



INTEGRATING LIFE CYCLE ASSESSMENT IN THE DESIGN OF INNOVATIVE BUILDING PRODUCTS

Webinar – Thursday, October 15th - 10:00 – 11:30



**Co-funded by
the European Union**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

PANEL DISCUSSION

Moderated by



Fred Robinson

Mykor



Andrea Klinge

KIT



Donald Nwonu

University of Bath



Stephen Allen

University of Bath

Ask your questions in the Q&A

Time	Speakers	Topic
10:00 – 10:10	Giorgio Alessandro (Communication Manager, G!E) and Erwin Franquet (Project Coordinator, Université Côte d’Azur)	Welcome & Introduction of the project
10:10 – 10:25	Stephen Allen (Coordinator of INBUILT LCA, University of Bath)	Integrating LCA in the Design of Innovative Products: insights from INBUILT
10:25 – 11:10	Fred Robinson (Mykor), Andrea Klinge (KIT), Donald Chimobi Nwonu (UBath) – Moderated by Stephen Allen (Ubath)	Panel Discussion
11:10 – 11:25	Q&A	

- You can ask your **questions in the chat using the Q&A function** - please specify who they are directed to
- You can **vote** on other people's questions
- We will address questions in the **Q&A** at the end of the panel discussion



INBUILT

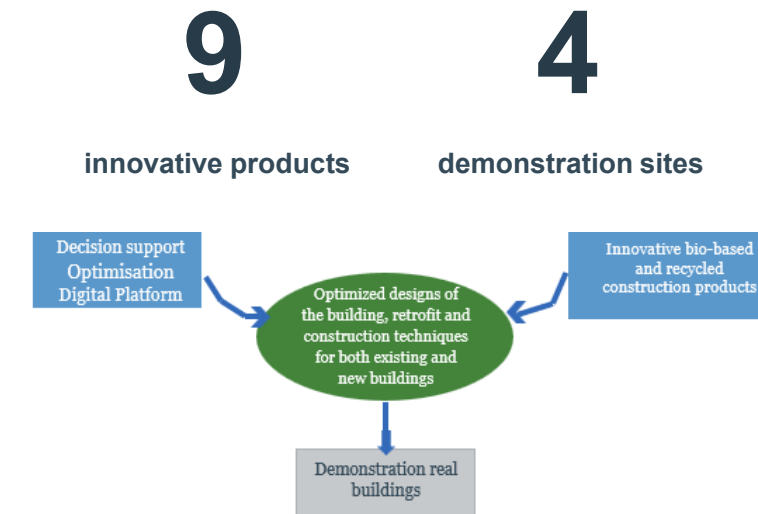
Innovative bio/geo-sourced, re-used and recycled products coupled with BIM-based digital platform for very low carbon construction, circular economy and resource efficiency

Advancing low-carbon and circular construction

INBUILT develops and demonstrates innovative building solutions combining low-carbon materials, circularity and digital design.

- 01 MATERIAL INNOVATION**
9 IP using bio-/geo-sourced, reused and recycled materials.
- 02 DIGITAL INTEGRATION**
A BIM-based platform supporting design choices and environmental evaluation.
- 03 REAL-WORLD VALIDATION**
4 demonstration sites across France, Germany and the United Kingdom.
- 04 LIFECYCLE PERFORMANCE**
Testing, LCA, social indicators and life cycle costing to inform better choices.

INBUILT IN NUMBERS



Research → Innovation → Demonstration

Two complementary innovation pathways

LOW-CARBON BUILDING PRODUCTS



Compressed Earth Blocks

Innovative, sturdy blocks made from local soil, with low carbon emission in production.



Hybrid Straw-Clay Boards

A unique mix of straw and clay that offers natural insulation, utilising renewable resources.



BioPUR Curtain Walls

Modular wall system using a novel biobased Polyurethane curtain wall framing system to create energy efficient building exteriors.



Recycled Paper and Textile Fiber Insulation Mats

Insulation solutions made from recycled paper and textiles for improved building thermodynamics.



Bio-based Insulation Panels

Low carbon, fire safe, thermal and acoustic rigid insulation sheet made from industrial residues.

REUSED & RECYCLED MATERIALS



Recycled Bricks (Fired and non-fired)

Bricks made from recycled materials, reducing landfill waste.



Recycled Concrete Blocks

Concrete made from demolition waste, lessening the need for new materials.



