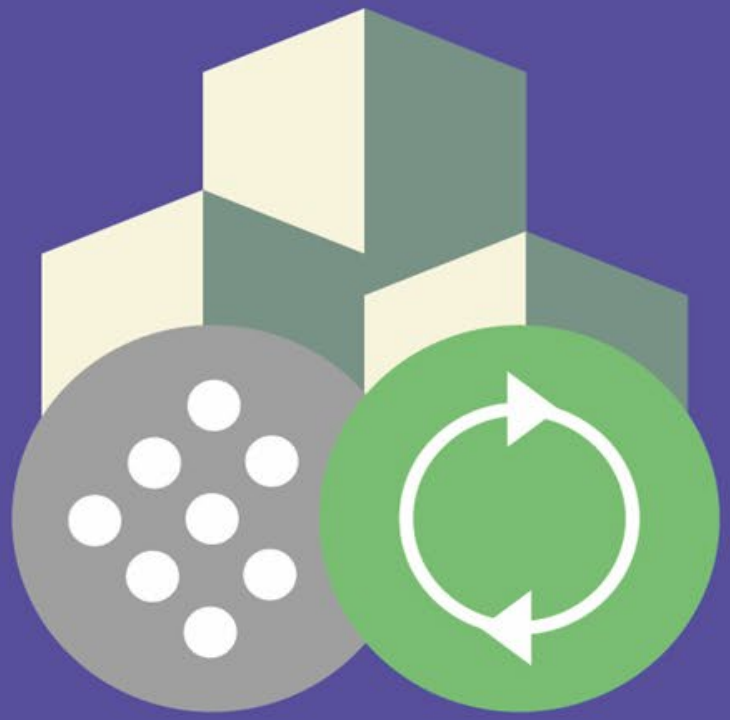


Circular technologies in construction

Putting Science Into Standards

CEN CENELEC

European Commission

Welcome!
We will start soon

Your Moderator

Fabio TAUCER

European Commission

Programme – 12 December

Main plenary room

14:00 - 14:10	**Welcome and introduction**
14:10 - 14:30	**Opening remarks**
14:30 – 15:30	**Needs for future standardization**
15:30 - 16:15	**How to bridge the gap**
16:15 - 16:30	*Coffee break*
16:30 - 17:15	**Framework indicators to measure circularity**

Programme – 13 December

Main plenary room	**08:45 - 09:00**	**Welcome to Day2**		
Parallel sessions	**09:00 - 09:45**	**Quality assurance of reused and recycled material, and end-of-waste criteria**	**Design for circularity, adaptability and disassembly**	**Building information (reporting formats, data management and storage)**
	09:45 - 10:00	*Coffee Break*		
	10:00 - 10:45	**Quality assurance of reused and recycled material, and end-of-waste criteria**	**Design for circularity, adaptability and disassembly**	**Building information (reporting formats, data management and storage)**
	10:45 - 11:00	*Coffee Break*		
Main plenary room	**11:00 – 11:15**	**Parallel sessions recap & takeaways**		
	11:15 – 12:00	**Panel & plenary discussion: The way ahead**		
	12:00 – 12:15	**Closing remarks**		

Opening Remarks

Salla SAASTAMOINEN

JRC Deputy Director-General, European Commission

Opening Remarks

Stefano CALZOLARI

CEN President

Opening Remarks

Maive RUTE

Chief Standardisation Officer, European Commission

Needs for future standardization

Philippe MOSELEY

Policy perspective, European Commission

Arturo DE LA FUENTE NUNO

Metrics for European integration, European Commission

Malgorzata WROBEL

New European Bauhaus, European Commission

Gilli HOBBS

Gap analysis, conclusions and recommendations, CEN/TC 350/SC 1 WG 2

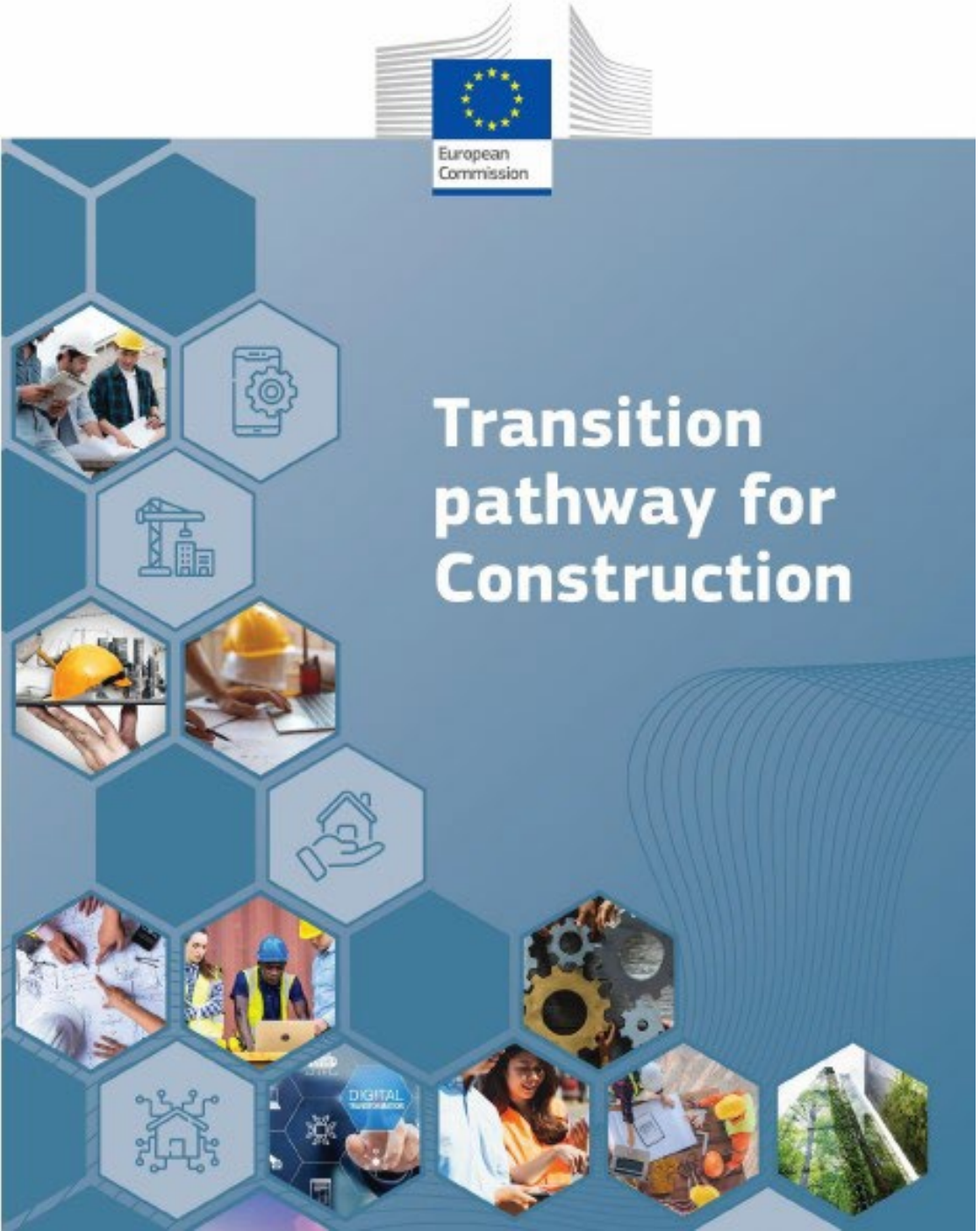
EU policies for a circular construction industry

Putting Science into Standards: circular construction technologies
12 December 2023

Philippe MOSELEY, Team Leader, DG GROW Construction Unit

The EU construction industry ecosystem

- 9.6% of EU Gross Value Added (EUR 1 158 billion)
- 25 million jobs, 5.3 million firms
- 37.5% of waste generated (2020)
- Half of resources extracted
- Buildings: 40% of energy consumed



Transition Pathway (March 2023): https://ec.europa.eu/docsroom/documents/53854

- Co-created with industry, Member States and other stakeholders
- A vision for the green and digital transition
- Recommendations of concrete action

Call for new commitments aligning with the Transition Pathway: https://ec.europa.eu/eusurvey/runner/TransitionPathwayConstruction_Commitments

European Commission

Construction Products Regulation revision

Unlock growth and jobs potential

Improve competitiveness

Greening of manufacturing

Sustainable built environment

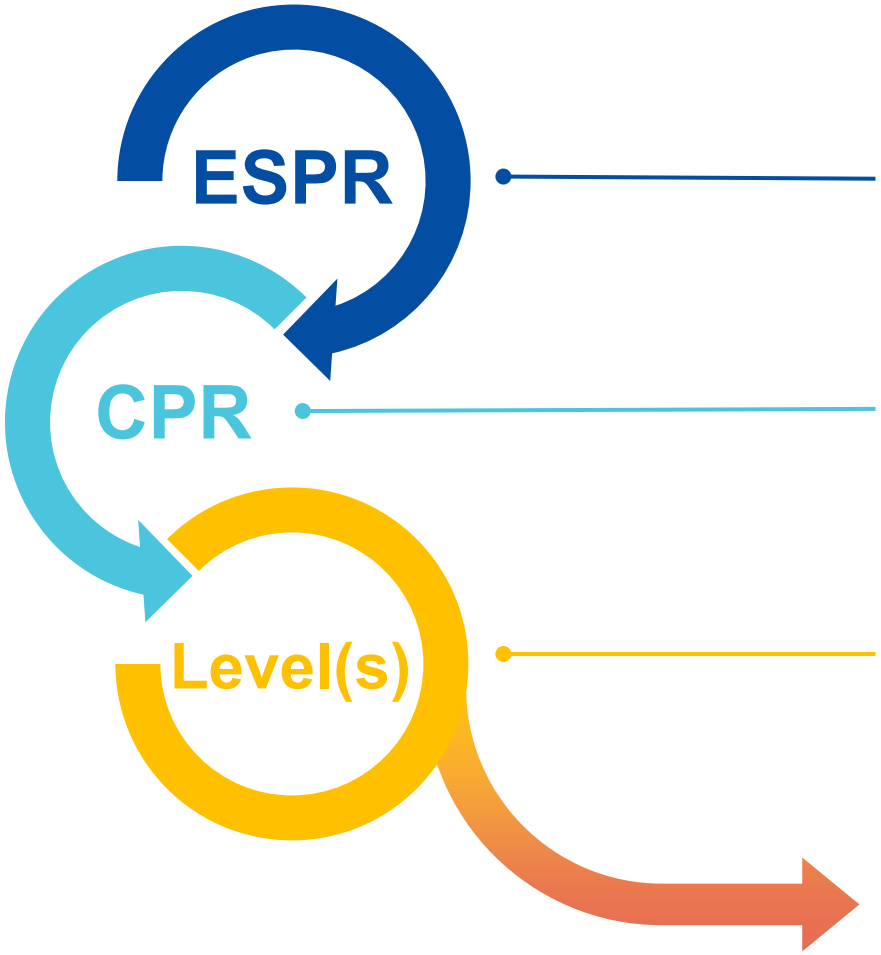
Circular economy

Digitalisation of construction

CPR review: https://europa.eu/!Dy69pr

European Commission

Construction products: EU Regulatory framework



Sustainable Products Initiative
Substantiating green claims from products placed on the European market

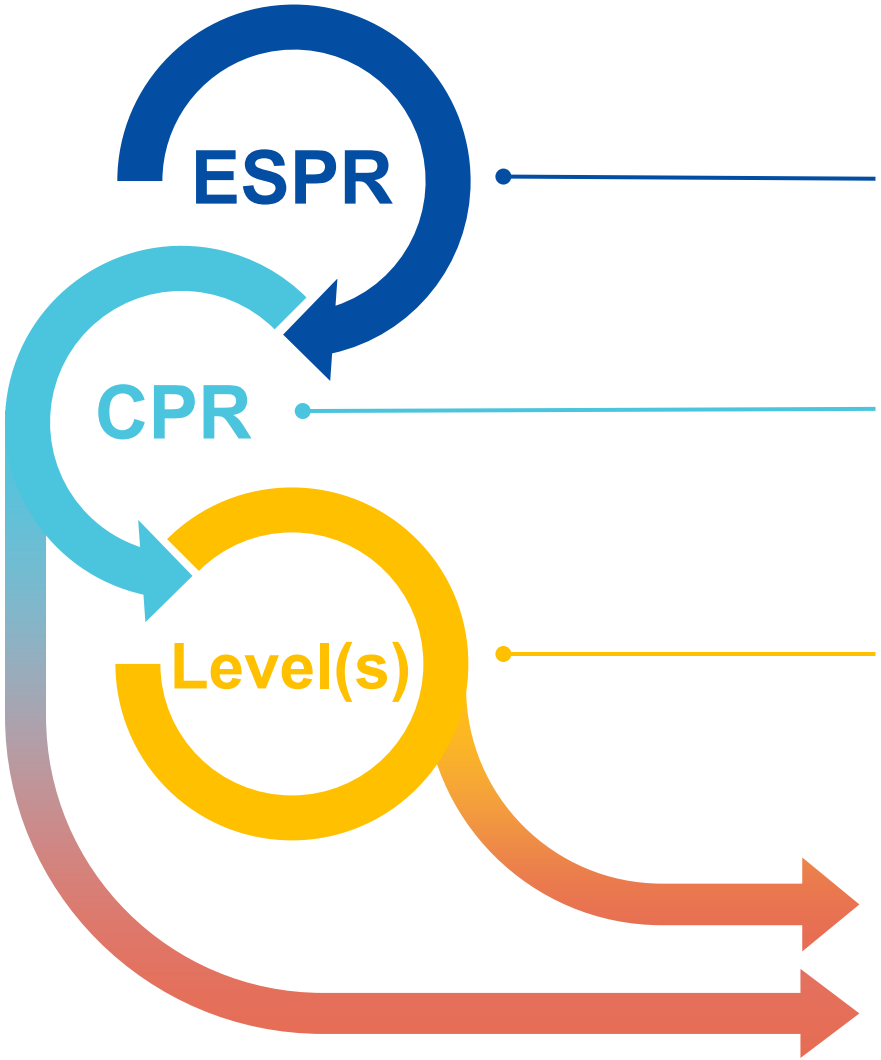
Construction Products Regulation
Delivery of environmental information from construction products

Level(s) methodology
Sustainability assessment of buildings

EU Taxonomy
Sustainable economic activities
Energy Performance of Buildings Directive
Sustainable buildings
Energy Efficiency Directive
Public procurement of buildings

European Commission

Construction products: National Regulatory framework



Sustainable Products Initiative
Substantiating green claims from products placed on the European market

Construction Products Regulation
Delivery of environmental information from construction products

Levels methodology
Sustainability assessment of buildings

National approach
Environmental building assessment
Product public procurement

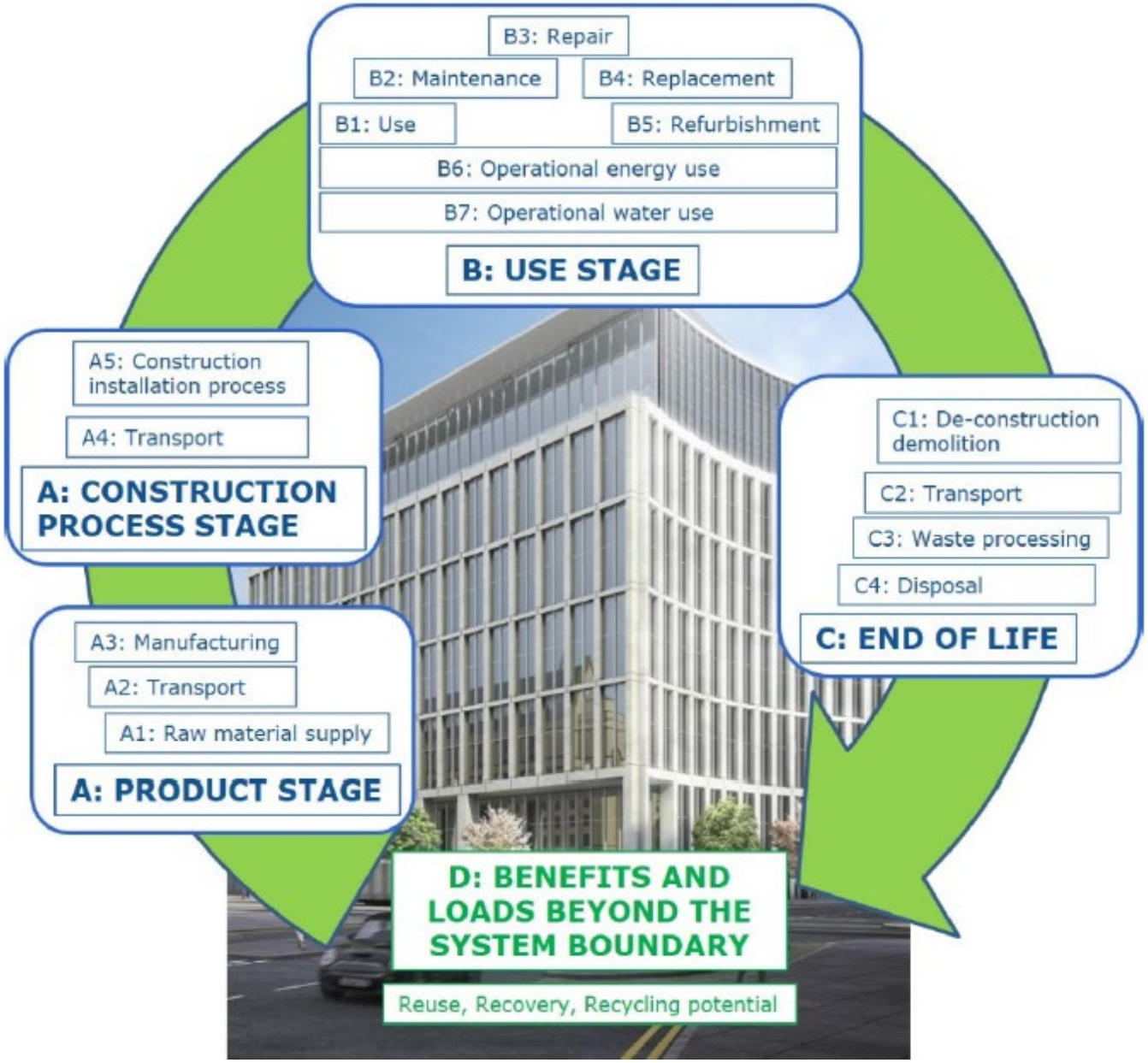
European Commission

CPR acquis preparatory work

Implemented by harmonised standards to be cited in the Official Journal
Level playing field for construction products (no barriers to trade)
Regulatory consistency to guarantee healthy internal market

2021	1	Precast concrete products
2021	2	Structural metallic products
2022	3	Reinforcing prestressing steel
2022	4	Doors, windows and shutters
2023	5	Cement
2023	6	Thermal insulating products
…	7	Structural timber products
	8	Concrete, mortar and grout
	9	Masonry
	10	Aggregates
	11	Fixed firefighting equipment
	12	Road construction products
	13	Floorings
	14	ETICs
	15	Curtain walling
	16	Wood based panels
	17	Structural bearings
	18	Kits and assemblies
	19	Wall and ceiling finishes
	20	Space heating appliances
	21	Roof coverings
	22	Circulation fixtures
	23	Waste water disposal
	24	Adhesives
	25	Gypsum
	26	Anchors and fasteners
	27	Membranes
	28	Glass
	29	Geotextiles
	30	Sanitary appliances
	31	Pipes and tanks
	32	Cables
	33	Chimneys
	34	Sealants

European Commission



The stages in a building life cycle, based on EN 15978.
Source: JRC 2021 Level(s)

Whole life cycle GHG emissions of buildings

- Declaration of buildings' life cycle GHG emissions (EPBD – political agreement 7.12.2023)
- 2050 Roadmap to reduce whole life cycle emissions of buildings (expected 2024)
- Taxonomy criteria for buildings
- Separately, the Commission is developing a certification scheme for carbon removals

European Commission

Preparatory Action: Analysis of GHG emissions and removals of EU buildings and construction (2023-2025)

Objective: provide a comprehensive overview of the effect on whole life cycle GHG emissions and carbon removals of the EU buildings sector and the associated construction, renovation and demolition activity.

