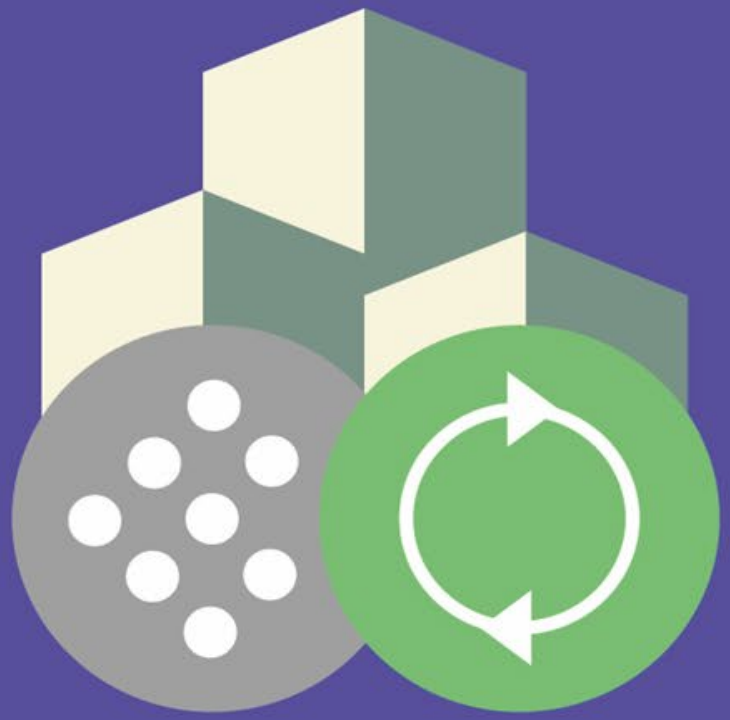

Circular technologies in construction

Putting Science Into Standards

CEN CENELEC

European Commission

Design for circularity, adaptability and disassembly

Design for circularity, adaptability and disassembly

Chair: Janet LYNCH, CEN/TC 350 SC 1, Arup

Rapporteur: Georgios TSIONIS, EC JRC

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Select the **Design for circularity, adaptability and disassembly** room

Agenda

Design for Circularity, Adaptability and Disassembly

Gap Analysis Review and Findings	• BURST
	  • 4. Planning and Design
	  • 5. Circular Procurement

Discussion- We are seeking Your Input	• DISCUSSION
	  • What are your thoughts on these gaps? Are there gaps we missed?
	• EXERCISE
	  • Can we relate the gaps to the service life of a built asset?
	  • We will attempt to rank gaps by Importance and Feasibility

Slido Survey and Takeaways	• SLIDO • Session Feedback Summary

Gap Analysis

Design for Circularity, Adaptability and Disassembly

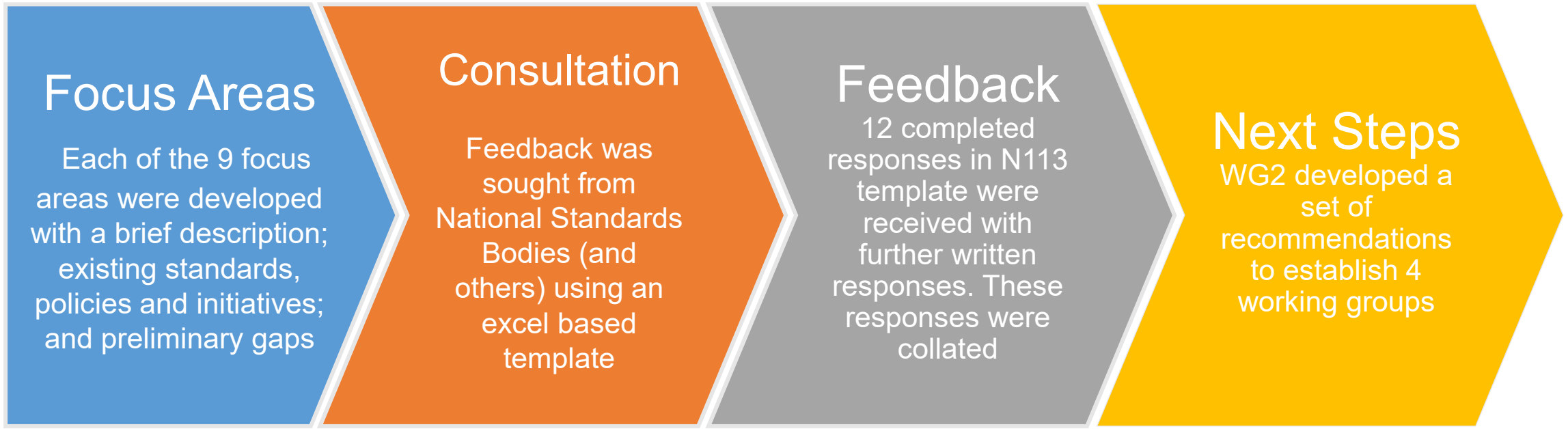
CEN/TC/SC1/WG2 “Gap analysis, conclusions and recommendations”