Reclaimed Wood Wall Panels

Reusable external and internal wall systems crafted from local reclaimed wood.



bioPUR Smart PLSMS Windows

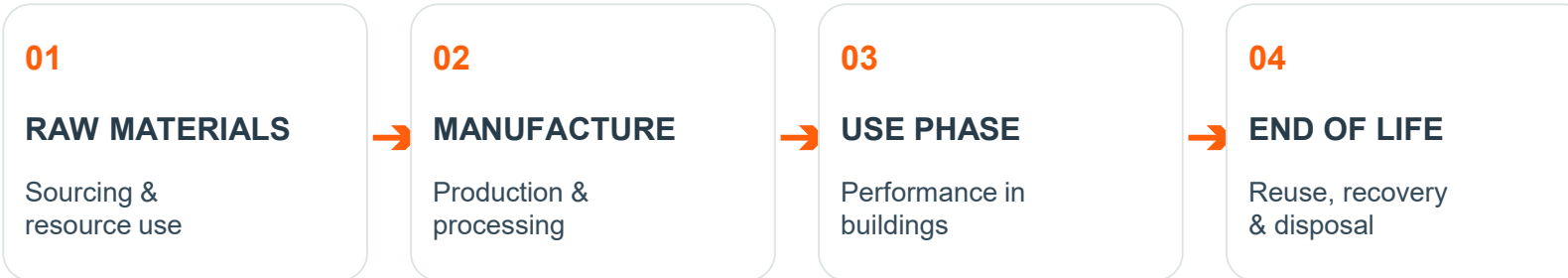
Highly insulating bioPolyurethane framed windows with plasmochromic technology, using recycled glass for better comfort.



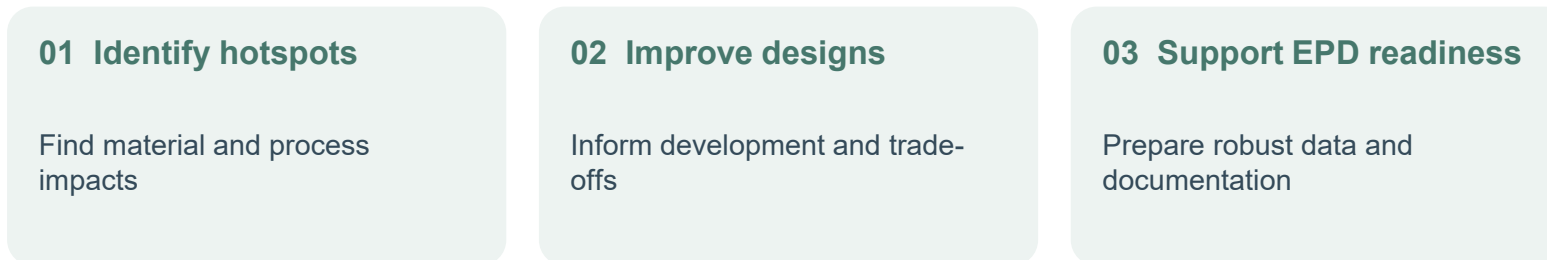
Second-Life Photovoltaic Panels

Repurposed photovoltaic panels to extend their lifecycle and enhance energy efficiency.

Life cycle assessment follows environmental impacts across product stages



WHAT THE RESULTS ENABLE



INBUILT PROGRESS

9

innovative products assessed through LCA + LCC

Aligned with EN 15804+A2

This dark blue box summarizes the progress of the INBUILT project. It features the title 'INBUILT PROGRESS' at the top, followed by a large white number '9'. Below this, it states 'innovative products assessed through LCA + LCC'. A horizontal line separates this from the bottom text, which reads 'Aligned with EN 15804+A2'.

Integrating LCA in the design of innovative building products: insights from INBUILT