Website https://c.ramboll.com/life-cycle-emissions-of-eu-building-and-construction

European Commission

EU Taxonomy for sustainable activities: Objectives

Make a substantial contribution

to at least one of the 6 environmental objectives

+

Do no significant harm

to any of the other 5 environmental objectives

+

Meet minimum safeguards

comply with international minimum safeguards

European Commission

By the end of the year, the Taxonomy will include 13 activities relevant to construction

Substantial contribution	Climate Mitigation	Climate adaptation	Circular Economy
Construction of new buildings	✓	✓	✓
Renovation of existing buildings	✓	✓	✓
Installation, maintenance and repair of energy efficiency equipment	✓	✓	
Installation, maintenance and repair of charging stations for electric vehicles in buildings (and parking spaces attached to buildings)	✓	✓	
Installation, maintenance and repair of instruments and devices for measuring, regulation and controlling energy performance of buildings	✓	✓	
Installation, maintenance and repair of renewable energy technologies	✓	✓	
Acquisition and ownership of buildings	✓	✓	
Demolition and wrecking of buildings and other structures			✓
Maintenance of roads and motorways			✓
Use of concrete in civil engineering			✓
Preparation for re-use of end-of-life products and product components			✓
Product-as-a-service and other circular use and result-oriented service models			✓
Marketplace for the trade of second-hand goods for reuse			✓

Avoiding emissions from insulation foams

New F-Gas regulation:

- From 2025, during demolition works, joint obligation on building owners and contractors to avoid emissions from foams containing **Ozone Depleting Substances and F-Gases** in laminated foam boards and foam panels. The gases must be destroyed.
- Cumulative savings of more than **180 million tonnes CO_2 eq** possible from this measure by 2050 in EU
- Globally, about **10 billion tonnes CO2 eq** are contained in such foams: almost 3 times EU's total annual GHG emissions.

Study: Background data collection for future EU end-of-waste criteria of construction and demolition waste

- Waste Framework Directive, Art.6 (End-of-Waste)
- Commission is required to assess need for EU-wide end-of-waste criteria.
- Study (2023-2024) aims to produce priority ranked list of waste streams for possible development of EU-wide end-of-waste criteria.

Study website: https://eu-cdw-eow-prioritylist-tauw-group.hub.arcgis.com/
Study ends Q1 2024

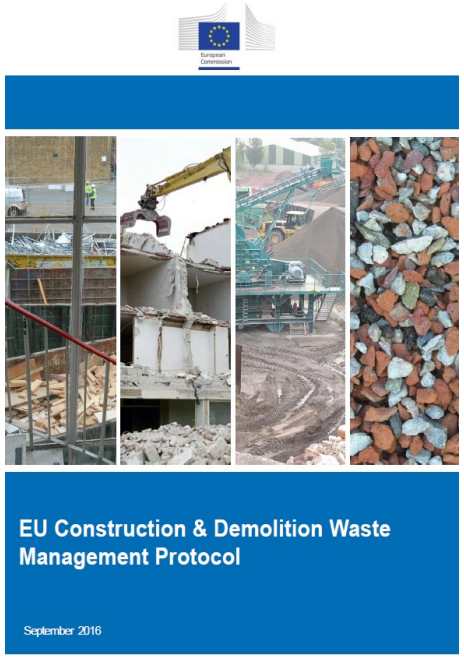
European Commission

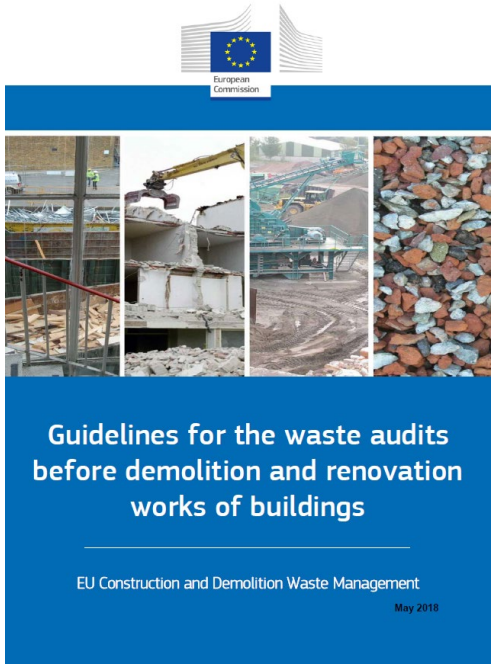
EU Construction & Demolition Waste Management Protocol

EU CDW Management Protocol (2016)
Guidelines for waste audits (2018)
Voluntary guidance documents (link), now being revised and updated

Revision now underway. It will aim to reflect recent policies (e.g. CEAP, Taxonomy, CPR), technical developments

Publication expected 2024





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Study ‘Measuring the application of circular approaches’

Study aimed to identify to what extent companies in the construction ecosystem are applying circular approaches in practice

- A majority of companies (70%) are applying circular approaches.
- Only a minority (38%) are measuring this.
- Recommended 19 indicators to measure circularity in construction
- Drivers and barriers to measurement identified.

Final study report: https://europa.eu/!fJdBhh
Annexes: https://europa.eu/!qHKTfc

European Commission

Study 'Measuring the application of circular approaches'

- Residual value per unit product/material at end of life *(euros per functional unit)* (P)
- Part of an Extended Producer Responsibility system *(yes/no)* (P)

- Reused/recycled content *(% by mass)* (B)
- Average age at demolition *(Years)* (U)

- At concept stage: comparison of asset life cycle assessment *(kgCO2 eq/ m2/yr)* (B)
- Realistic end of life scenarios developed *(yes/no)* (P)

- Designed for disassembly/deconstruction *(% reuse potential by mass)* (B)
- Average reused and recycled content in new buildings/infrastructure (circular inputs) *(% by mass)* (O)

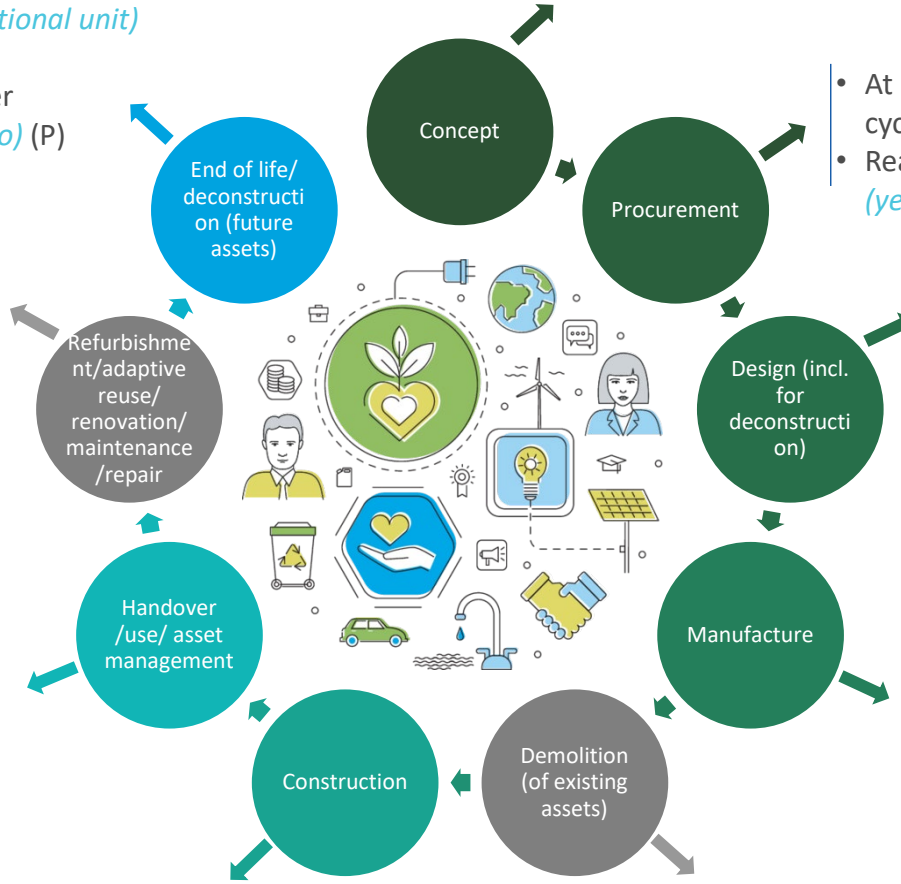
- Remanufactured/reused content *(% by mass)* (P)
- Reused, recycled and secondary content input (manufacturer level) *(% by mass)* (O)

- Hazardous waste generated at demolition *(% by mass)* (B)
- Average age at demolition *(years)* (U)

- Wastage rate at installation *(% by mass)* (P)
- Construction waste generated on and off site *(tonnes/100K Euros (project value)* (B)

- Effective utilisation of building (e.g. levels of occupancy) or asset; intensiveness of use *(hours of utilisation/m²)* (B)
- Predicted service life of buildings/infrastructure portfolio *(average number of years)* (O)

- Construction related waste generated through refurbishment cycles *(tonnes/100K Euros (project value))* (B)
- Refurbishment/transformation rate of buildings/infrastructure portfolio *(% of buildings/infrastructure refurbished/year)* (O)



Indicator level of application:

P: Product level
B: Building/asset level
O: Organisational level
U: Urban level

The two stages in grey are not necessarily a part of the ecosystem – as they might occur or not.

European Commission

Digital transition of construction

‘Support of the digitalisation of the built environment, public procurement and SMEs in construction’

- Preparing the ground for a construction **data space**
- Supporting the digitalisation of **building permit** systems
- Supporting adoption of Building Information Modeling (**BIM**)

Technical study for the development and implementation of **Digital Building Logbooks** in the EU

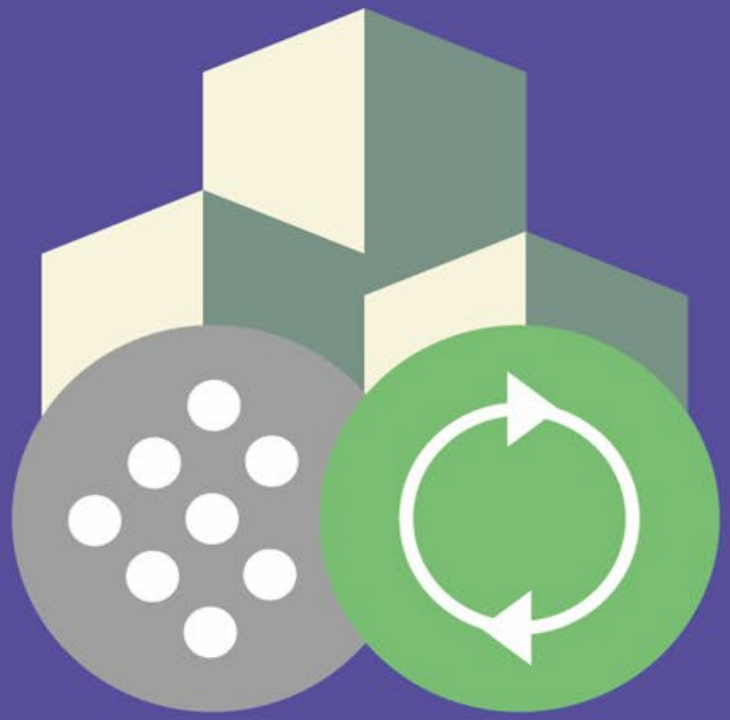
+ several ongoing Horizon Europe projects on digital permits and logbooks

European Commission

Thank You! Merci! Gracias! Diolch!

https://single-market-economy.ec.europa.eu/sectors/construction_en

EU Construction Ecosystem



Circular technologies in construction

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Metrics for European integration

Arturo de la Fuente, European Commission (Eurostat)

Overview

2 Parts:

- 1) EU Circular economy monitoring framework & waste statistics
- 2) What statisticians need to measure circular economy

EU monitoring framework Circular Economy

- The EU monitoring framework is part of the Circular economy action plan (2020)
- In 2023, the Commission revised the circular economy monitoring framework, previously adopted in 2018.
- Dashboard of 11 indicators organised in 5 dimensions
- Balanced scope environment & economy
- Indicators using already available data

Production and consumption

	Value	Data	Trend	Metadata
Material consumption				
Material footprint tonnes per capita	14 (2020)			
Resource productivity index 2000 = 100	135.5 (2021)			
Green public procurement				
Waste generation				
Total waste generation per capita kg per capita	4 813 (2020)			
Generation of waste excluding major mineral wastes per GDP unit kg per thousand euro, chain linked volumes (2010)	65 (2020)			
Generation of municipal waste per capita kg per capita	530 (2021)			
Food waste kg per capita	131 (2020)			
Generation of packaging waste per capita kg per capita	177.9 (2020)			
Generation of plastic packaging waste per capita kg per capita	34.6 (2020)			

Waste Management

	Value	Data	Trend	Metadata
Overall recycling rates				
Recycling rate of municipal waste percentage	49.6 (2021)			
Recycling rate of all waste excluding major mineral waste percentage	58.0 (2020)			
Recycling rates for specific waste streams				
Recycling rate of overall packaging percentage	64.0 (2020)			
Recycling rate of plastic packaging percentage	37.6 (2020)			
Recycling rate of WEEE separately collected percentage	83.4 (2020)			

Secondary raw materials

	Value	Data	Trend	Metadata
Contribution of recycled materials to raw materials demand				
Circular material use rate percentage	11.7 (2021)			
End-of-live recycling input rates (EOL-RIR), aluminium percentage	32.0 (2022)			
Trade in recyclable raw materials				
Imports from non-EU countries thousand tonnes	41 388.1 (2021)			
Exports to non-EU countries thousand tonnes	37 616.2 (2021)			
Intra EU trade thousand tonnes	91 655.6 (2021)			

Competitiveness and innovation

	Value	Data	Trend	Metadata
Private investment, jobs and gross value added related to circular economy sectors				
Private Investments percentage of gross domestic product (GDP) at current prices	0.8 (2021)			
Persons employed percentage of total employment	2.1 (2021)			
Gross value added percentage of gross domestic product (GDP) at current prices	2.1 (2021)			
Innovation				
Patents related to waste management and recycling number	295.3 (2019)			

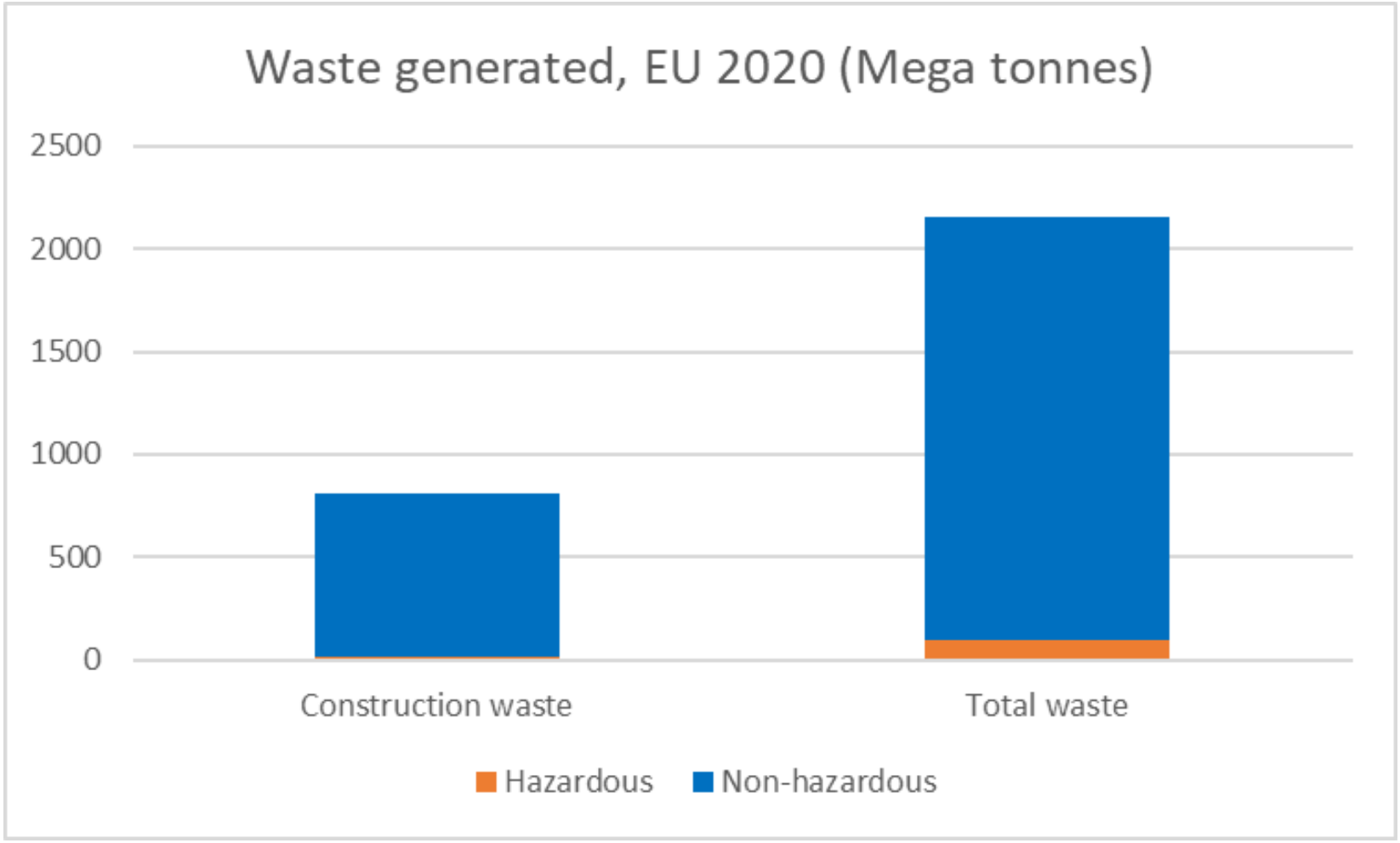
Global sustainability and resilience

	Value	Data	Trend	Metadata
Global sustainability from circular economy				
Consumption footprint Index 2010=100	**104** (2021)			
GHG emissions from production activities kg per capita	**6 412** (2021)			
Resilience from circular economy				
Material import dependency percentage	**22.9** (2021)			
EU self-sufficiency for raw materials, aluminium percentage	**11.0** (2022)			

EU framework: some features

- In general, we seek to capture all economy/society
  - There are no specific indicators for the construction
- Some indicators for specific materials or critical raw materials
  - Construction major generator of (mineral) waste. Treated separately
- Specific indicators for construction sector would be complementary
  - Narrower scope, more detail on specifics

Other waste statistics about construction sector



How statisticians get their data? (1/2)

- From statistical surveys to businesses
  - Better if variables can be extracted from accounting books
  - Variables requiring engineer knowledge are difficult to collect
  - Simpler to measure materials than technologies
  - **ISO-like standards help a lot**
- From administrative sources e.g. waste collected, patents
  - Definitions based on legislation (‘waste’, ‘batteries’, ‘hazardous’)
  - More about ‘recycling’ than ‘recovery’, ‘remanufacture’, ‘refurbish’, etc.
  - Those we can only measure indirectly, e.g. via repair sector

How statisticians get their data? (2/2)

- Tracking flows of materials or energy from different sources ('accounting')
  - Fine to measure 'reduce' or 'recycle'. Also 'reuse'. E.g. 'industrial symbiosis': waste for one sector is a resource for another one
  - Require very detailed information about businesses outputs and **inputs**
- Modelling e.g. material or carbon footprints
  - Conventional input-output tables are not detailed enough: 'environmentally extended multi-region input-output tables'
  - Require knowledge or assumptions about the value chains upstream. **digital product passports** would help a lot
  - Statisticians, researchers & technologists must work together

Other challenges for metrics

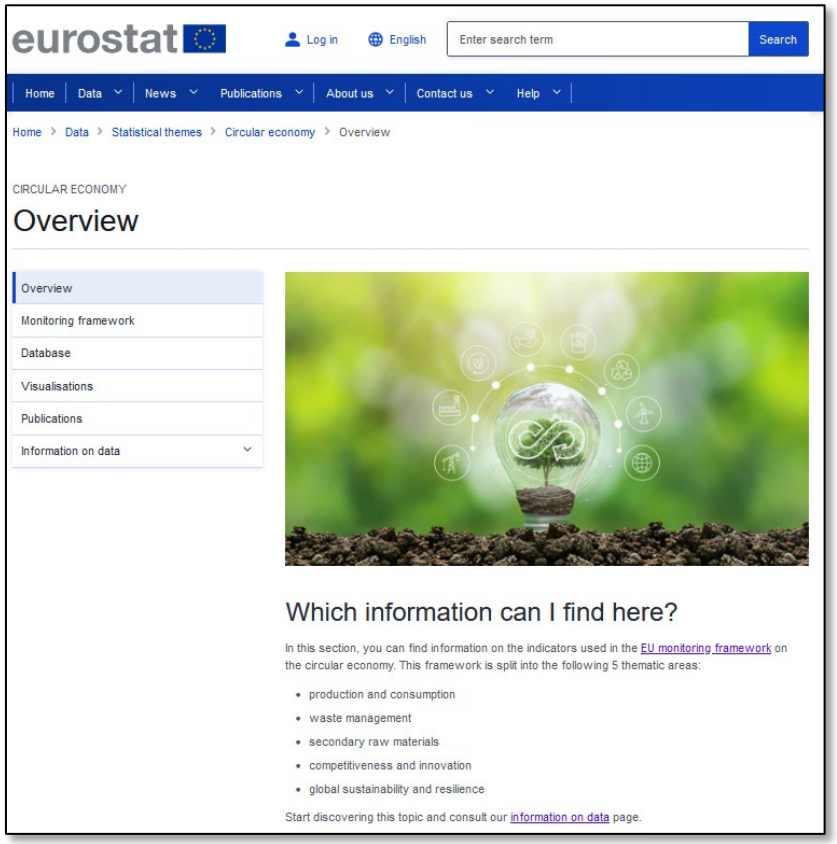
- Measuring material or energy efficiency for individual products
  - Efficiency relative to what? The benchmark for efficiency is a moving target
- Measuring circular design, circular technologies
  - How to disentangle the part of the businesses innovation to improve efficiency vs safety or other features for customers?
- Statistical classifications measure products (outputs) not how they are made or the purpose to make them
  - E.g. a window

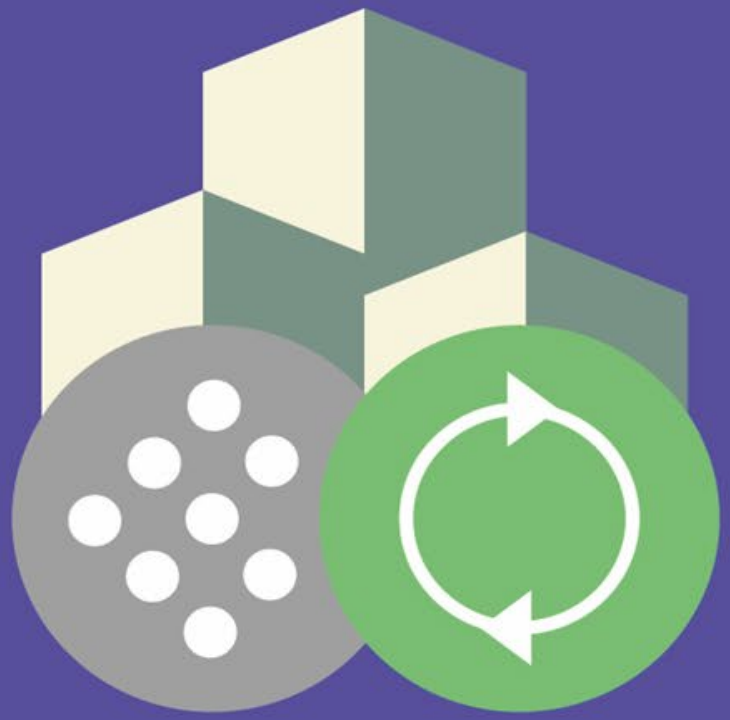
Conclusions about standards for metrics

- Very important for statisticians is how and who will report the information in the businesses:
  - Accounting clerks? Engineers? Centralised information or not?
  - The information they have determines what statisticians can ask
- Some aspects of circular economy are inherently harder to measure:
  - ‘remanufacture’, ‘refurbish’ is harder than ‘recycling’ or ‘recover’
  - [Hardest] design>>technologies>>products>>materials [simplest]
- Digital product passports and standards (e.g ISO) can help a lot
- Statisticians, researchers & technologists must work together

To know more:

- Eurostat website: circular economy
- Eurostat website: waste
- Eurostat website: environment
- Eurostat online database
- Eurostat methodology





Circular technologies in construction

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Thank you!