Convenors: Marc Blum and Gilli Hobbs

Gap Analysis 9 Focus Areas

1. Framework and definitions
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 & 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

Gap Analysis Process



Gap Analysis – Focus of Todays Workshop Session

4. Planning + Design & regulations for circularity (product/building/Civil Engineering Works)

5. Circular procurement

Planning and Design Findings (1/3)

Gap Analysis Findings Sub-Themes

Circular Planning and Design

Design for Adaptability

Design for circularity (other than those specified above)

Design for Disassembly and Reversibility

Design for Reuse

Planning and Design Findings (2/3)

Gap Analysis Findings

4.1	Classification/definition: reuse potential in new design; level of quality of reuse: upcycling, recycling, downcycling; design levels for circularity including - building (reuse potential), design for reuse of structure; Product (reuse potential), Material (recycling potential)
4.2	Design Rules and methods of performance assessment for: Design for disassembly – e.g. How to design products/ buildings/ civil engineering works for disassembly?; Design for retention and reuse; Design for Adaptability/ transformation (which could support aspects such as Design to avoid demolition; Design for indefinite life or long life); Design for Reduce, Reuse, Repair, Recycling; Other aspects of 'designing for circularity' such as Design for maintenance and efficient operation; Design for adaptation to climate change; Design for minimum inuse/whole life GWP; Methods to facilitate circularity: modularity, standardization, prefabrication and industrialization.
4.3	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; Product integrity; load bearing capacity etc..
4.4	A Framework is required to enable re-certification of materials and components to enable safe re-use by market operators sufficient to ensure acceptance by market surveillance authorities. Framework should cover both for direct re-use without processing and for reuse following recycling/remanufacture/refurbishment processes. The reuse of wastes and byproducts is enabled from a regulatory and environmental perspective by the Waste Framework Directive[1] Articles 5 and 6. An example of where this would be beneficial is steel beam reuse and the reclamation of crushed aggregates from demolition waste. Criteria may be country specific in some cases.
4.5	The ease and ability to deconstruct and reuse a building product is influenced by: 1) connection type (bolts, screws, casted, etc), 2) weight (influences handling and personnel and equipment) and 3) built on site vs. (partially) prefabricated. These are also gaps.

Planning and Design Findings (2/3)

Additional Gaps - Summary

Additional Gap Identified	Rationale
Assessment methodology for existing buildings	Definition and standardisation of assessment to value existing buildings in terms of materials for reuse, repurposing and recycling
Design for change	The idea that a building can have multiple functions or uses in the lifetime should be more explicit than the focus on 'reuseability
Execution	The focus area focusses on 'planning & design', but also execution of works should be in scope and might require standardisation.
Clearly defined flows of material from buildings regarding reuse, recycled, repaired etc.	Clearly defined flows of material from buildings regarding reuse, recycled, repaired etc.
Standard for pre-demolition audits	Standard for a pre-redevelopment audit in order to assess the condition of a building to decide for renovation or demolition including relevant details on materials/construction that can be reused, and the different scenarios' impact on price, environment, CO2, etc
	Existing test standards are available but there is a need for additional non-destructive test standards