Dr. Stephen Allen

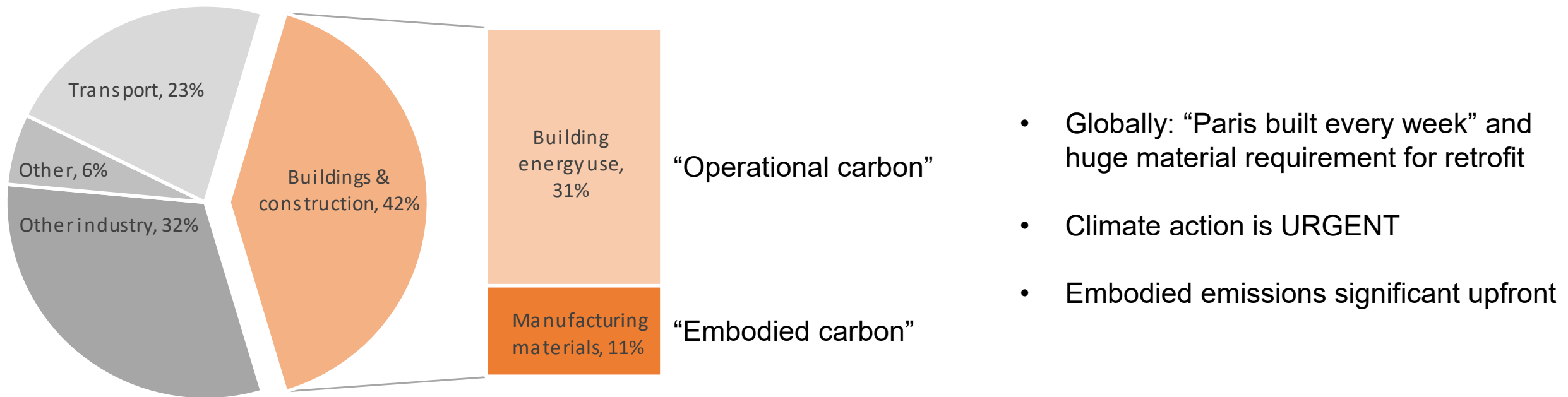
Associate Professor, Department of Architecture and Civil Engineering
Associate Director, Institute of Sustainability and Climate Change
University of Bath