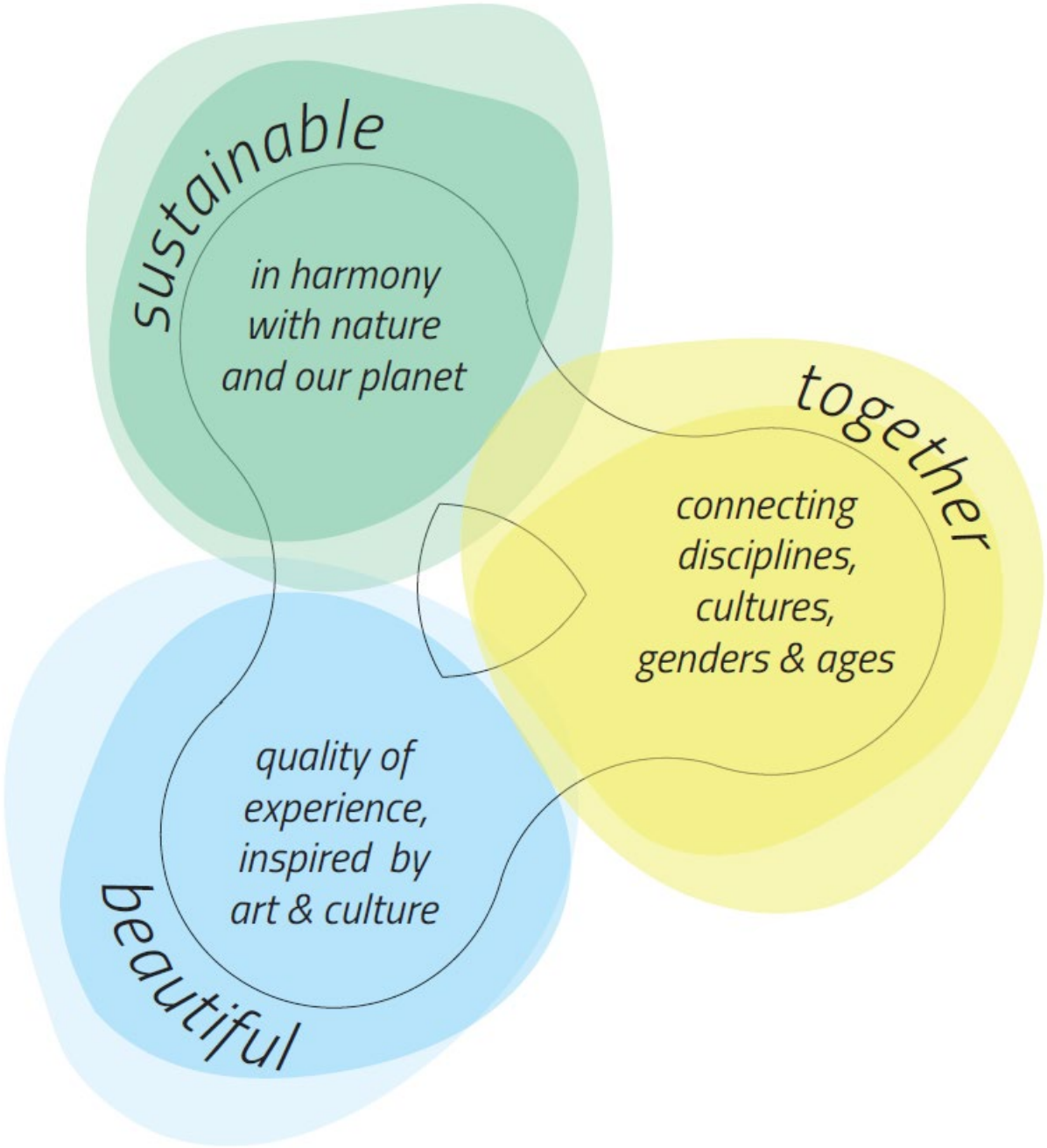
NEW EUROPEAN BAUHAUS

Malgorzata Wrobel

Policy Analyst JRC.B4 - New European Bauhaus

Directorate-General Joint Research Centre,
European Commission

Circular Technologies for construction industry
Putting science into standards' workshop
12-13 December 2023



https://europa.eu/new-european-bauhaus/about/about-initiative_en

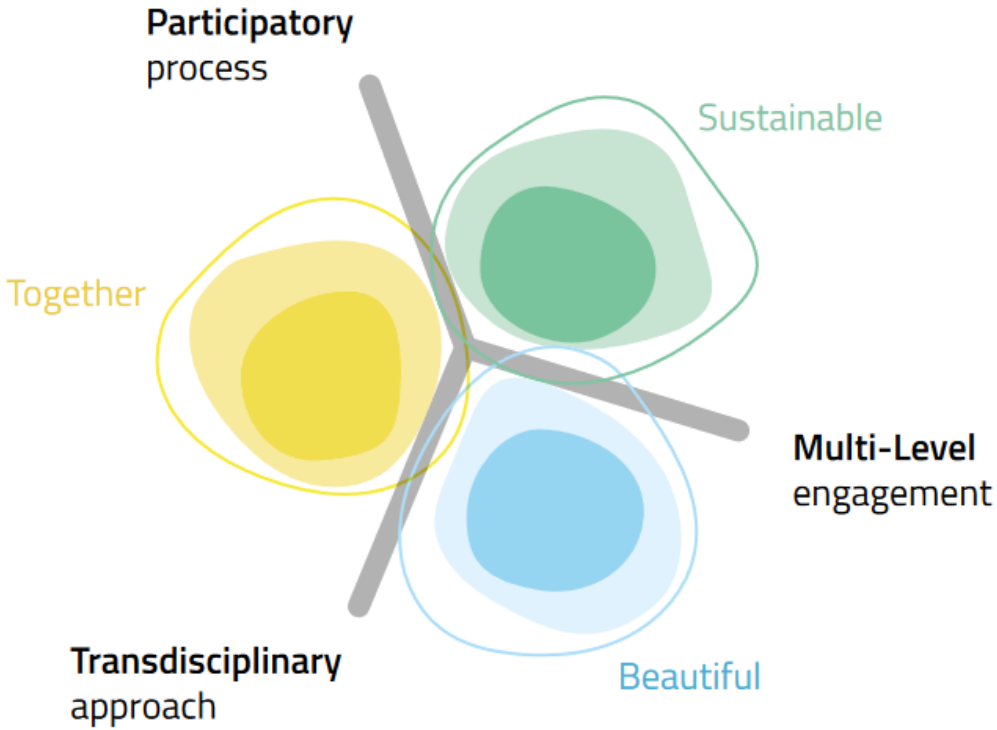
What is the New European Bauhaus?

The **New European Bauhaus** (NEB) is an environmental, economic, and cultural initiative launched by the European Commission in 2020 and **co-created** with stakeholders across sectors.

NEB promotes an **integrated approach** to the Green Transition of our economy and societies, building on:

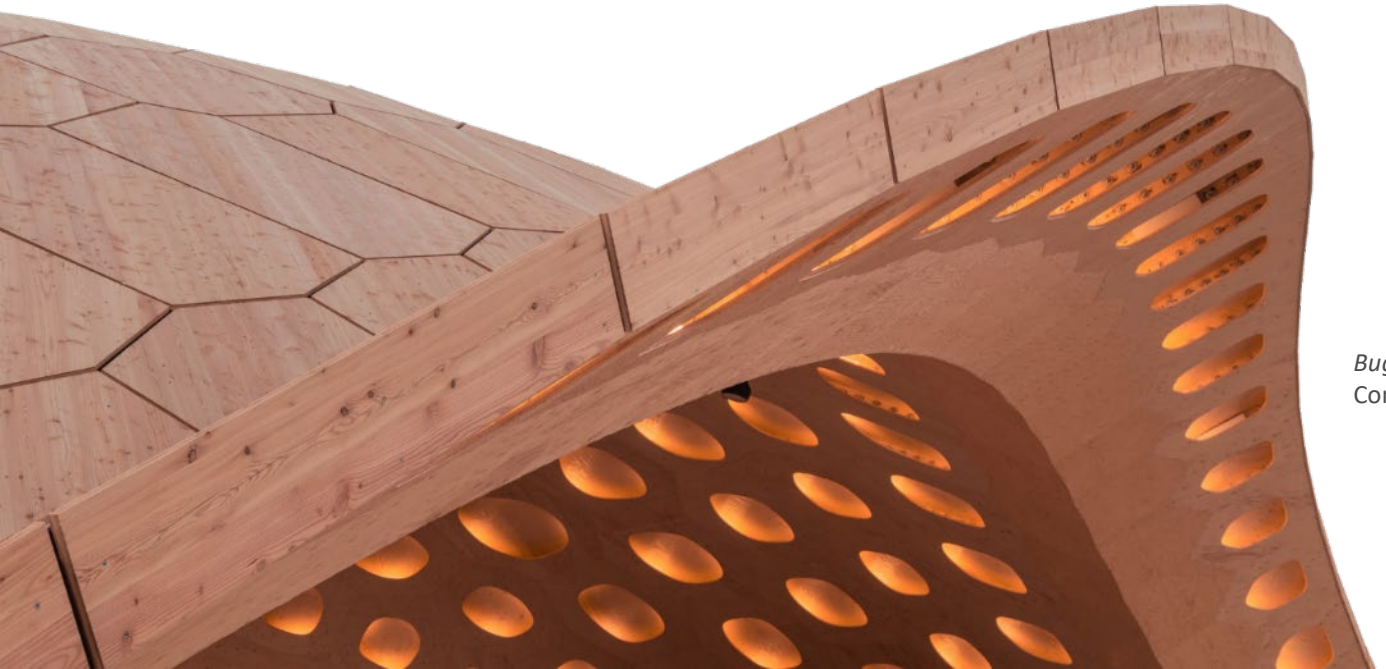
3 Values

3 Working Principles



Why do we need the New European Bauhaus?

1. To **bring the green transition closer to people**, making it a cultural transition;
2. To **shape a collective change in thinking and behaviour** and open a debate about how we want to live in respect of nature and the planet;
3. To **make everyone part of the change** – making change beautiful, useful, meaningful, and attractive;
4. To **stimulate hope, creativity and innovation** to address the climate crisis;
5. To offer an example of how to **enhance citizens' involvement and ownership** in political decisions and policies that are made and implemented;



Buga Pavillion,
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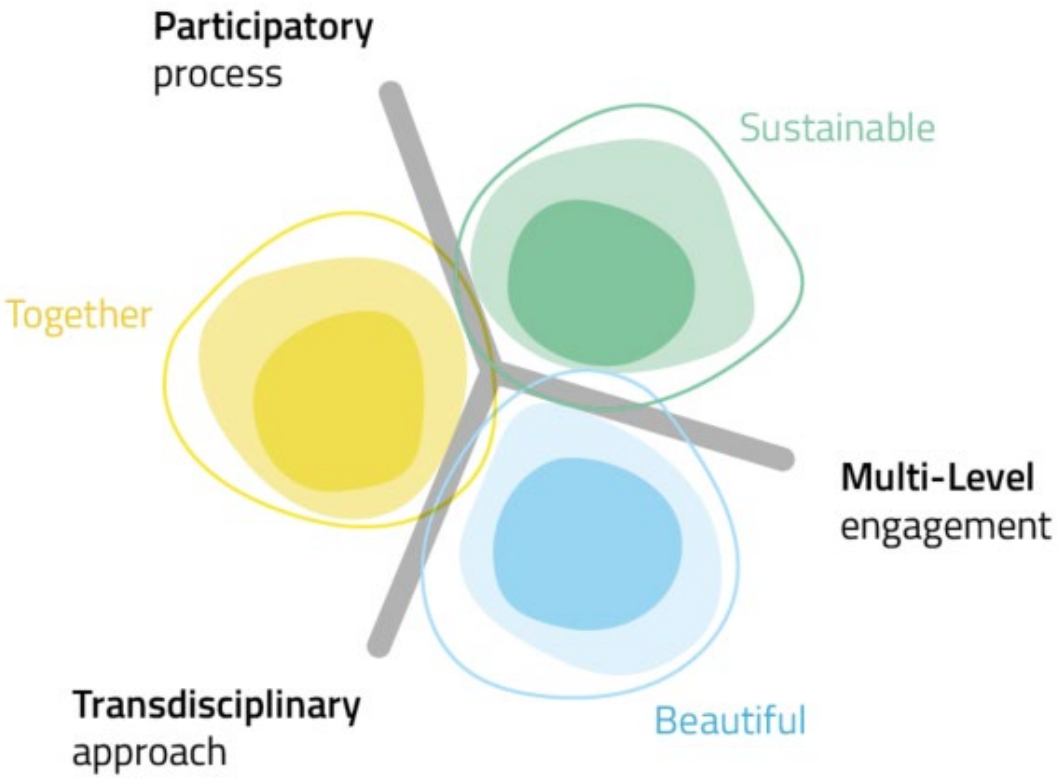
How do we deliver the NEB?

1. By co-creating with and expanding an active **NEB Community** and by recognising and **supporting bottom-up initiatives**
2. By financing **testing and demonstration** and by **integrating NEB objectives in EU programmes**
3. By increasing **awareness and mobilisation**
4. By developing **standards and guidelines** to support NEB projects

RUrban-Bagneux
Prizes 2022 ceremony
A school for each and everyone
New European Bauhaus Festival 2022

NEB Lab: Labelling Strategy
New European Bauhaus **Compass**



A guiding framework for decision-makers and project managers who wish to apply NEB values and principles to their activities

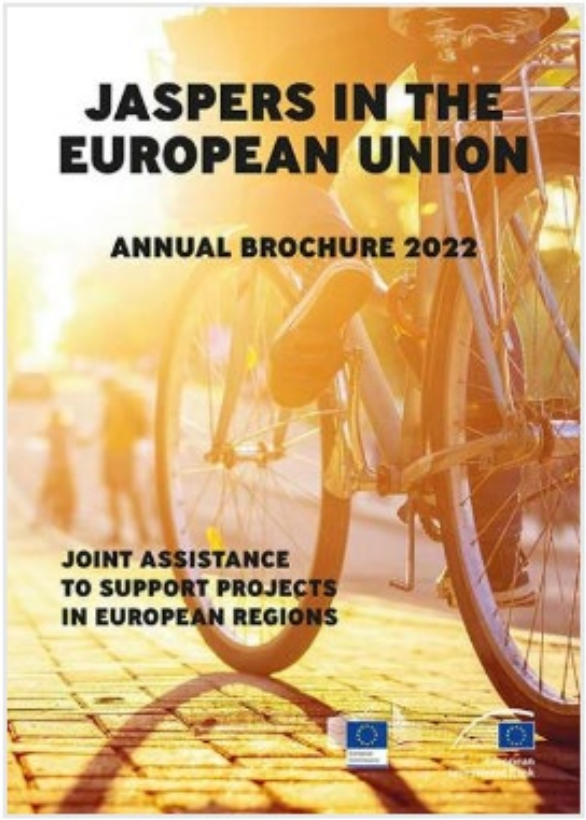
NEB Checklist for small projets & **Investment guidelines** for project promoters

- **Checklist for small projects** – *December 2023*

spelling out the necessary elements to assess a small project through the NEB values

- **The Guidelines for investors** – *April 2024*

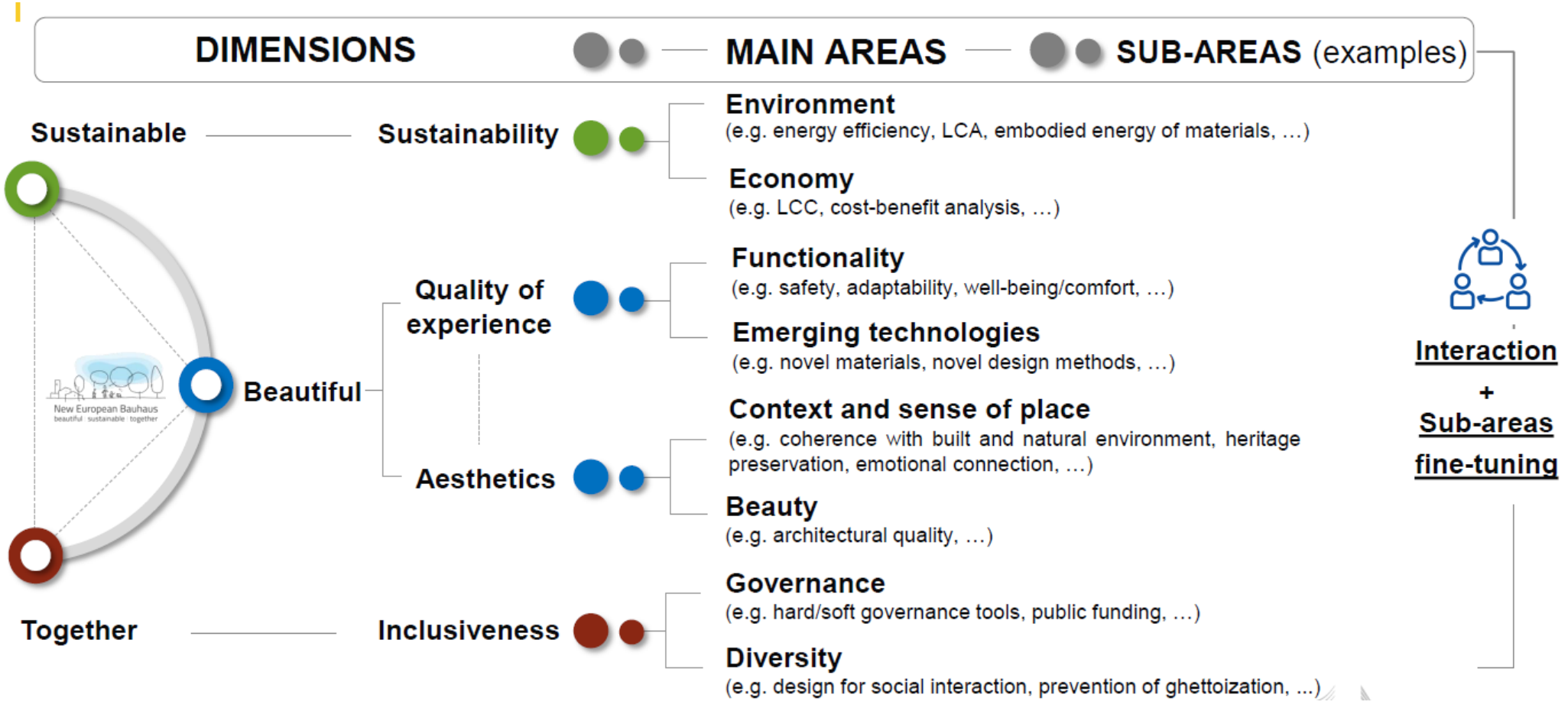
this tool would complement existing and on-going NEB guidelines and toolkits aimed at providing practical and operational support to project promoters considering the incorporation of NEB principles into their project design and implementation



https://jaspers.eib.org/

NEB Lab: Labelling Strategy

New European Bauhaus **Self-assessment tool**

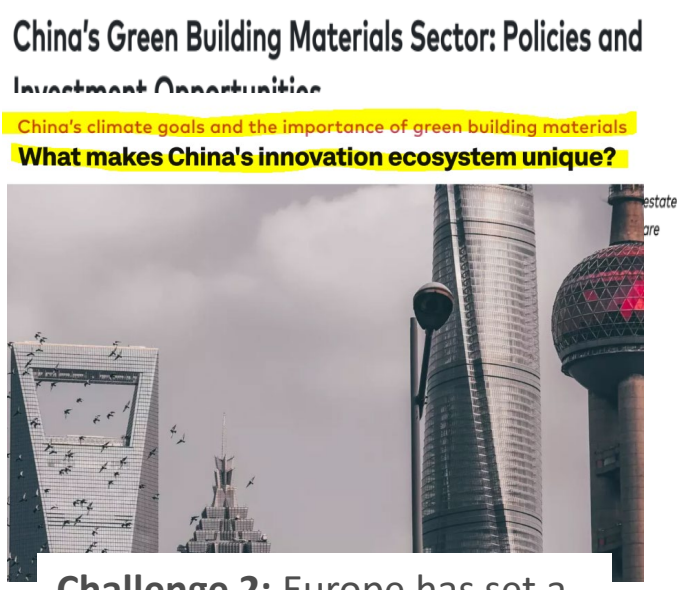


Tomorrow: how to strengthen the movement?

