials in the next use
- **Easily adaptable** - suitable for a different function (e.g. a school that becomes residential)
- **Non-destructive** – to last longer
- **Light design and less-material** used - without compromising functional requirements such as bearing capacity
- **Environment wise** choice of materials

Construction materials to be:

- **Durable** – to meet certain quality standards in order to last longer
- **Renewable** - obtained from sustainable source (usually bio-based) and require little energy to produce and transport (local)
- **Non-hazardous** - hazardous materials leads to concerns about the quality, environmental risk, upcycling potential and a lack of confidence or trust
- **Reusable/ recyclable** – to increase number of cycles before becoming waste
- **Contain high recycled content** – increases uptake and marked demand



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Barriers and enabling conditions

Enabling conditions:

- **technical progress** - advanced technologies enabling production of high quality aggregates from CDW - building trust and boosting the demand of recycled CDW
- **know-how** - findings from the life cycle analysis on how to make “greener” products
- **Corporate Social Responsibility** policy - to distinguish themselves in the market with sustainable materials/ buildings
- **economic and financial benefits** - savings associated with durability, easier deconstruction, lower waste management costs, no energy loss for extraction virgin materials, less frequent maintenance, and higher residual value

Barriers - economic concerns rather than technical limitations

- higher investment (high quality materials) but the overall life-cycle costs are low
- financial savings are difficult to evaluate and they are visible in the future

Voluntary agreements

Voluntary pledge by the business and support by the Government

Example (NL) Green Deal Green Building Materials (GroeneBouwmaterialen.nl):

- Public sector representatives - the Ministry of Economy, the Ministry of Environment
- District of Tomorrow B.V. – an education course for extra qualification at Zuyd Univ.
- Green Building Materials V.O.F. – an innovative company selling sustainable materials



Commitments:

- **Laws and regulations** (licensing, rules, information, etc.) → introducing the subject of green building materials in education, colleges and universities
- **Market incentives.** (standards, certification, GPP) → standards on materials/ techniques
- **Innovations** (business initiative for a new product, service, business model that needs support) → to set up an assessment method for green (building) materials with a view to possible standardization;

Passports and Declarations

Building/ Material Passports – define general characteristics that make materials valuable for recovery, continuous exchange of information throughout the life cycle, The aim is prevention, reuse, recycling - helps choosing materials, proves eco-claims, builds trust, creates demand

- **Manufacturing phase** (info provided by manufacturer) – Health impact, Reuse potential, Positive impacts on Environment, Use and reuse instructions, Connections
- **Build/Use phase** (info provided by installer, maintenance, owner) - Assembly, cleaning, maintenance, defined use period, take-back and reuse options
- **Disassembly phase** (disassembler, deconstructor) - take-back services, composition, disassembly instructions, connections, locations

Environmental product declarations (EPD) – product producer to inform about a product’s environmental and health impact. Short version of LCA externally verified

- ISO14025 -Type III environmental declarations/ EN15804 for LCAs in building sector
- LCA according to Product Category Rules – calculations and guides to ensure uniformity
- 28 EPD programmes referring to ISO 14025 exist, more than 2256 PCR and 3600 EPDs
- 19 env. impact categories, indicators – resource use, waste and output flows of materials & energy.

Environmental Cost Indicator– combines all and expresses impact in Euro

Certification systems

Certification systems - measure the concept of sustainable development in buildings:

- criteria (energy efficiency, sustainability, socio-economic), and measurable indicators
- Rating system to score the criteria based on importance factors
- Certification process - steps to award the certificate
- BREEAM (1990 UK), HQE (1996 France), LEED (1998 USA), CASBEE (2001 Japan), Green Star (2002 Australia), DGNB (2009 Germany); DGNB- focus on sustainability

Chemicals of concern in construction products

- **REACH, CLP** – mandatory reporting, tracking of haz. substances **but not in products**
- **BASTA database**(Swe) - self-declaration by manufacturers, independent audits, REACH and CLP criteria, 3 list of products – 1) stringent criteria, 2) basic, 3) difficult to replace

Renewable materials

- Bio-based Building Materials Catalogue (initiative of the Dutch Ministry of Economy)
- “bio-based product” label (France) – min. content of biobased material per product family, (e.g. -70% for insulation, and 25% for plant-based concrete)

Thank you!

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