<http://go.bath.ac.uk/stephen-allen>



Co-funded by
the European Union

Global, annual picture

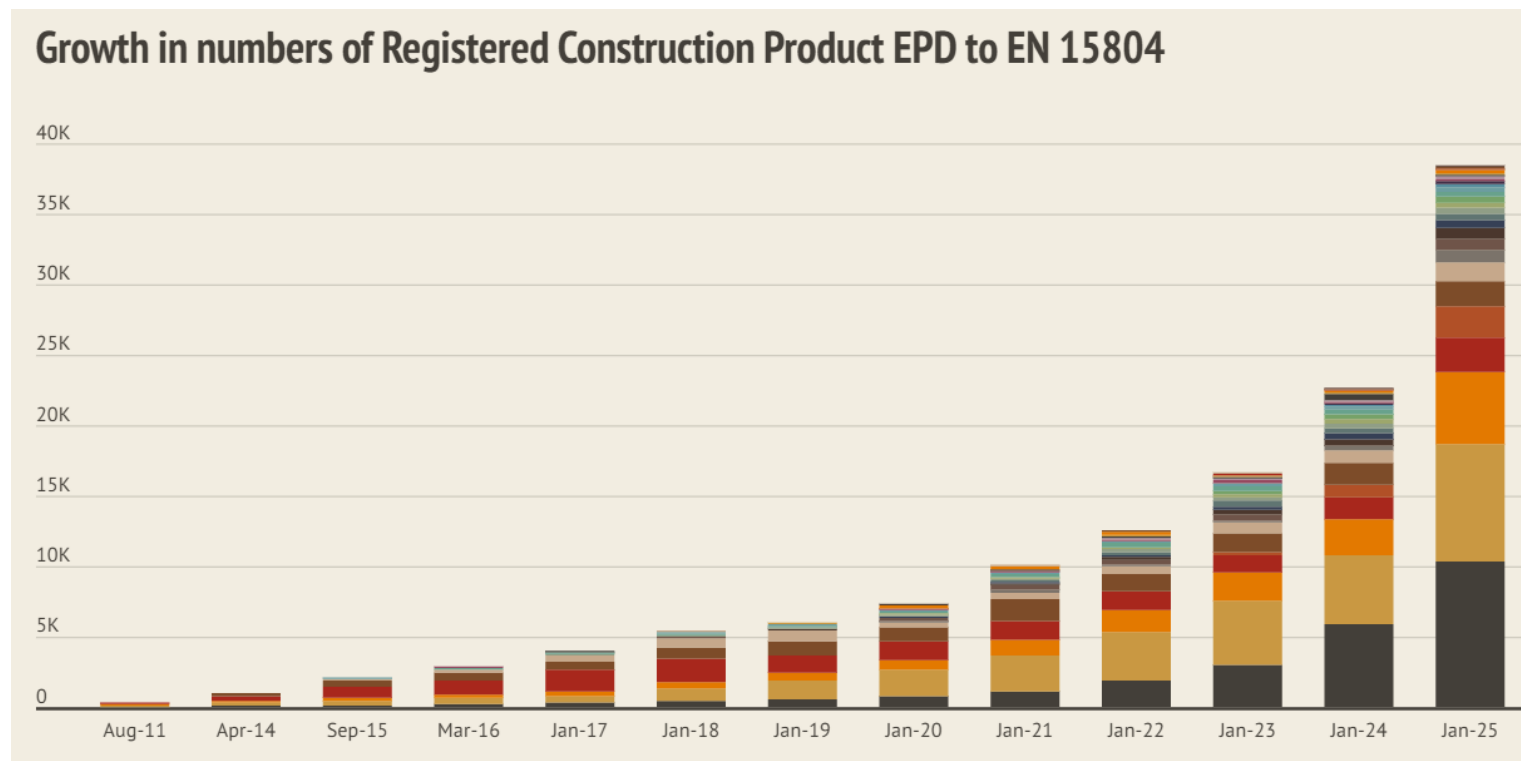


European policy

- Updated Energy Performance of Buildings Directive (EPBD): life-cycle Global Warming Potential to be disclosed from Jan 2028 for new buildings above 1000 m², and from Jan 2030 for all new buildings
- Leading Member States already moving to GWP disclosure (e.g. France's RE2020; Denmark's BR25)
- This requires LCA at two levels:
 1. **Individual construction products – today's topic**
 2. Whole buildings – INBUILT's forthcoming Digital Platform (future INBUILT webinar)

Growth in commercial use of LCA

- In 2025, over 180,000 Environmental Product Declarations (EPD) to either EN 15804 (below) or ISO 21930.
- How can companies developing new products and construction techniques engage with this?



Sustainable construction at University of Bath



1st

Dept. Arch. and Civil Eng.
(ACE) ranking in Research
Excellence Framework*

Balehaus / Modcell



Large environmental chamber



Gold

Teaching Excellence
Framework

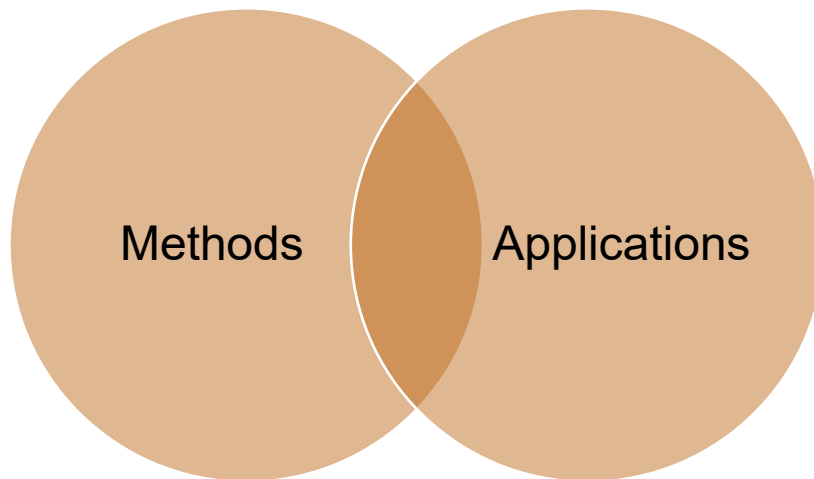
Assessment and strengthening of concrete
structures



ICE Database

ICE (Inventory of Carbon & Energy)		
Authors:	Dr Craig Jones*	Professor Geoffrey Hammond
Affiliation:	 Resource efficiency at its best	 UNIVERSITY OF BATH
*corresponding author. Contact details: http://www.circularecology.com/contact.html		

LCA: methodological innovation and practice application



Examples:

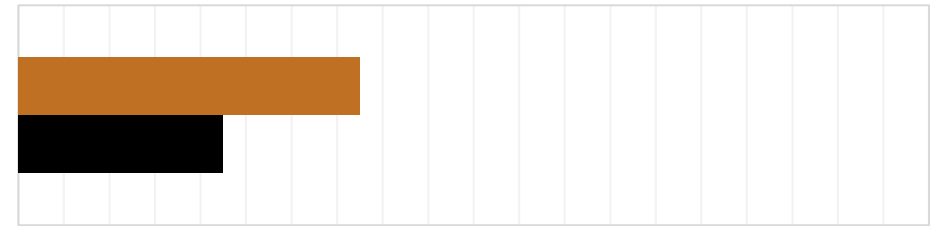
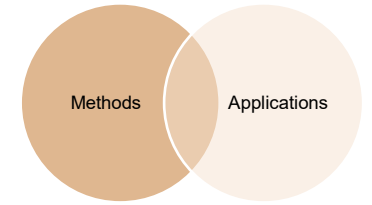
- **Combining LCA with physical testing**
- Tackling **uncertainty** during LCA and its interpretation
- **Forecasting** rather than historic accounting