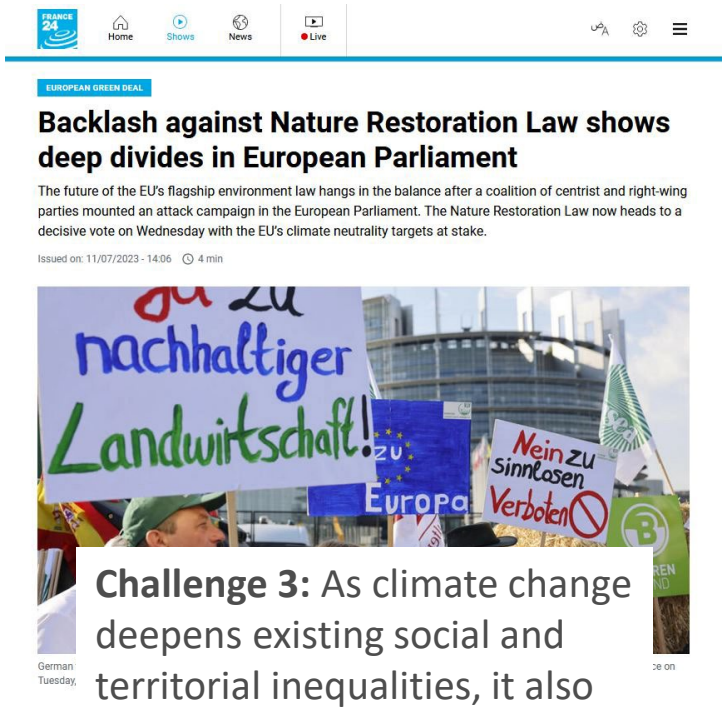
Europe is facing **important challenges**

Revitalise European neighbourhoods with design for sustainability and inclusion

Challenge 1: Climate change is accelerating, and the pace of transformation remains too slow.



Challenge 2: Europe has set a major ambition to be a world leader in green transformation, but can the industry follow?



Challenge 3: As climate change deepens existing social and territorial inequalities, it also risks eroding trust in democratic institutions.

How can *you* join the movement?

- **Call for Partners** open to non for-profit organisations, NGOs, Universities
- **Call for Friends** open to for-profit organisations, as well as public authorities (regions, villages & cities)
- Can **join the NEB Lab** and contribute to projects
- Opportunities for **networking** and engaging in discussions and **peer learning activities**
- Follow the **New European Bauhaus Festival 17-21 April 2024**

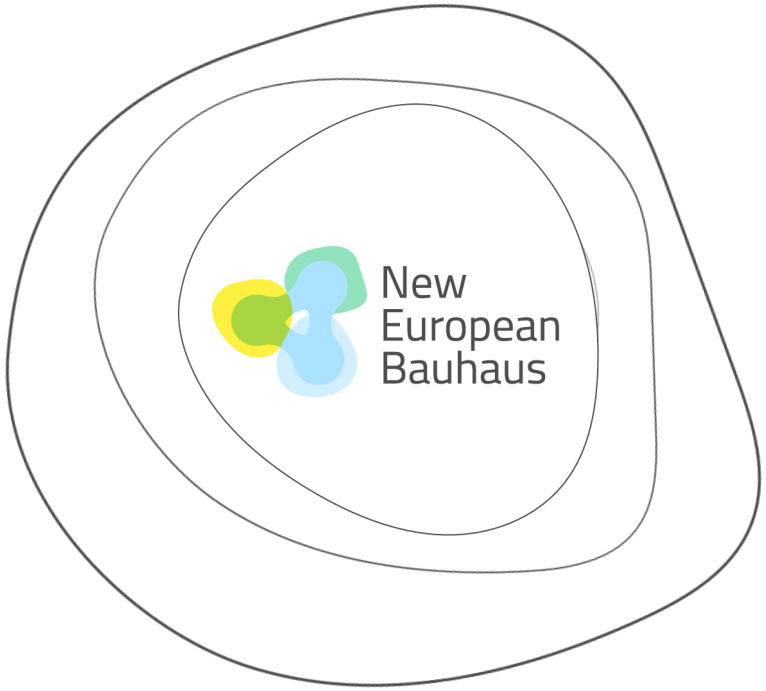
Become a friend of the New European Bauhaus

Become a partner of the New European Bauhaus

NEB Festival 2024 - Apply for Satellite events


“ If the European Green Deal has a soul, then it is the New European Bauhaus which has led to an explosion of creativity across our Union.”
Ursula Von der Leyen,
President of the European Commission
Thank you !

#NewEuropeanBauhaus



- **Web:** https://europa.eu/new-european-bauhaus
- **Instagram:** @neweuropeanbauhaus
- **Newsletter**: https://europa.eu/new-european-bauhaus/stay-touch/e-zine_en

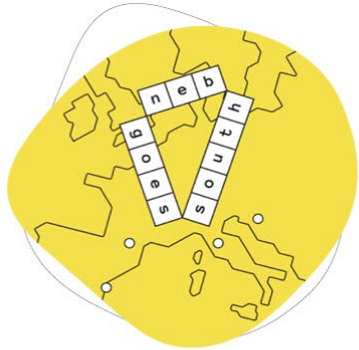

Thank you!

How do we deliver the NEB?

INNOVATIVE FUNDING

TRANSFORMATION
OF PLACES OF LEARNING

REGULATORY ANALYSIS
AND EXPERIMENTATION



NEB GOES SOUTH

NEW EUROPEAN BAUHAUS
OF THE MOUNTAINS

NEB Lab

LABELLING STRATEGY

ACTIONS FOR UKRAINE

NEB STEWARDSHIP LAB

NORDIC CARBON NEUTRAL BAUHAUS

NEW EUROPEAN BAUHAUS
ON THE DANUBE

How do we deliver the NEB?

700 Partners

158 Friends

120 Prizes winners & finalists

150 Onboarded projects

624 000 Website views

28 000 Newsletter subscribers

31K Instagram followers

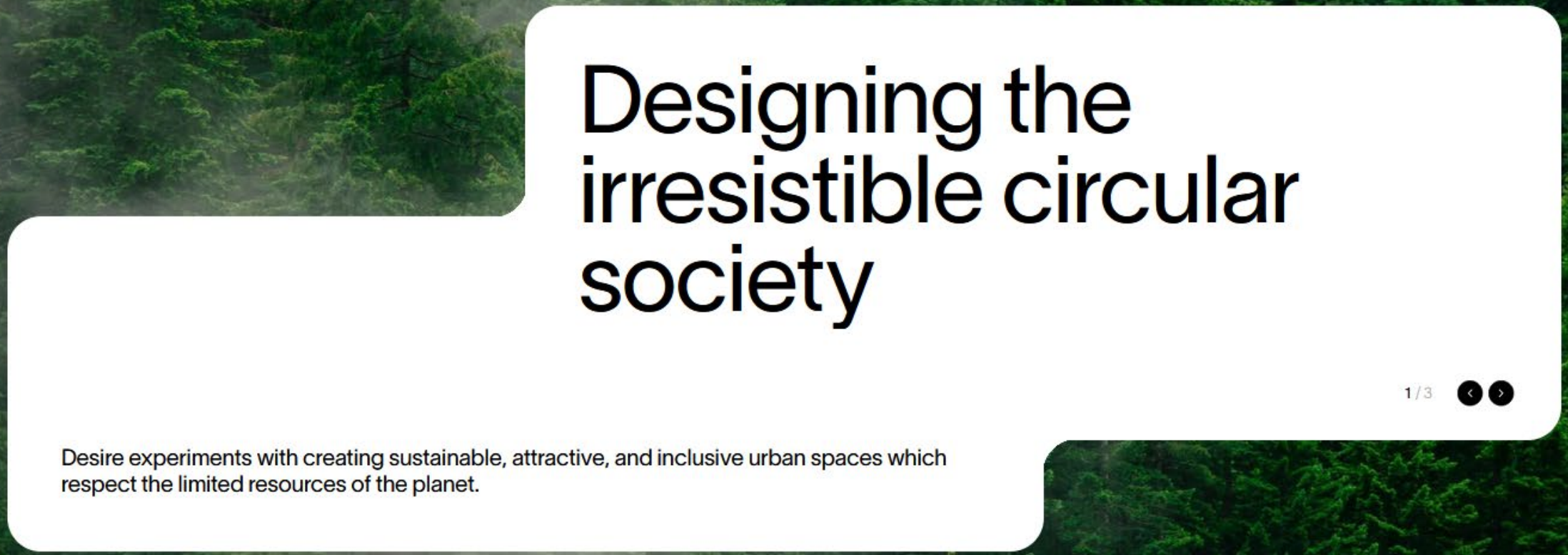
9K LinkedIn followers

desire an irresistible circular society

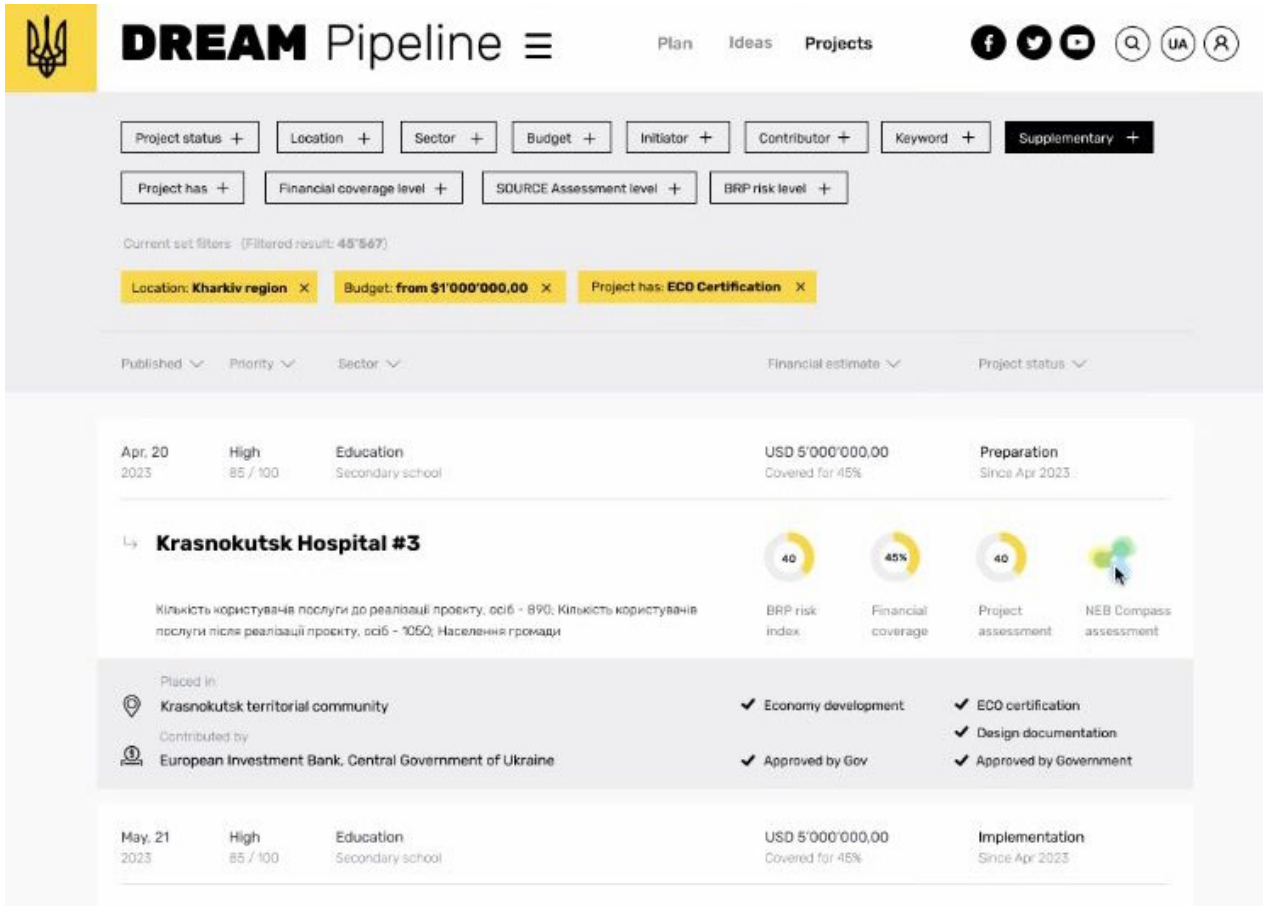
NEB Lighthouse demonstrators

DESIRE: 8 transformation sites in 8 neighbourhoods, including 3 in Denmark and one in Latvia.
The goal is to rethink social housing and public spaces with circular, affordable, and context-sensitive approaches.

In Riga: How to apply circularity principles to adapt a 40-year old Soviet building to modern living standards? Transformation of a five-story building (empty since 2018) **to house families with physical and mental disabilities** + multiple social services and community centres for the neighbourhood.



A project of hope: NEB Actions for Ukraine



The New European Bauhaus Festival 2022
@ European Union 2022

New European Bauhaus

NEB Lighthouse Demonstrators

NEB-STAR: connecting climate-friendly cities by working together with people and organisations in Stavanger, Prague and Utrecht.

CultuurCampus: makeing Rotterdam South a better place to live and learn by combining culture, education, research and policy.

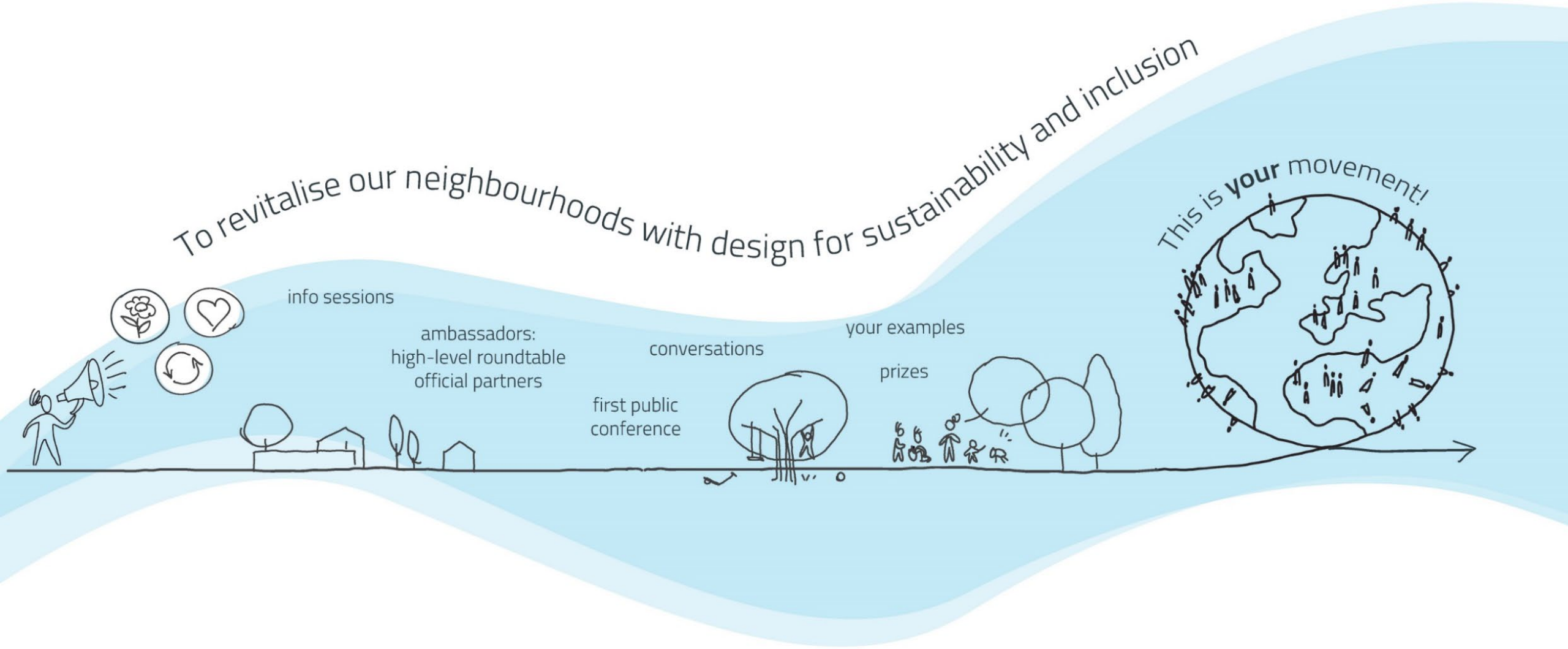
EHHUR: supporting cities and people by changing their surroundings with their eyes, hearts and hands in seven countries: Denmark, Greece, Belgium, Portugal, Turkey, Croatia and Italy.

DESIRE : creating sustainable, attractive, and inclusive urban spaces which respect the limited resources of the planet in interaction with citizens, artists, urban planners, contractors, builders…

NEBourhoods: prepares Munich-Neuperlach (DE) for the future as mapped out by the European Green Deal when it comes to the built environment, circularity, mobility, energy, food, and health.

CrAFt : will support all 5 selected projects, as well as future NEB lighthouse project. Test collaborative local models for NEB transformations in 3 ‘sandbox cities' and guide the 100 cities selected under the ‘Climate-Neutral and Smart Cities' Mission.

Tomorrow: how to strengthen the movement?



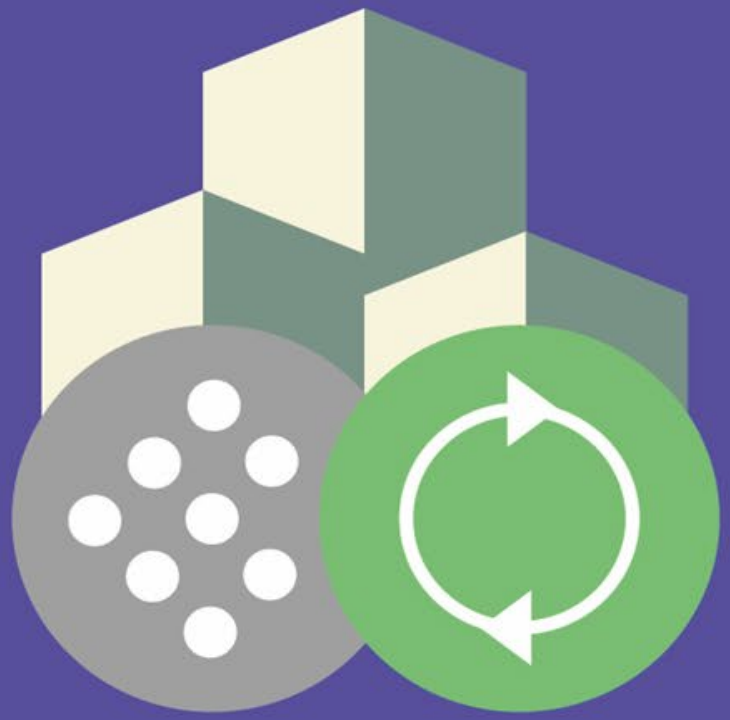
Tomorrow: how to strengthen the movement?