Circular Procurement Findings (1/3)

Gap Analysis Findings Sub-Themes

Procurement Principles

Procurement Requirements

Circular Procurement Findings (2/3)

Gap Analysis Findings

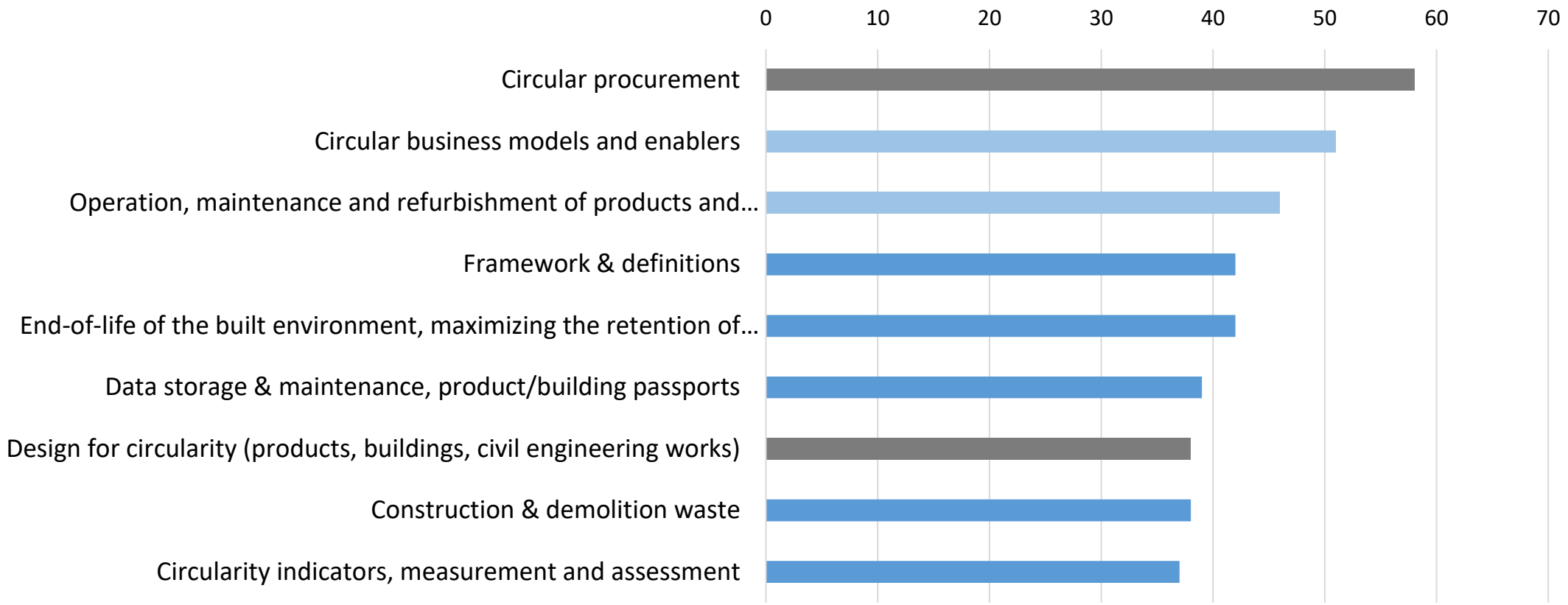
5.1	Framework for creation of detailed technical procurement criteria for the construction sector, which are additional to those set out in EU GPP criteria. The need for these new criteria may be country, material or other procurement specific reasons. Such a framework might include use of domain experts to create the criteria and consider the perspective of and requirements of construction industry insurance providers and need for warrantees.
5.2	Common understanding of the differences between circular and green procurement and if the difference is at all important
5.3	A commonly accepted method of carbon consideration in procurement as a “stepping stone” to product specific data sheets such as EPDs for example is not currently in place but is proposed in the CPD and EcoDesign framework under consideration by the commission and the EU Parliament.
5.4	Framework for weighting of circular procurement criteria to support decision making by procurement authorities
5.5	Framework for materiality assessment of importance of circular criteria for specific assets for procurement.
5.6	Framework for engagement of domain specialists to create country specific circular procurement criteria which are legally robust.
5.7	Whole life costing and a detailed procurement framework for this is not available currently. It may be beneficial to have sector specific whole life costing guidelines.
5.8	A detailed framework for retaining value of assets through procurement where they may be kept in use in their current form or recycled may be beneficial