Example: UNCARB

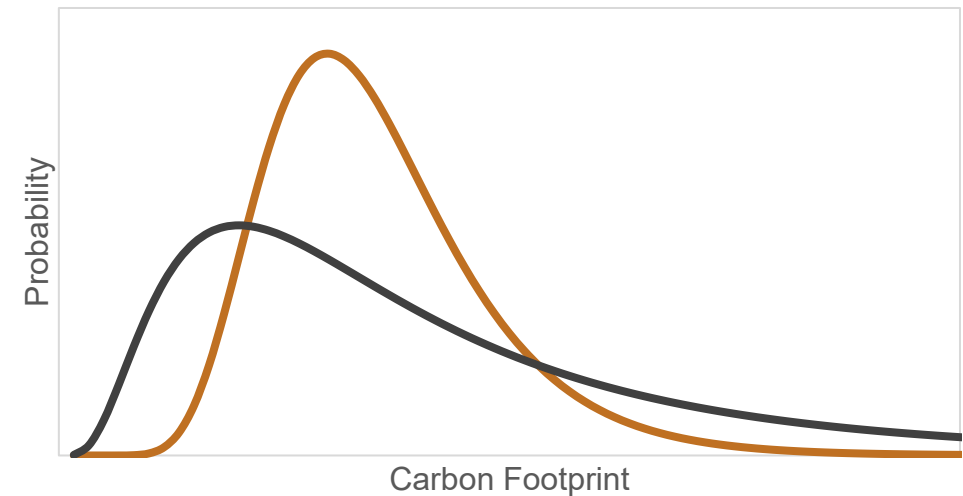
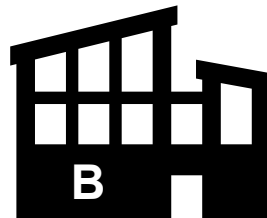
Tackling UNCertainty when predicting CARbon footprints of construction products & buildings (2021-24)

Aims:

- improve confidence in results
- improve likelihood of carbon savings in practice

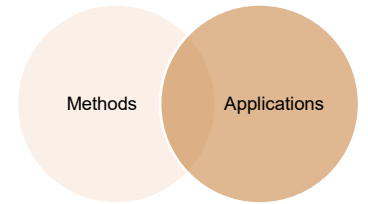


vs.



Example: embodied carbon in construction purchasing

Translation of UNCARB and other research...



From [Communications](#)

University of Bath to partner with construction sector software firm Causeway on carbon calculation

Knowledge Transfer Partnership grant from Innovate UK will help companies drive towards Net Zero goals

Press release

Published on Thursday 29 June 2023

Last updated on Friday 30 June 2023

[View more announcements in Communications](#)