Exploratory work on a **NEB Mission**

Tomorrow: how to strengthen the movement?

NEB Festival 2024: a key moment

- To **gather** the NEB Community
- To **demonstrate** that a more sustainable, beautiful, and inclusive future is at reach
- To **showcase** regenerative and circular approaches to construction and design
- To **raise awareness and reflect** on challenges and existing solutions
- To **exchange collectively** on ways to strengthen the impact of the New European Bauhaus



Circular technologies in construction

Putting Science Into Standards

CEN CENELEC

European Commission

Gap Analysis, conclusions and recommendations

Gilli Hobbs, CEN TC350 SC1 Working Group 2

Objective of Working Group 2

'Establish a formal WG2 with a knowledge focus to prepare for standardization work ahead. The deliverable of WG2 to be Technical Reports (TRs) on key topics to provide a basis for SC1 decision making and prioritization of standardization items in the committee' September 2021

9 focus areas and task groups: brief description; existing standards, policies and initiatives; and preliminary gaps:

1. Framework and definitions (*already underway with Working Group 1*)
2. Circularity indicators, measurement and assessment
3. Circular data, data storage and maintenance and product/building passports
4. Planning + Design & regulations for circularity (product/building/Civil Engineering Works)
5. Circular procurement
6. Construction site and resources & regulations in context of circular economy
7. Operation & maintenance/refurbishment & regulations in the context of circular economy
8. Built environment End-of-life and maximizing resource retention (building, product, material)
9. Circular business models and enablers

Consultation process

- Documents circulated to the NSBs (National Standards Bodies). November 2022 - February 2023
- Feedback was sought in a number of ways using an excel based template (N113), these included:
  - *A1 > Prioritisation of preliminary gaps (40 identified across 9 focus)*
  - *A2 > Additional gaps identified*
  - *B > Additional information and comments relating to the 9 focus areas (especially other guidance, policies and standards).*
- 12 responses: NSBs - Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Norway, Spain, UK, plus Metals for Buildings
- Support for all the preliminary gaps identified, lots of additional context and specific priorities added, alongside additional gaps (~30) and comments on scope and linkages to other activities (such as technical committees for product groups)
- Consultation report produced, reviewed (NSBs/ SC1/ WG1/WG2) and updated April – July 2023
- Final consideration of recommendations at SC1 plenary meeting September 2023

Top 5 ranked 'Gaps'

	Description (summarised)
1	Framework to enable re-certification of materials and components to enable safe reuse by market operators sufficient to ensure acceptance by market surveillance authorities. Framework should cover both for direct reuse without processing and for reuse following recycling/remanufacture/refurbishment processes.
2	*Linked to Framework and Definitions* - Sector specific approaches (as detailed in the "New Circular Economy Action Plan") and General strategic circular economy approaches into the standardization work.
3	Clear definition of recycling, different types of recycling, e.g. % recycled content, impacts incurred in the recycling process
4	Differentiate between 1) Environment to be built 2) Environment already built - and define the interface
5	Guidance/ testing requirements for reusing various products/ materials in new developments, including performance assessment of Steel, Concrete, Timber, Bricks, Composite products; recertification; design rules design for quality assurance, liability and acceptance criteria; Qualification of Building Inspector or checking Engineer for Circularity; technical performance

Recommendations of final report

Proposed new working groups, examples of scope, preliminary work items and key links:

1. Data, measurement, assessment, indices, and indicators linked to circular economy – products and asset(infrastructure)/building level
2. Reused: Quality assurance, testing, requalification, traceability of reused products and materials (including pre-development & pre-demolition audits)
3. Recycled: Quality assurance, testing and certification of products containing recycled content (including end of waste criteria)
4. Design for circularity (including reused/recycled content, adaptability, disassembly)

Detailed example

Reused: Quality assurance, testing, requalification, traceability of reused products and materials (including pre-development & pre-demolition audits)

Possible Scope: Retention and reuse in the built environment, including:

- Building, component, product and material levels
- Retention, reuse in same application, reuse in different application (repurposing)
- Existing built environment (new/future built environment addressed in proposed 'Design for Circularity WG')
- Pre-development and pre-demolition audits
- Quality assurance, testing, requalification, traceability

Examples of possible content for the standardization activities:

- Pre-development and pre-demolition audits – approach (reuse audit), methodology and data
- Building asset retention – approach, appraisal method and data
- Horizontal standard (or framework) for quality assurance, testing, requalification and traceability of reused/repurposed products and materials (to then be used by TCs for product groups)
- Methods to evaluate the benefits of reuse/recycling (also relevant to Recommendation 1 and 3)

Links to

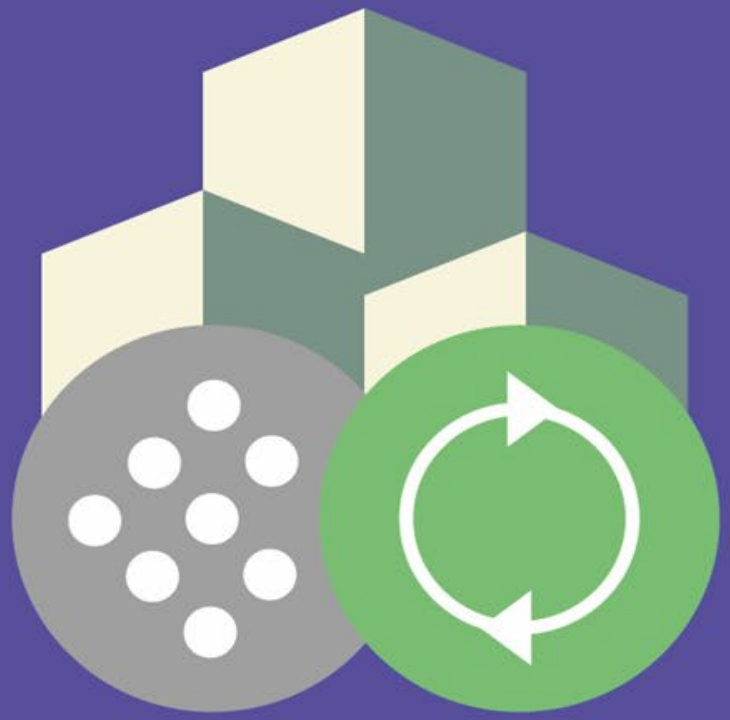
- WG1 to define terms and definitions; Proposed WG for recycled products and materials if established; Reused materials and components in accordance with CPR Acquis; Technical committees for key product groups such as CEN/TC 135/WG 2, Technical requirements for the execution of steel structures; CEN/TC 250/SC 3, Eurocode 3 – Design of steel structures; CEN/TC 371, Energy performance of buildings; EN 206:2013 "Concrete - Specification, performance, production and conformity; FCRBE material reuse toolkit

Next steps – 5 Task Groups

Question: Should a Working Group be established:

If so: Title and scope; propose a convenor; to propose work item(s), which could be e.g. a horizontal standard, a Technical Specification or a Technical Report

1. Circularity related parts to a product, material and building passports/log-books
2. Circularity Assessment
3. Pre-demolition and pre-redevelopment audits and evaluation
4. Horizontal standard/Technical Report for re-use of construction, products, and materials
5. Horizontal deliverables for design for circularity at all levels for construction



Circular technologies in construction

Putting Science Into Standards

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Thank you!

How to bridge the gap

Kasper GULDAGER JENSEN

Chair of CEN/TC 350/SC 1 Circular economy in the construction sector

Catherine CHEVAUCHE

Chair of ISO/TC 323 Circular economy

Philippe OSSET

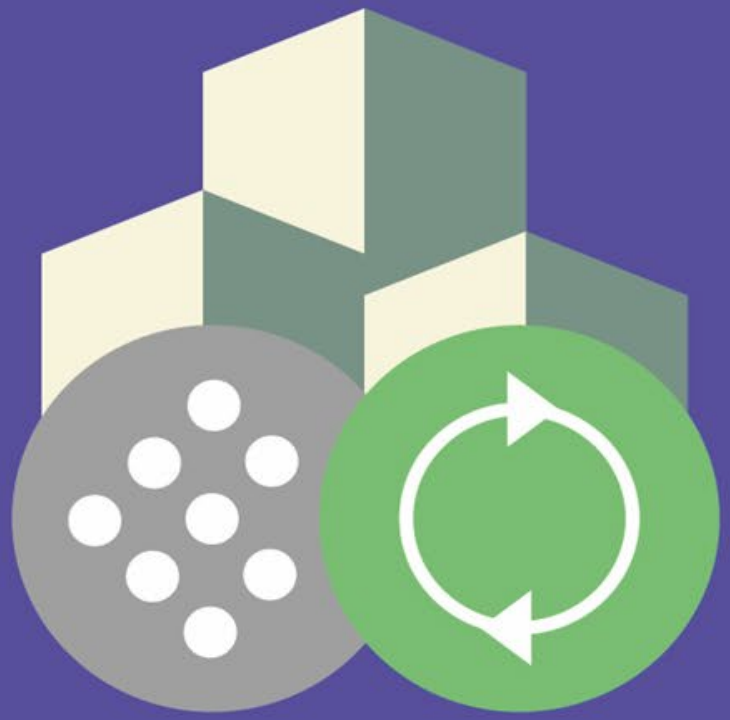
Chair of ISO/TC 59/SC 17 Sustainability in buildings and civil engineering works

Mike LEVY

ASTM International

Steve DENTON

Chair of CEN/TC 250 Structural Eurocodes



Circular technologies in construction

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How to Bridge the Gap?

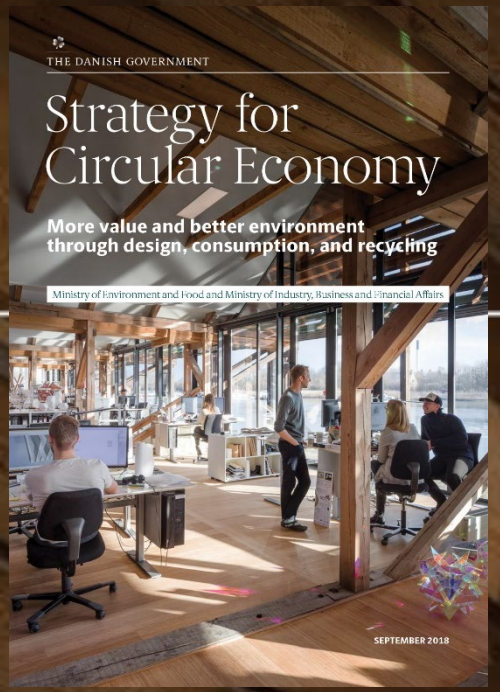
Kasper Guldager Jensen, Chair 350/SC1

Circular Construction Works

THE DANISH GOVERNMENT

Strategy for Circular Economy

More value and better environment through design, consumption, and recycling



CEN/TC 350 SC1

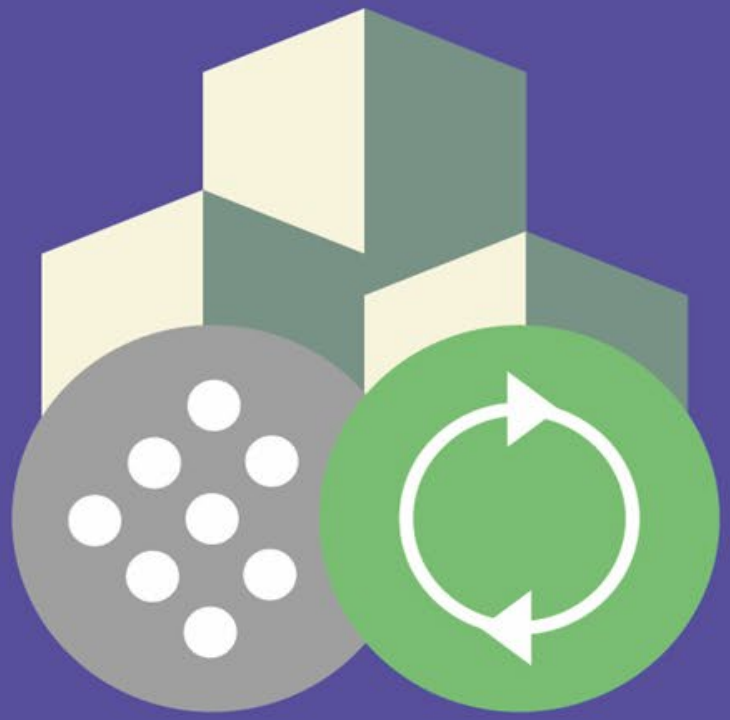
european standards
circular construction

Working Group (1) and Task Groups (2-7)

1. Framework, principles and definitions (DK)
2. Product, material and building passports (DK)
3. Circularity assessment tools (NL)
4. Pre-demolition and pre-redevelopment audits (UK)
5. Re-use of construction, products, and materials (SE)
6. Design for circularity at all levels for construction (DK)

CEN/TC 350 SC1

european standards
circular construction



Circular technologies in construction

Putting Science Into Standards

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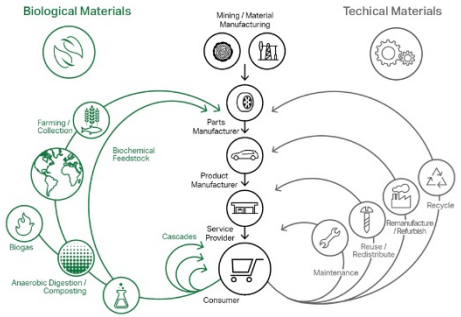
European Commission

How to Close the Circle?

Kasper Guldager Jensen, Chair 350/SC1

Circular Construction Works

Cradle to Cralde
Manual
2013



Building a Circular
Future
2016


CRADLE TO CRADLE®
I DET BYGGEDE MILJØ
EN MANUAL TIL DEN DANSKE BYGGEINDUSTRI

INTRODUKTION

Hvad er Cradle to Cradle?

C2C er en revolutionerende designstrategi, der blev udviklet af kemikeren Michael Braungart og arkitekten William McDonough op igennem 1990'erne. Strategien er beskrevet i bogen 'Cradle to Cradle: Remaking the Way We Make Things'.*

C2C er en reaktion på det som Braungart og McDonough kalder for 'Cradle to Grave' tilgangen, der udgør et designparadigme udviklet i løbet af industrialiseringen. 'Cradle to Grave' tilgangen har grundlæggende fejlet ved at anskue menneskelig produktion som adskilt fra naturen og ved at betragte jordens ressourcer som uudtømmelige. Dette har resulteret i de enorme klima-, forurenings-, affalds- og ressourceproblemer, som verden står overfor i dag, og som over tid vil destabilisere priser og sociale forhold.

C2C henter inspiration i naturens integrerede systemer, hvor alting er næring for noget nyt, og al vækst produceres af vedvarende energikilder. Konceptet introducerer en tankegang, hvor produktion ikke efterlader affald og forurening – men i stedet bidrager positivt til de naturlige systemer. C2C filosofien handler således grundlæggende om at forbedre kvaliteten af det, vi producerer, så det i stedet for at være 'mindre dårligt' bliver 'mere godt'.

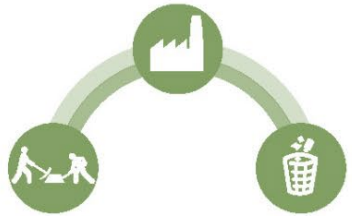


Diagram 1: Cradle to Grave - I dag brændes de fleste materialer eller deponeres i naturen efter endt brug

Grundlæggende principper

AFFALD=FØDE

I naturen findes affald ikke, da alt er næring for noget andet. Det første C2C princip handler derfor om at anskue alle materialer som en potentiel ressource for enten det biologiske eller det tekniske kredsløb.

BRUG VEDVARENDE ENERGI

Alle biologiske systemer drives af energi fra solen. Det andet C2C princip handler om at basere produktion og bygninger på energi fra vedvarende kilder såsom sol og vind. Disse energikilder er uudtømmelige.

VÆRDSÆT MANGFOLDIGHED

Inspireret af naturens mangfoldighed og evolutionære udvikling tilskynder det tredje C2C princip os til at værdsætte mangfoldighed af naturens arter, menneskeskabte kulturer og løsninger.

Disse tre principper er fundamentet for C2C. Principperne definerer og understøtter to metabolismer for alle materialer – det biologiske kredsløb og det tekniske kredsløb.

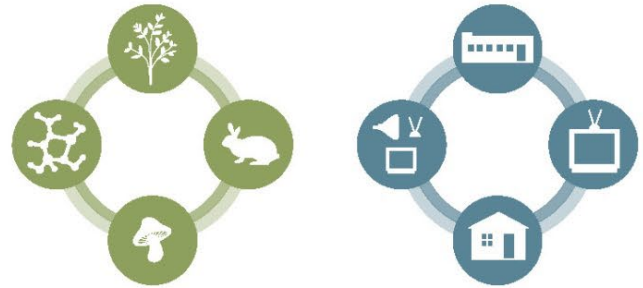
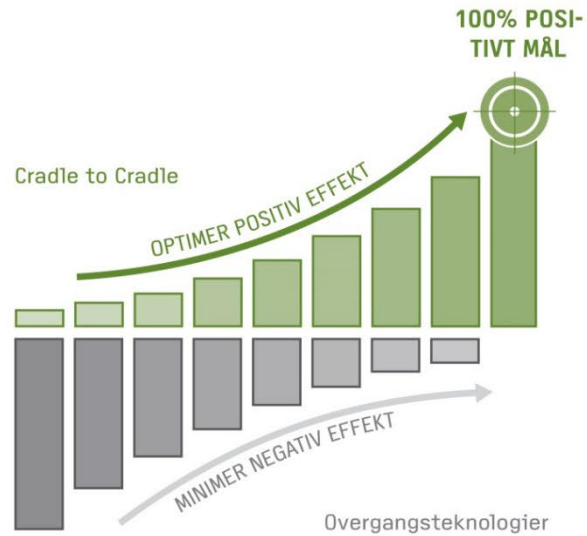


Diagram 2: Det biologiske og tekniske kredsløb, hvor materialer enten kan bionedbrydes eller recirkuleres i nye produkter

** Cradle to Cradle. Remaking the way we make things.*
William Mcdonough & Michael Braungart, North Point Press NY, 2002



Tre faser mod et 100% godt mål

FASE 1 - ANALYSE

Værdier formuleres som målsætninger i analysefasen og sigter mod en intention om et 100% positivt mål.

FASE 2 - STRATEGIER

En række specifikke strategier opstilles, der enten kan bruges til at minimere negative effekter eller maksimere positive effekter. Hver strategi gøres operationel gennem opstilling af en række konkrete redskaber.

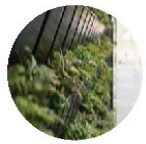
FASE 3 - MÅLBARE SKRIDT

En række målbare skridt bør formuleres, for at kontrollere, hvorvidt elementet løbende skaber den forventede værdi og er gavnligt både socialt, økonomisk og miljømæssigt.