Circular Procurement Findings (3/3)

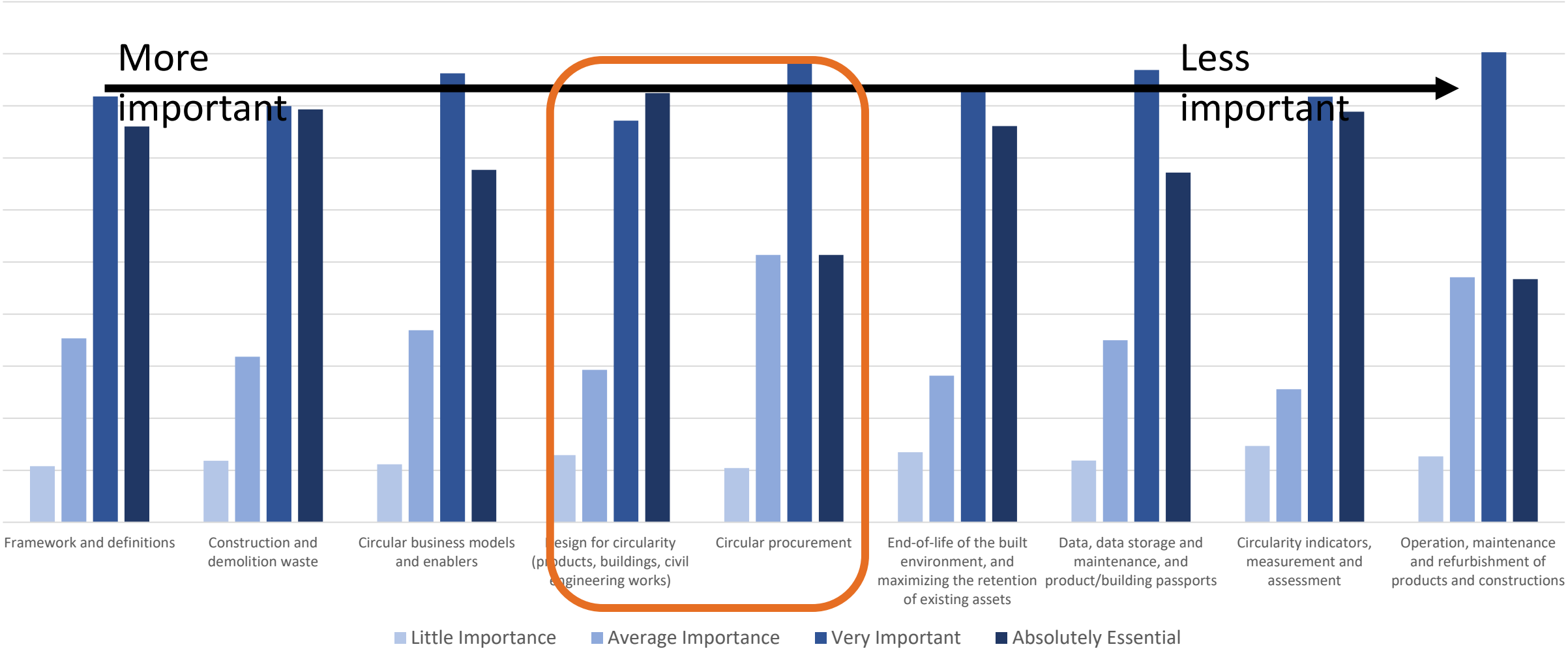
Additional Gaps - Summary

Additional Gap Identified	Rationale
Standardisation of specifications for large procurers would be beneficial	For example, specification for low carbon concrete. There are carbon clauses for The Chancery Lane Project (https://chancerylaneproject.org/climateclauses/). This clause may be of particular interest: https://chancerylaneproject.org/climate-clauses/thenet-zero-standard-for-suppliers/