TECHNICAL CIRCLE

1 WOOD CONSTRUCTION

2 ENERGY FACADE AND ROOF



3 INTEGRATED GREEN

4 ALGAE WATER CLEANING

5 INTELLIGENT INDOOR CLIMATE

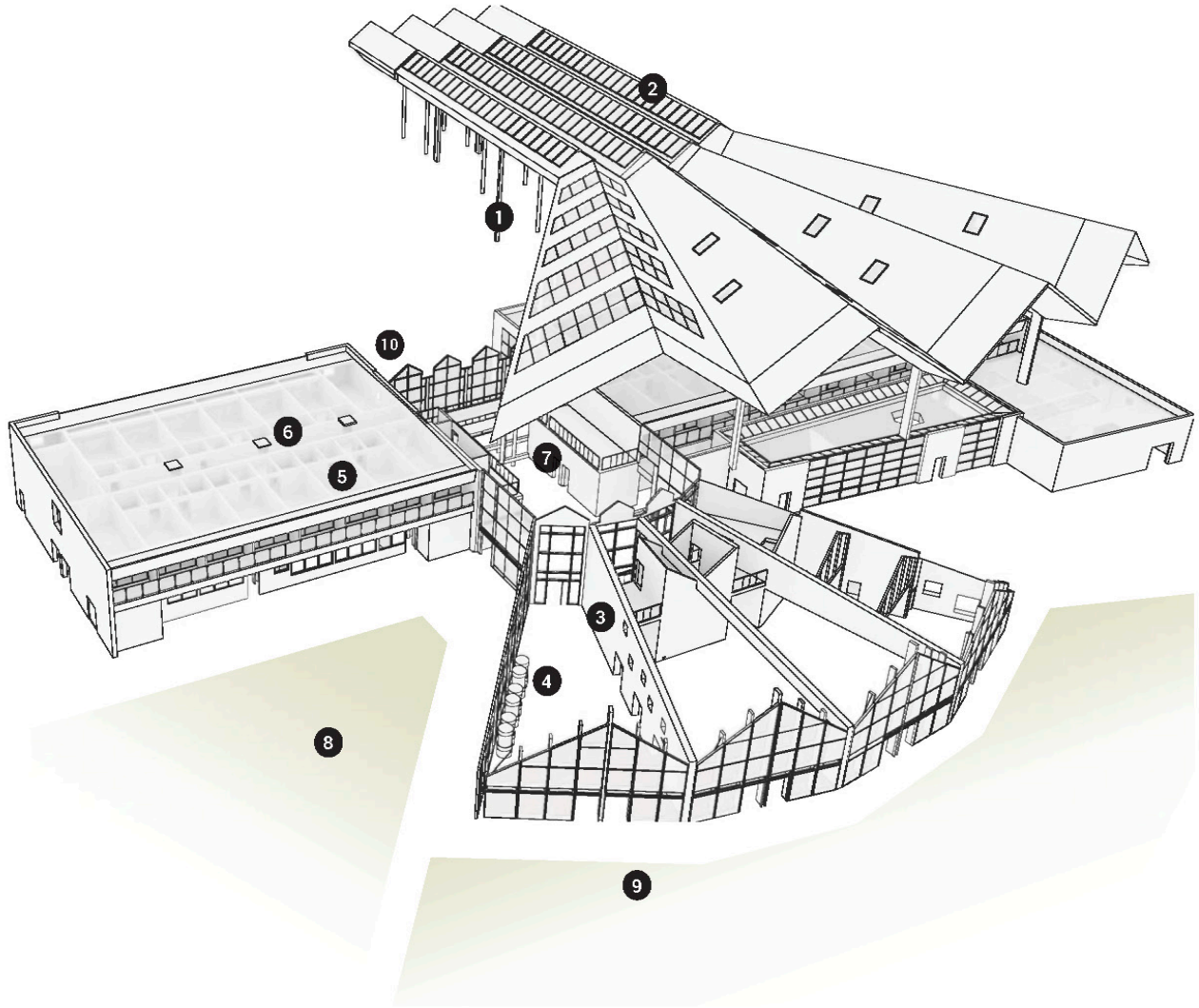
6 AIR CLEANING CARPETS

7 ACTIVE GYPSUM PLASTER

8 EARTH LUNG

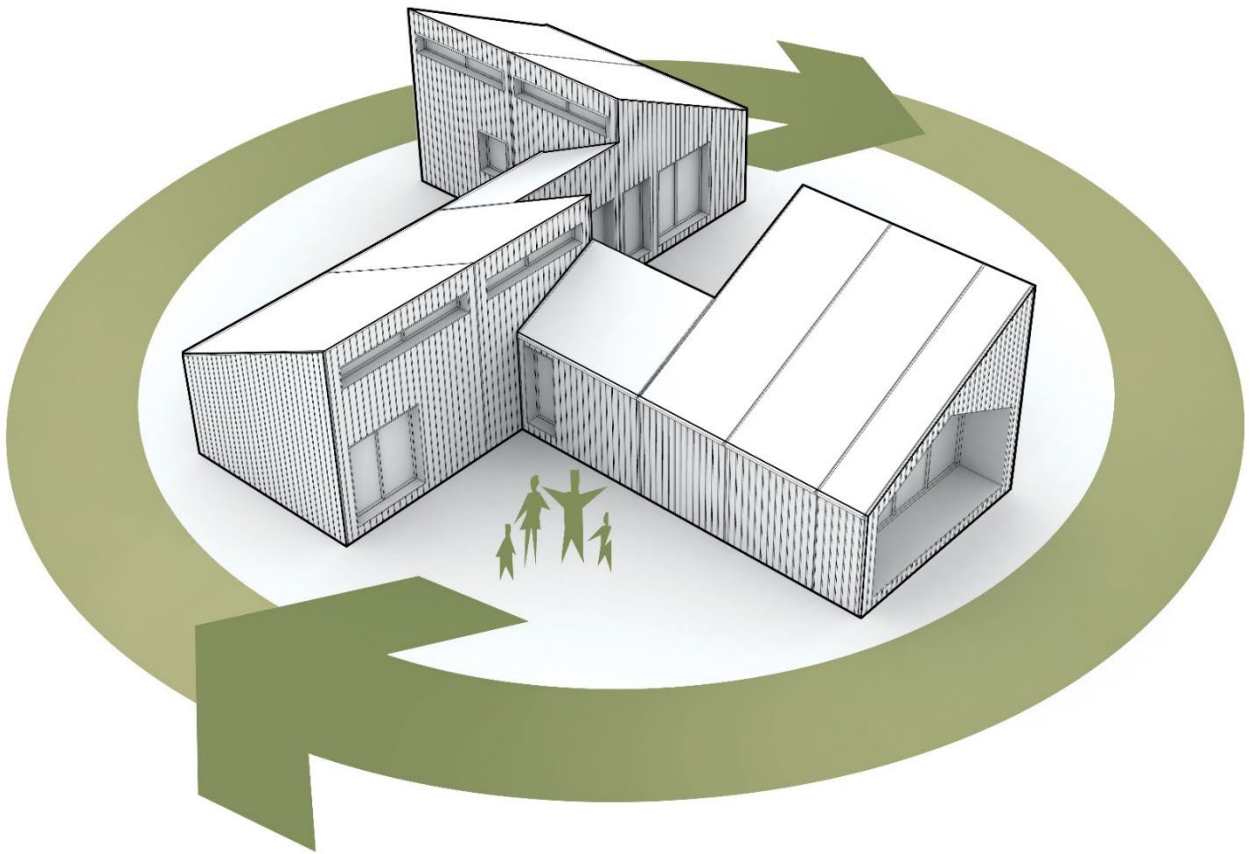
9 BITUMEN TREE LANDSCAPE

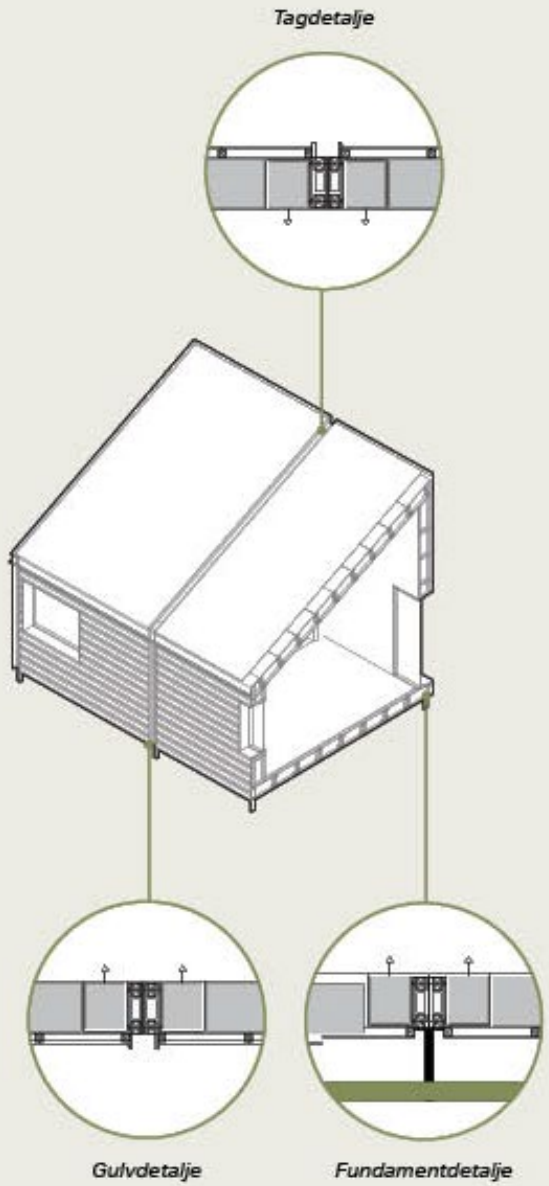
10 UPCYCLED GLASS PAVEMENT

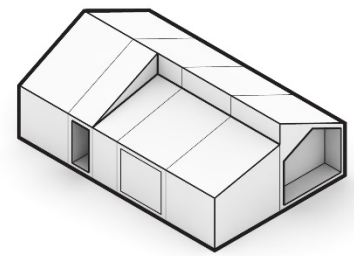


BIOLOGICAL CIRCLE

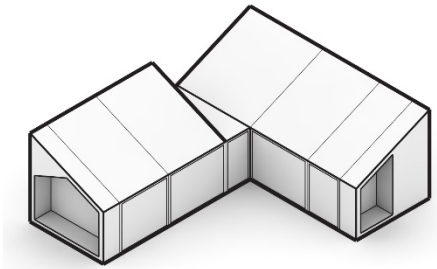

EENTILEEN
GXN
NCC
Deloitte.
TEKNOLOGISK INSTITUT



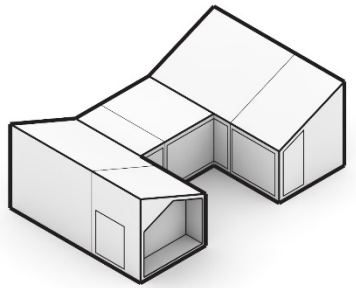

Tagdetalje
Gulvdetalje
Fundamentdetalje



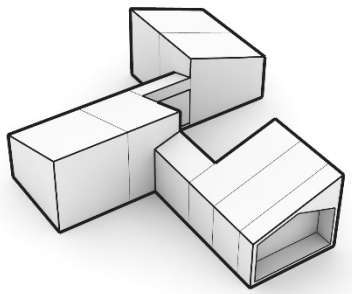
K | Kompakt | **120m²**



V | Vinkel | **109m²**

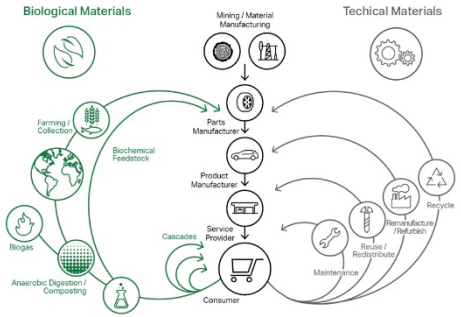


U | Gårdhavehus | **118m²**



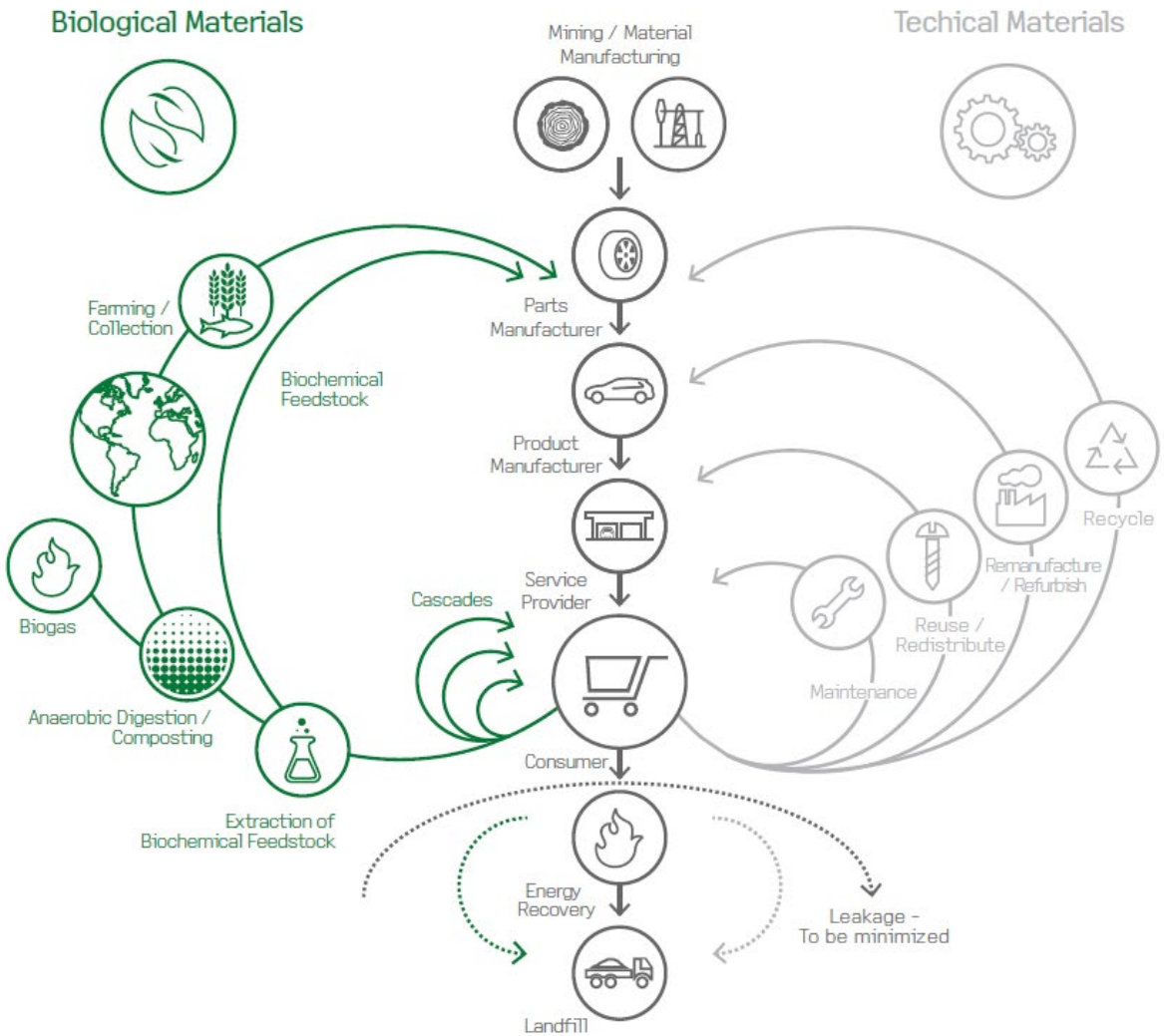
X | Åben Form | **137m²**

Cradle to Cralde
Manual
2013



Building a Circular
Future
2016

Building a Circular Future

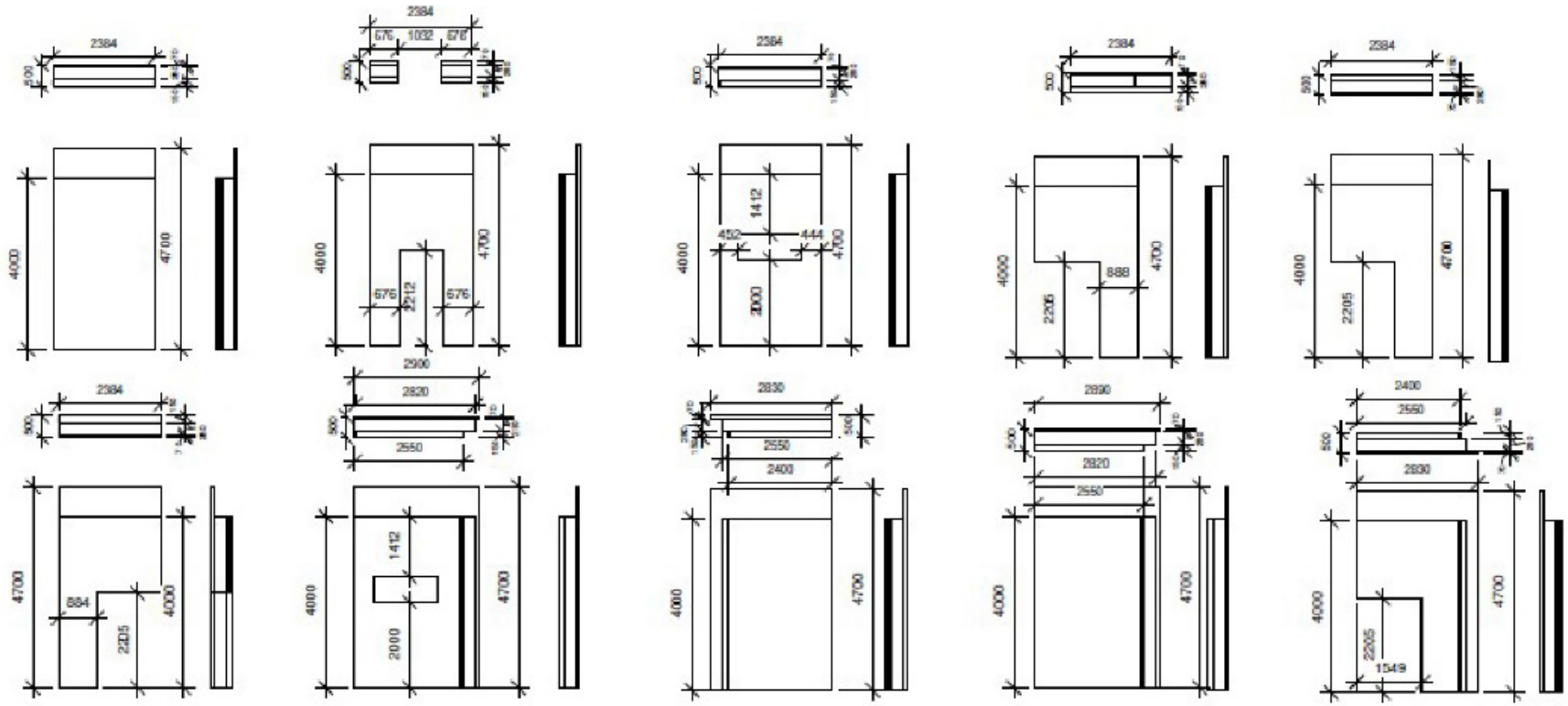

Biological Materials
Techical Materials
Mining / Material Manufacturing
Farming / Collection
Parts Manufacturer
Biochemical Feedstock
Product Manufacturer
Recycle
Remanufacture / Refurbish
Service Provider
Cascades
Biogas
Reuse / Redistribute
Maintenance
Anaerobic Digestion / Composting
Consumer
Extraction of Biochemical Feedstock
Energy Recovery
Leakage - To be minimized
Landfill

2010

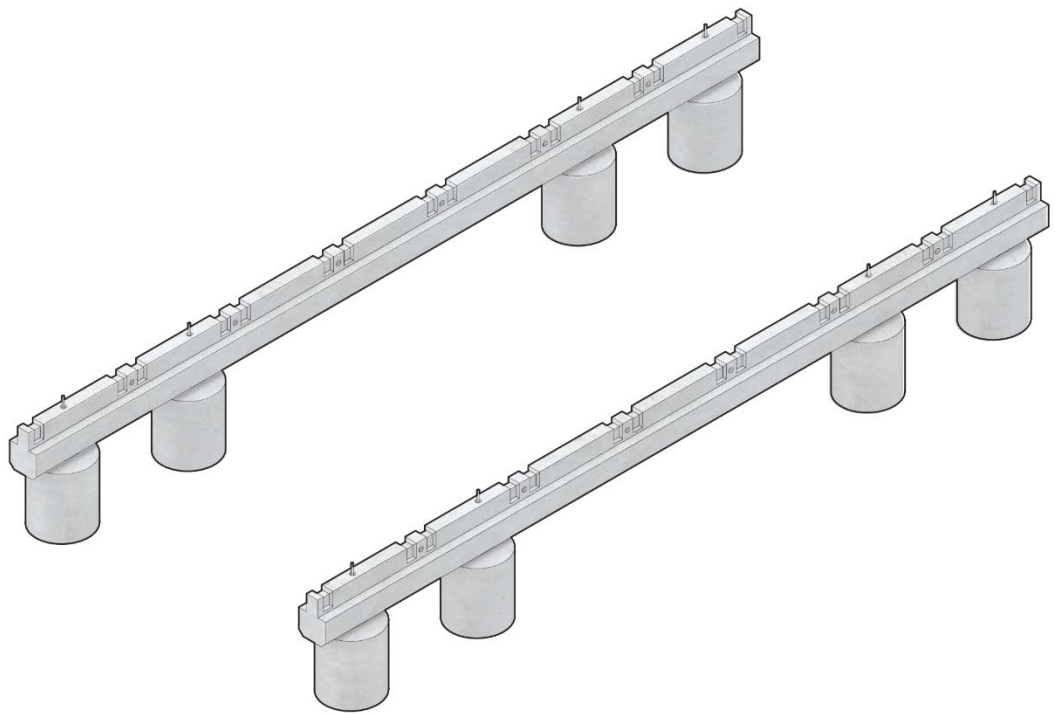

Kingo

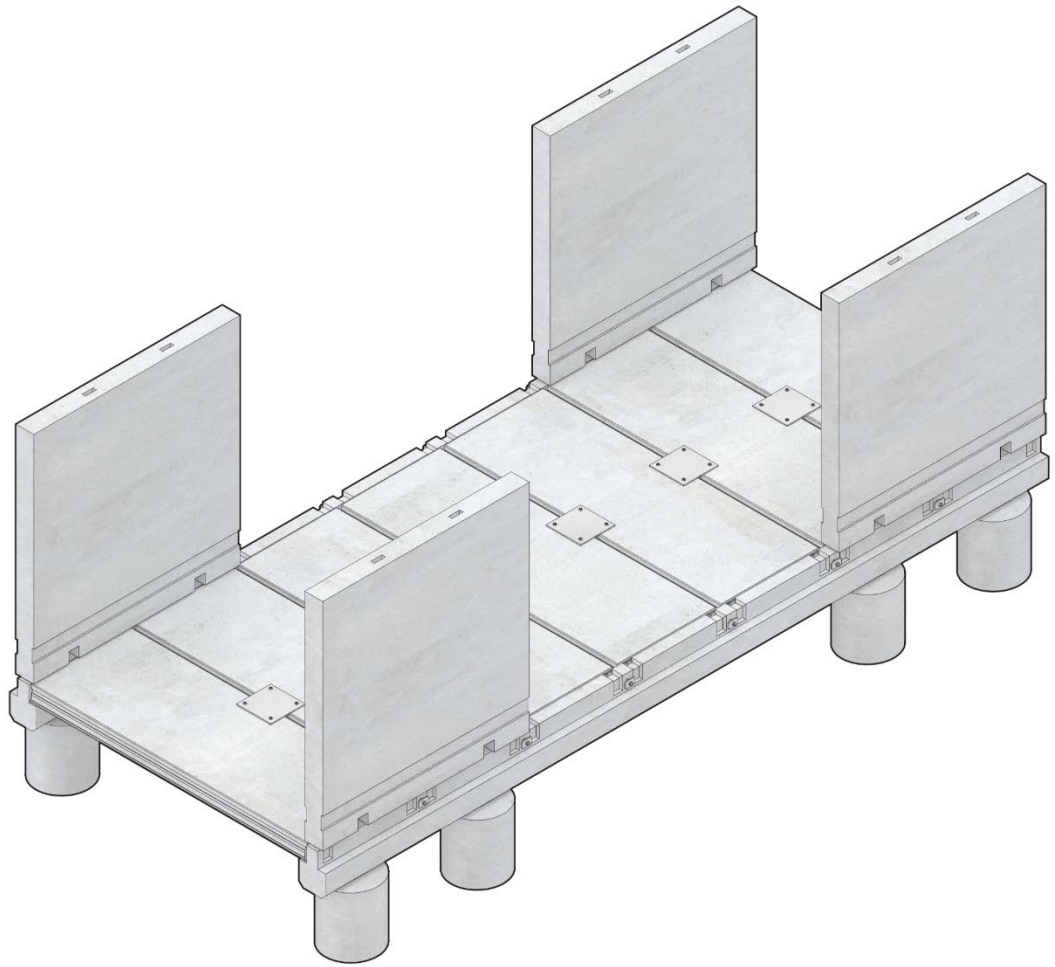
FUTURE CIRCLE

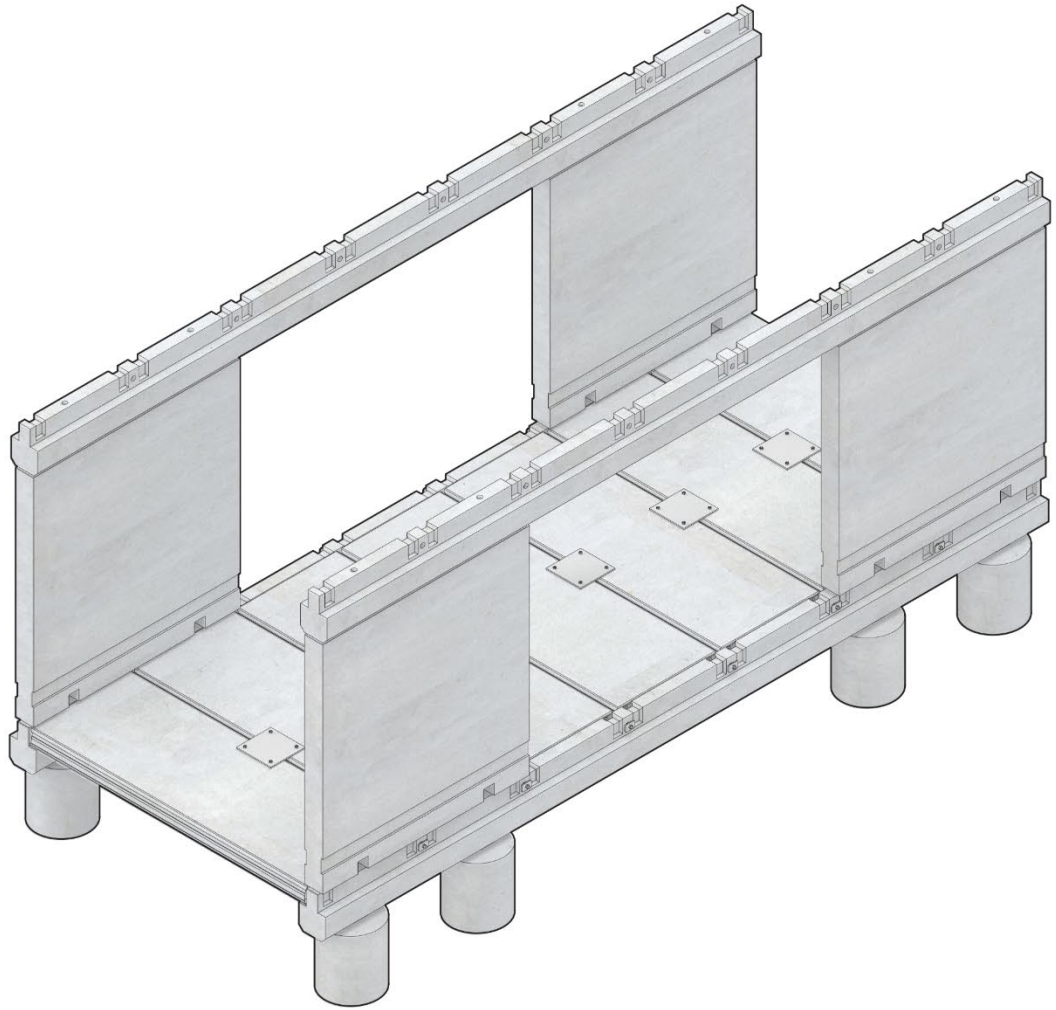
Exposition / Exterior

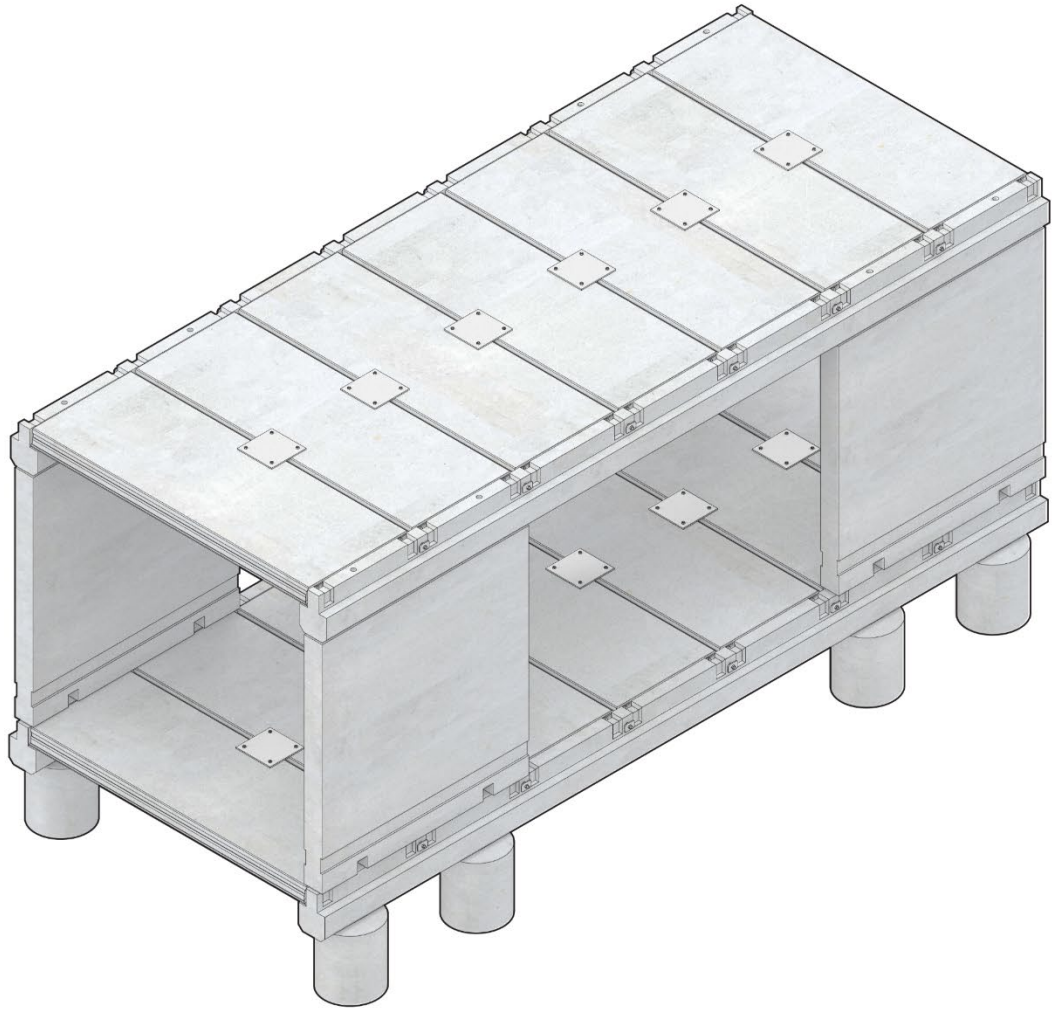

2384
4000
4700
884
2205
676
1032
1212
2900
2820
2550
1412
2000
2830
2400
452
444
888
1549

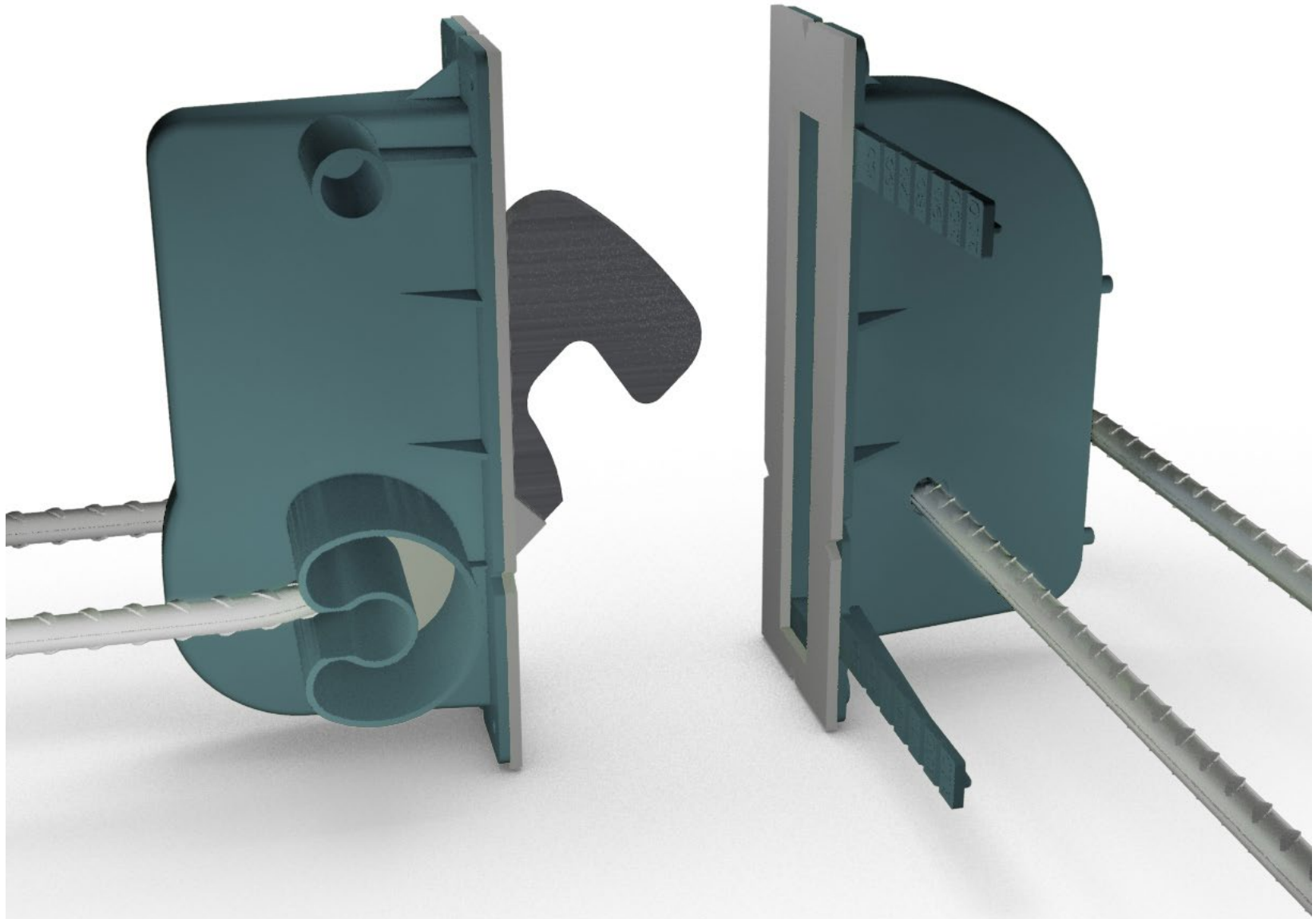
Wall Beam Deck



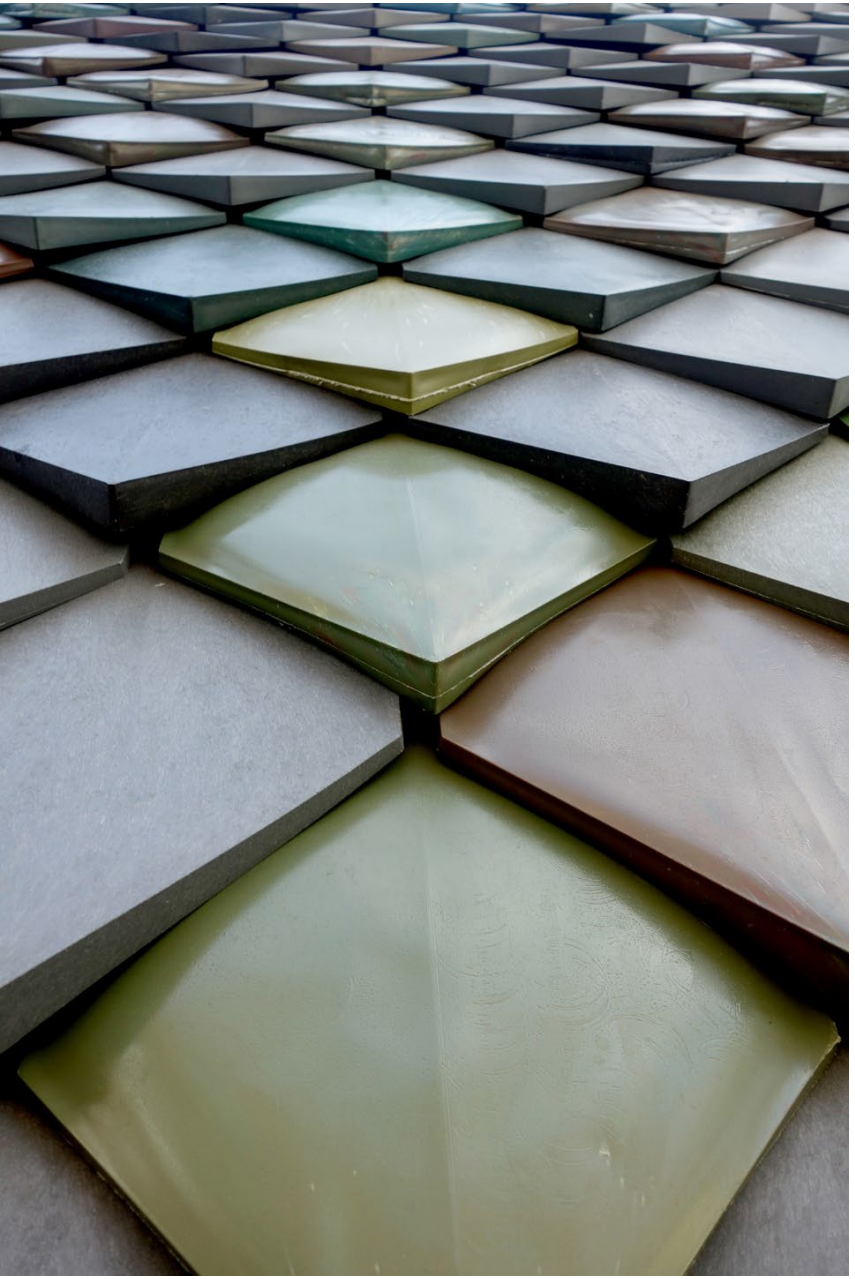


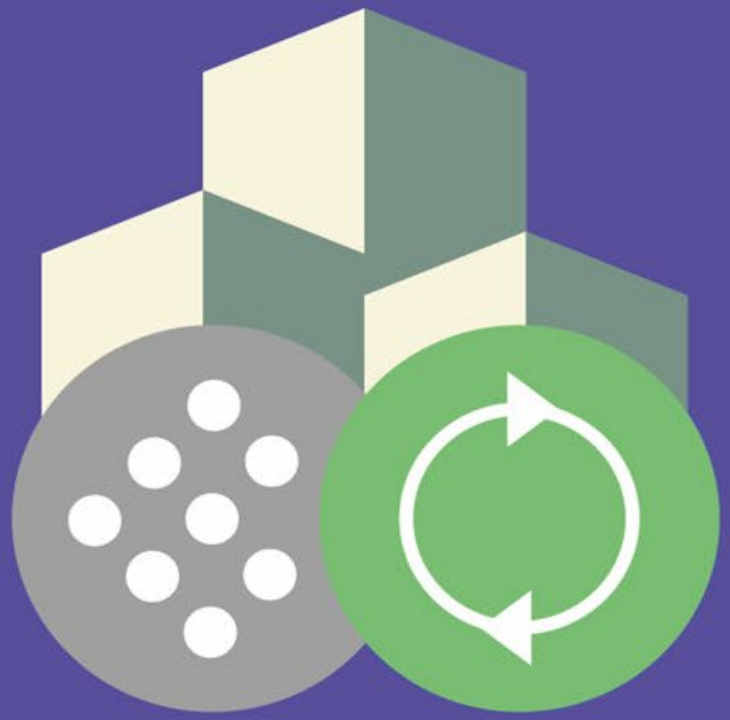







Circle House
Circle House
50–100
25–50
15–25
5–15
0–5
Circle House





Circular technologies in construction

Putting Science Into Standards

CEN CENELEC

European Commission

How to Start the Circle?