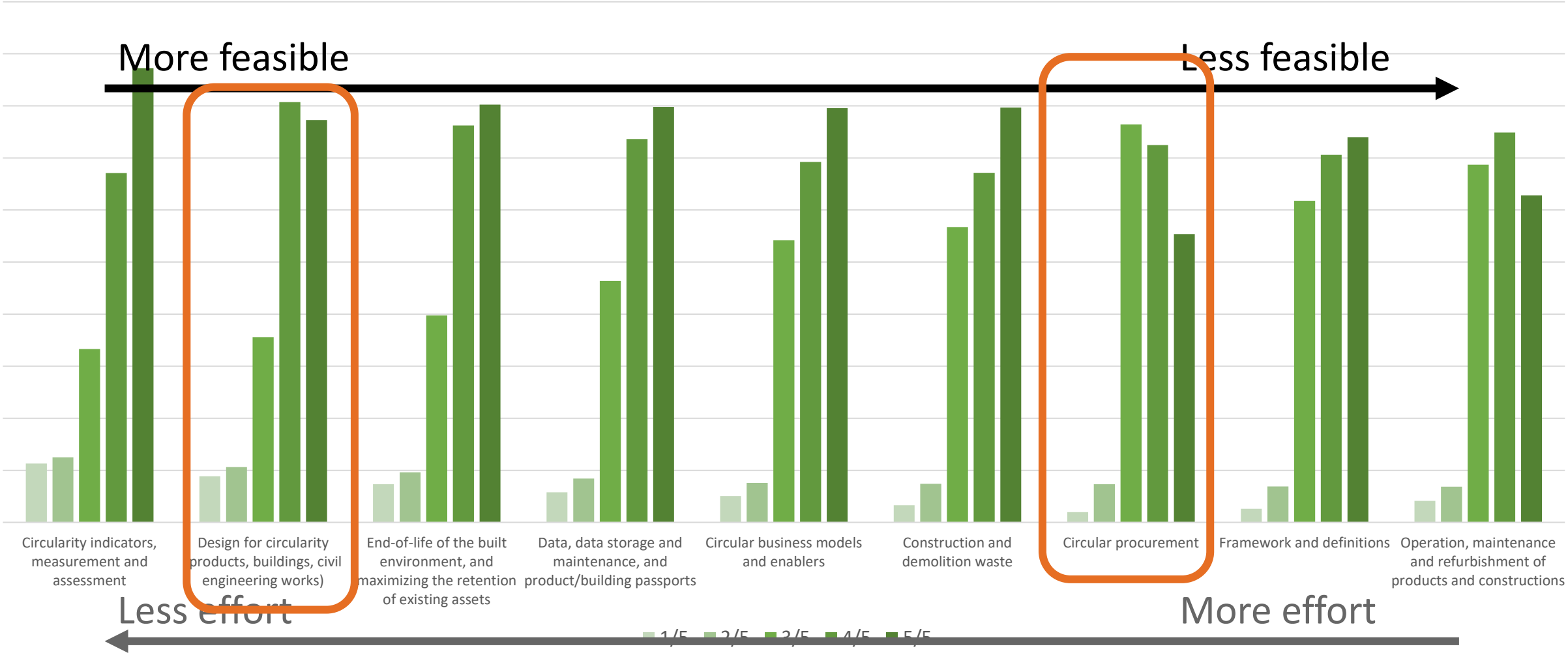
Gaps rated as less known



Assessment of gaps importance

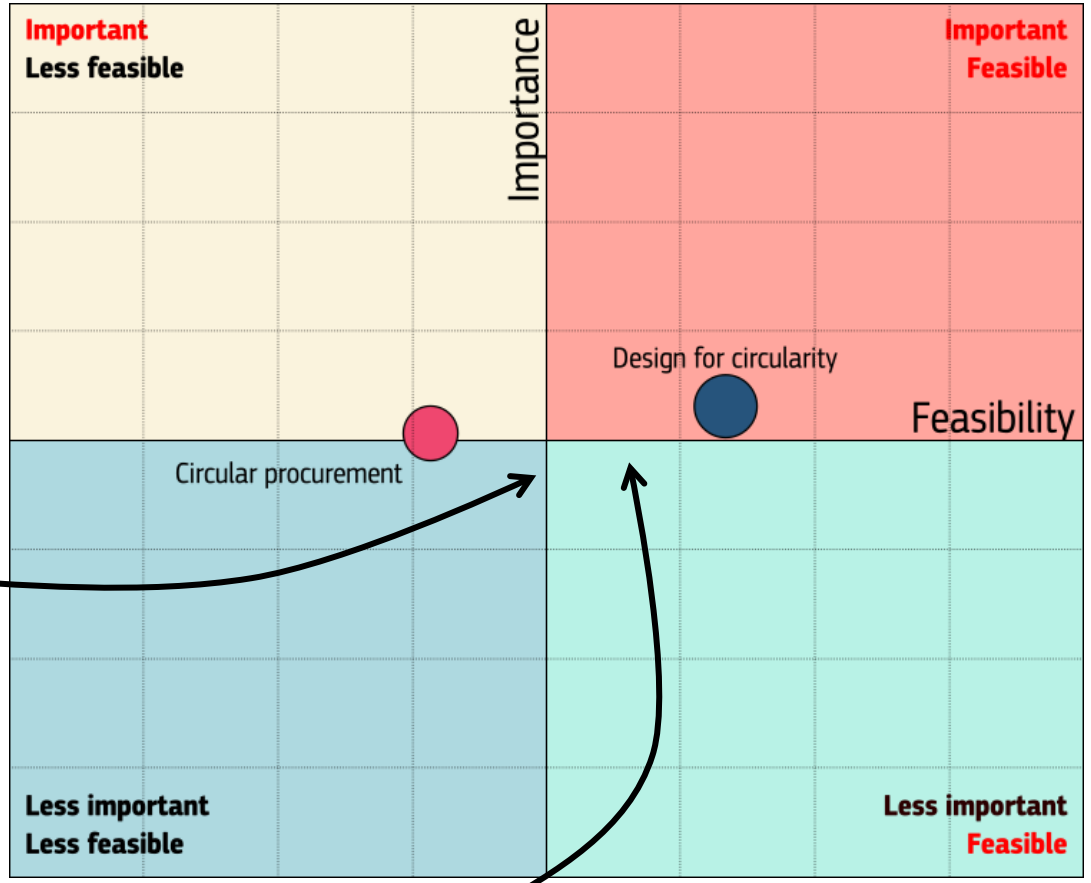


Rating the effort to improve the gaps

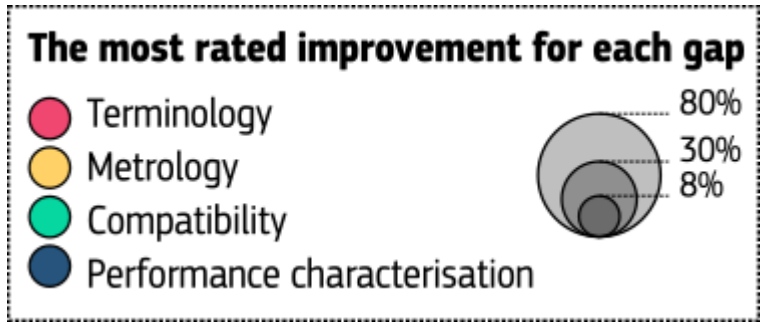


Rating the gaps - Session 3

Design for circularity, adaptability and disassembly



Both gaps are considered of medium importance and in the middle of the feasibility range.



Terminology for Circ. Procurement and performance characterisation for Design are the most rated improvements.