Kasper Guldager Jensen, Chair 350/SC1

Circular Construction Works

Framework and indicators to measure circularity

Chair: Lisbeth OTTOSEN, CEN/TC 350 SC 1

Rapporteur: Andreas JENET, European Commission

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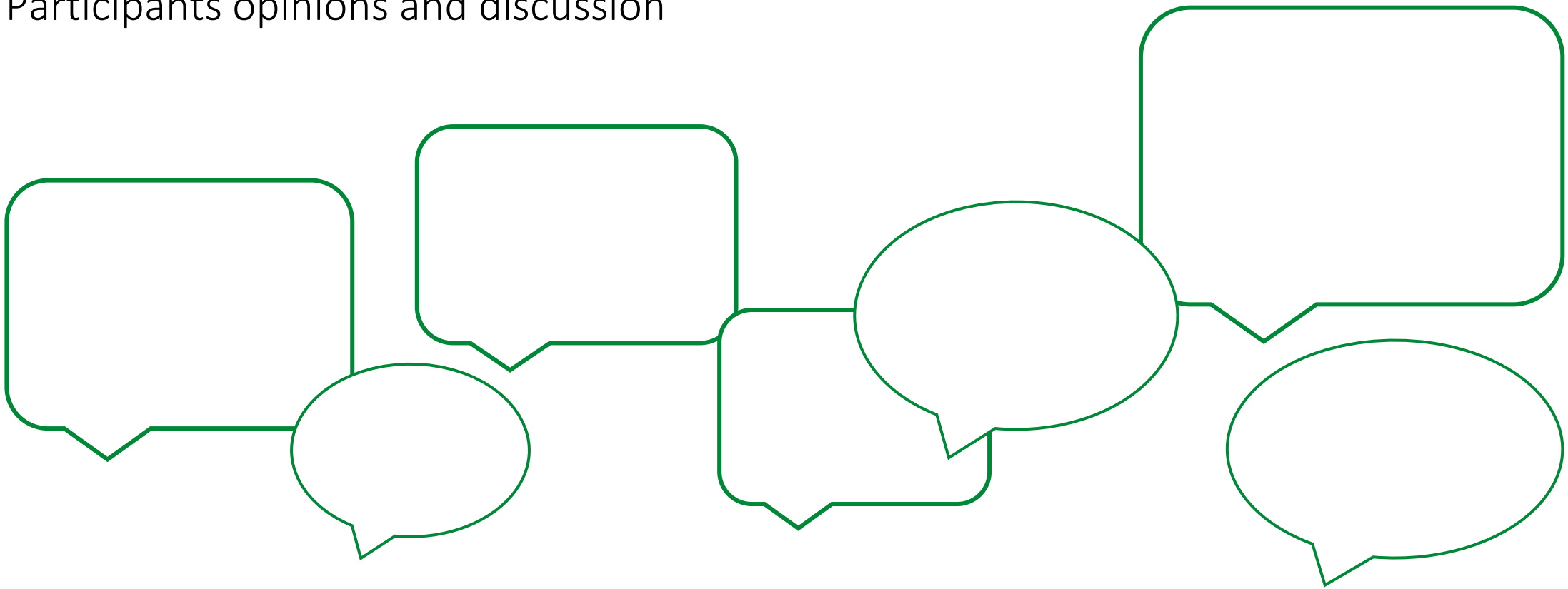
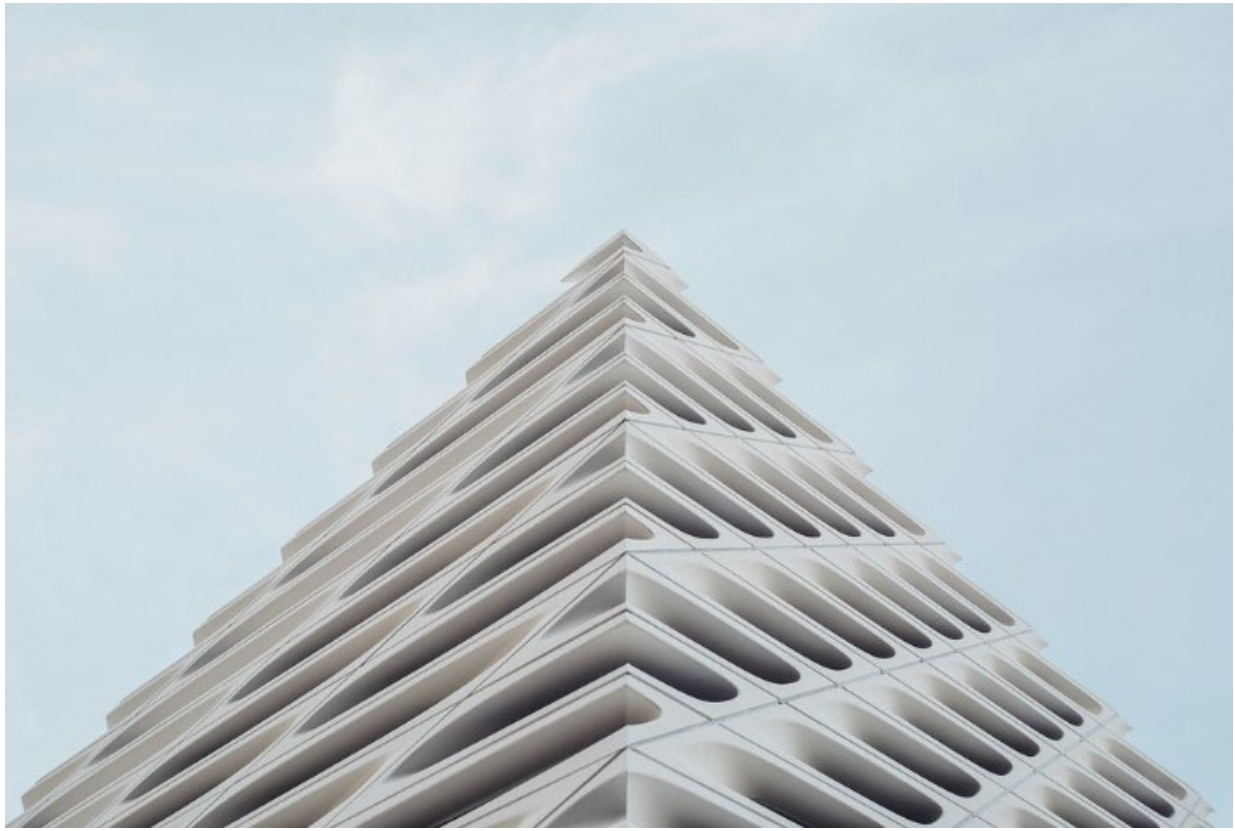
✓ Select the **Plenary** room

Program for this session

- Introduction to session and objective (L.M. Ottosen)
- Introduction to Canvas (A. Jenet)
- Participants opinions and discussion



Earth Overshoot Day
27. juli 2023



Circular technologies in construction - Putting science into standards

Science

Evidence based

Standards

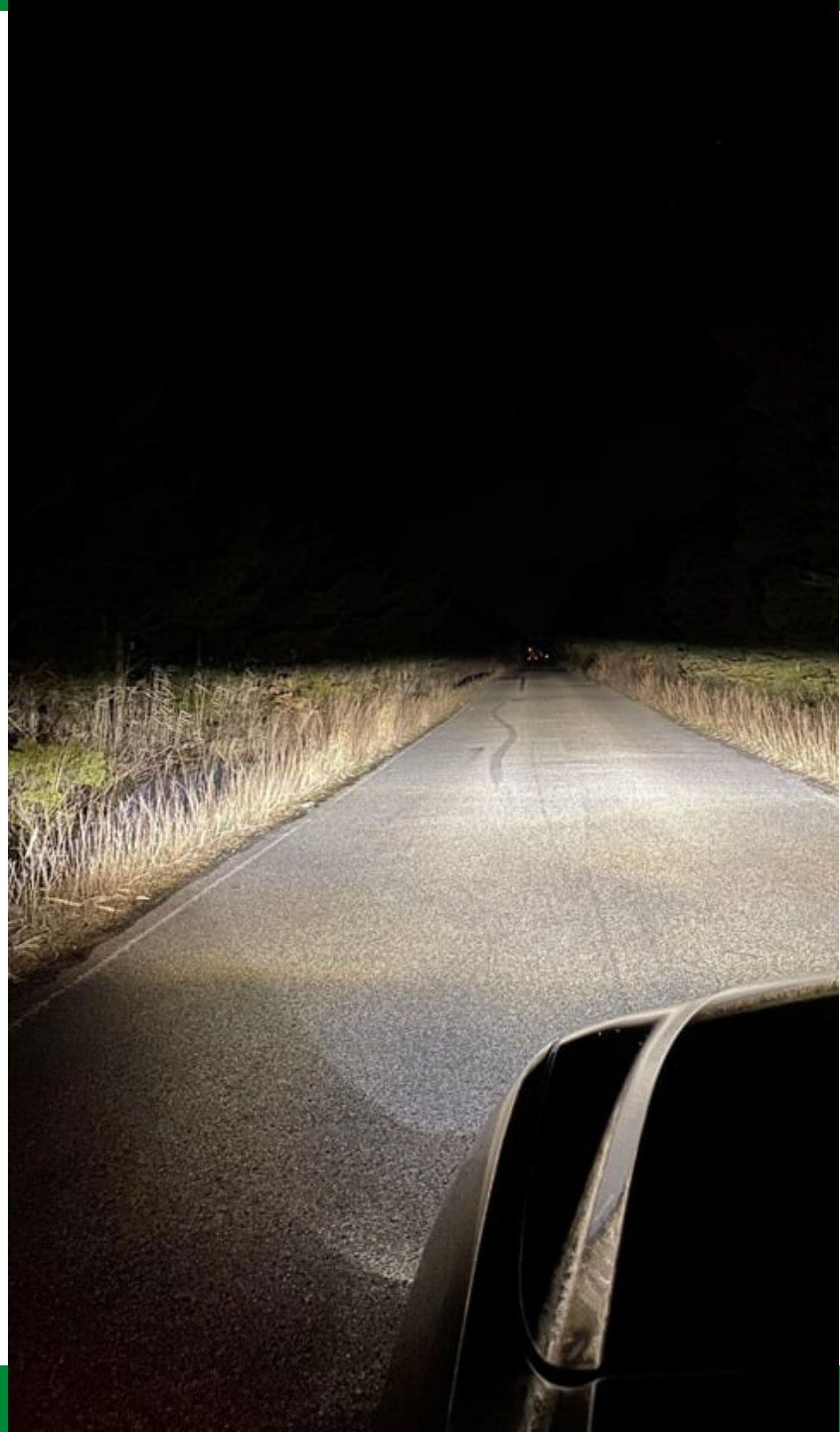
Consensus based

Objective for this session “Framework and indicators to measure circularity”

Expose the GAP analysis - bring your knowledge into play

Are we ready to implement circular construction?
What are the major issues to overcome – beyond what was initiated after the GAP analysis?

- Terminology and definitions
- Metrology (measurement, indicators)



CEN/TC 350 SC 1 – WG1 and WG2

CEN/TC 350 ‘Sustainability of construction works

CEN/TC 350/SC 1 'Circular economy in the construction sector‘

- WG1: Circular Economy – Terminology, Principles and Framework for Implementation
- WG2: GAP analysis

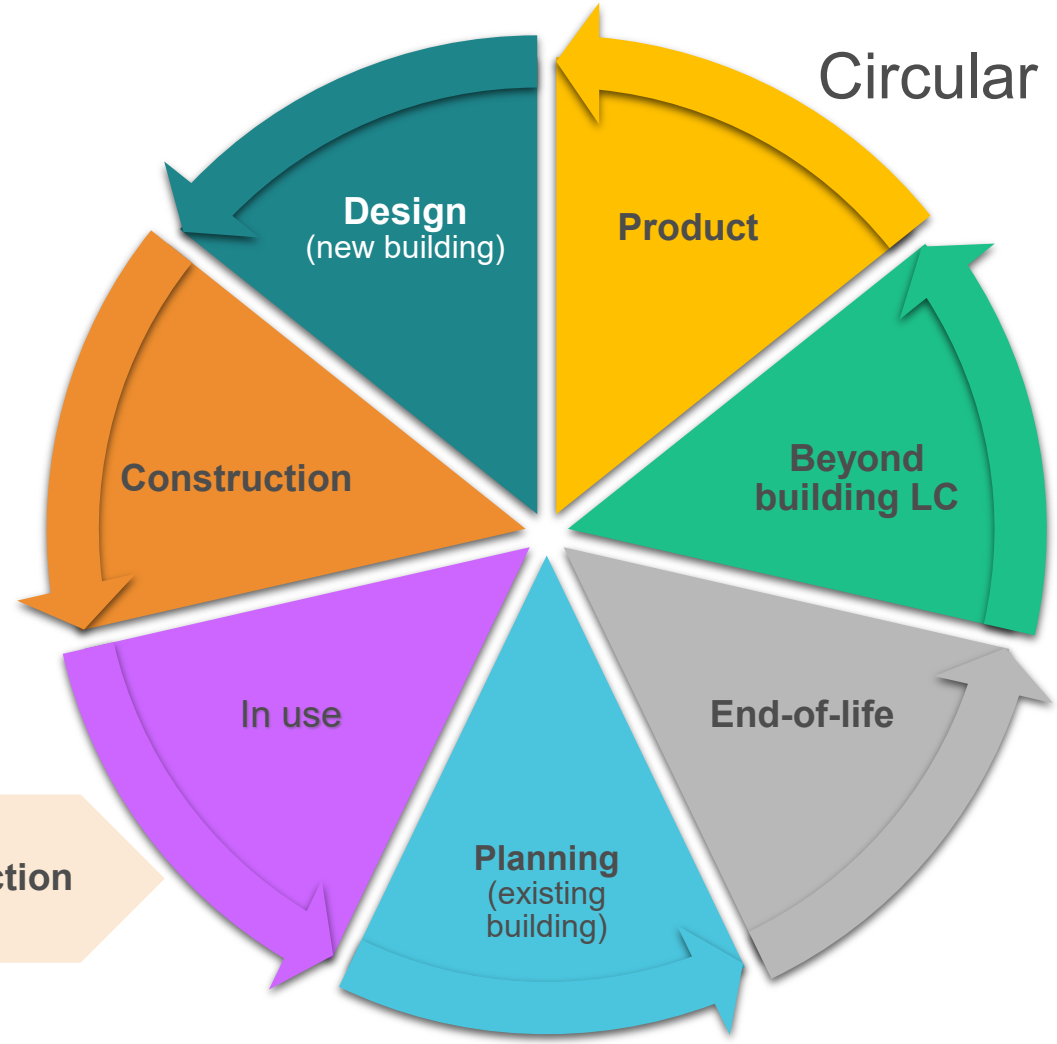
Newly formed task groups

TG No	TG Name	Members	Convener
TG 1	Circularity related parts to a product, material and building passports/log-books	29	Martha Lewis
TG 2	Circularity assessment	35	Flora Anvarifar
TG 3	Pre-demolition and pre-redevelopment audits and evaluation	19	Gillian Hobbs
TG 4	Horizontal standard/Technical Report for re-use of construction, products, and materials	33	Markus Beckman
TG 5	Horizontal deliverables for design for circularity at all levels for construction	25	Evert Schut


if not now,
WHEN ?

The Building life cycle

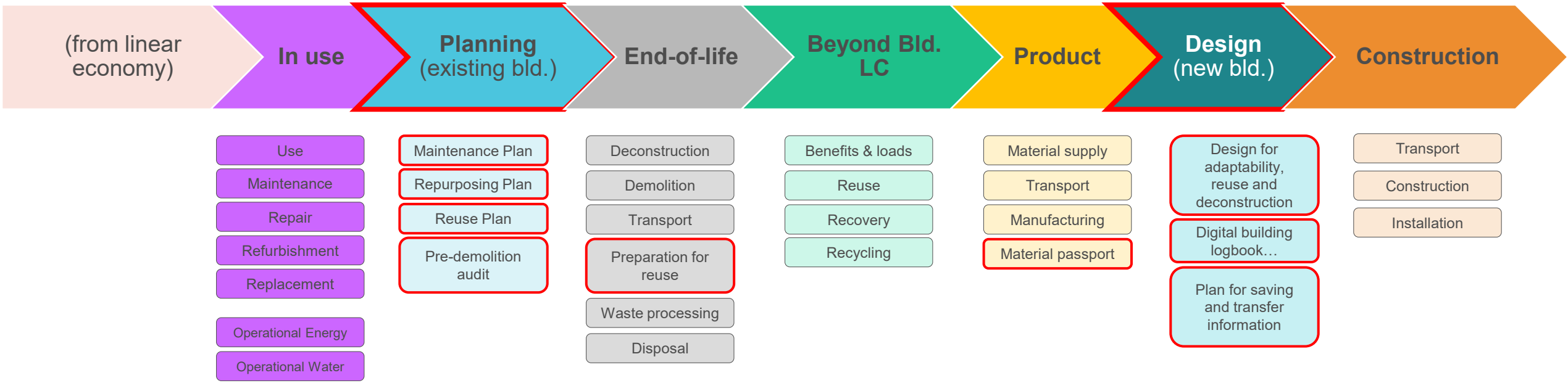
Circular Economy



Linear Economy

European Commission

The circular Building life (unwrapped)



Stage from EN15978

Requirement for Circular Economy

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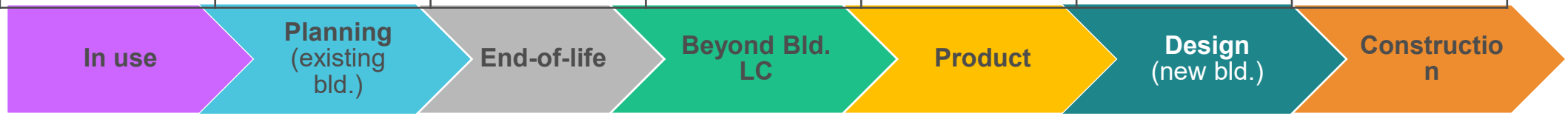
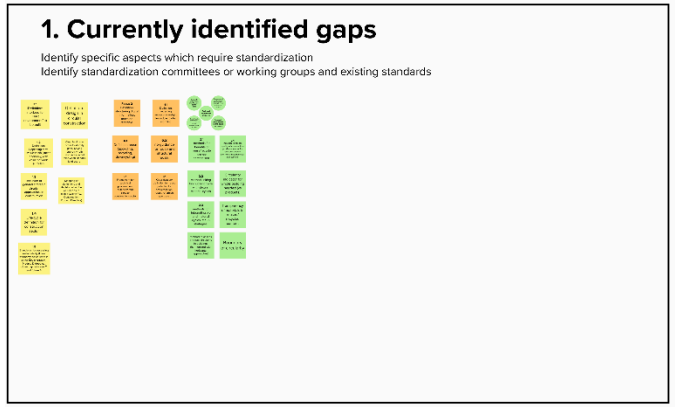
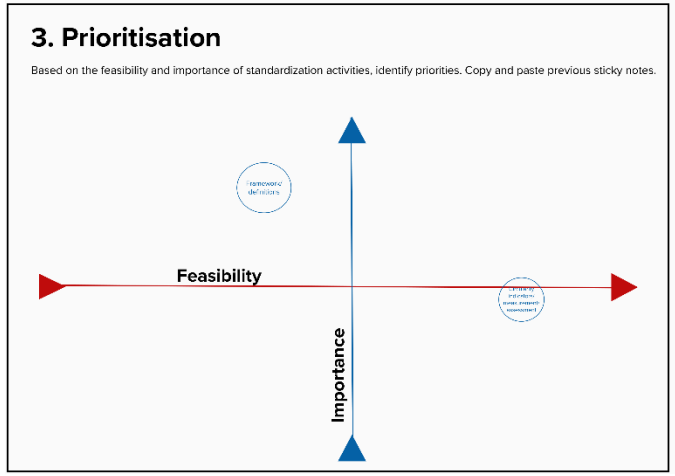
Standardisation steps

Operability assessment							
Compatibility							
Performance characterisation							
Metrology							
Terminology							

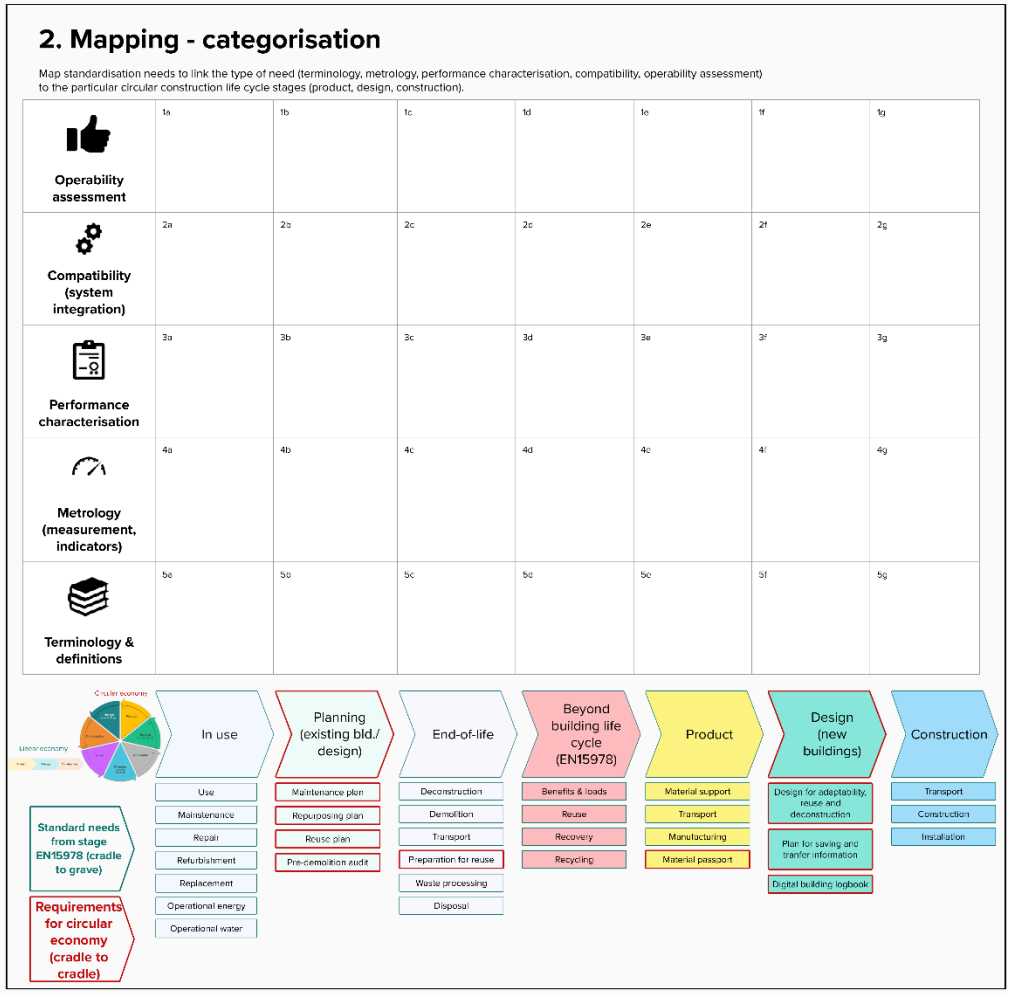


The Canvas for the rapporteur





Framework & indicators to measure circularity
Moderator: Lisbeth Ottosen, CEN/TC 350 SC 1
Rapporteur: Andreas Jenet, EC JRC



European Commission

Thank you for joining us today

See you tomorrow!