Calculating carbon embedded in buildings will help drive to Net Zero

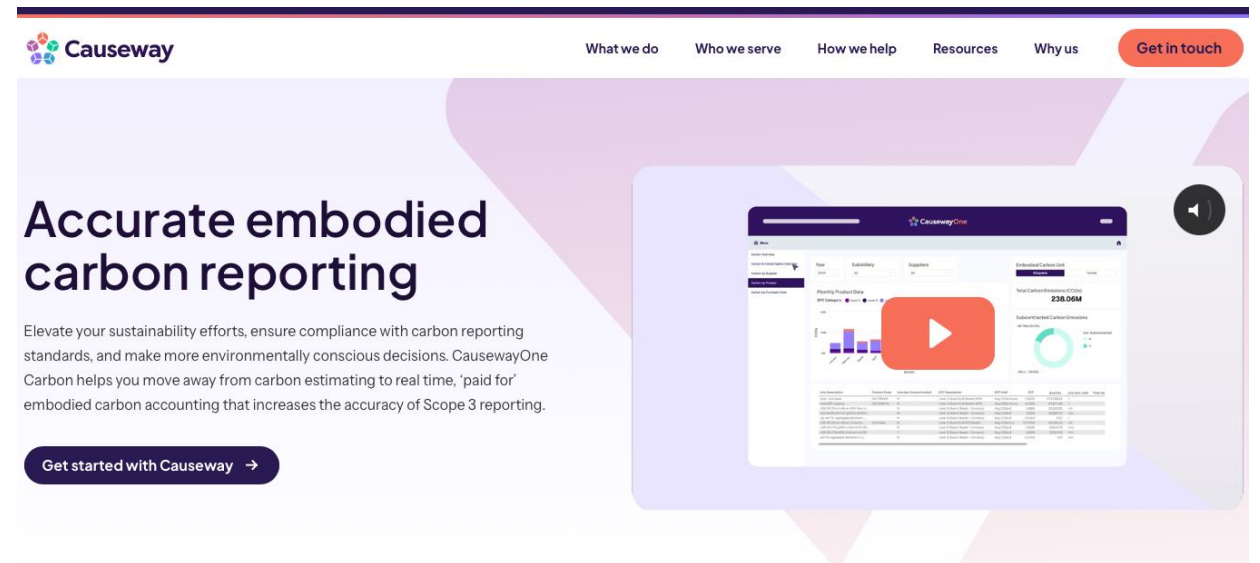
Media enquiries

Press Office
press@bath.ac.uk
 +44 (0)1225 386319

Media Centre

[Find information for journalists, bloggers and online commentators](#)

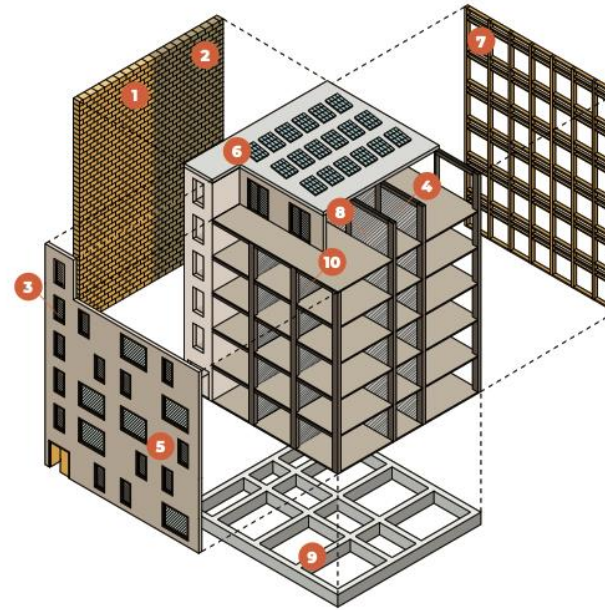
Share

The screenshot shows the Causeway website. The header includes the Causeway logo and navigation links: 'What we do', 'Who we serve', 'How we help', 'Resources', 'Why us', and a 'Get in touch' button. The main content area features the headline 'Accurate embodied carbon reporting' and a sub-headline: 'Elevate your sustainability efforts, ensure compliance with carbon reporting standards, and make more environmentally conscious decisions. CausewayOne Carbon helps you move away from carbon estimating to real time, "paid for" embodied carbon accounting that increases the accuracy of Scope 3 reporting.' Below this is a 'Get started with Causeway' button. To the right, there is a video player showing a screenshot of the CausewayOne software interface, which displays various carbon reporting metrics and a large red play button.

<https://www.causeway.com/supply-chain/carbon-reporting>

LCA in INBUILT



1 Recycled Bricks (Fired and non-fired)
Bricks made from recycled materials, reducing landfill waste.
Producer: Leipfinger – Bader



2 Compressed Earth Blocks
Innovative, sturdy blocks made from local soil, with low carbon emission in production.
Producer: FILIATER



3 Electrochromic Smart Glazed bioPUR windows
Windows embedding dual band electrochromic films made with recycled glass integrated in a highly insulating bioPolyurethane frame.
Producer: INDRESMAT and LEITAT



4 Bio-based Insulations Panels
Fire safe, thermal and acoustic rigid insulation sheet made from industrial residues.
Producer: Mykor Portugal



5 Reclaimed Wood Wall Panels
Reusable external and internal wall systems crafted from local reclaimed wood.
Producer: Karlsruhe Institute of Technology



6 Second-life Photovoltaic Panels
Repaired and reconditioned carbon-free photovoltaic panels with enhanced energy efficiency and lifespan over 10 years.
Producer: CEA and SolReed



7 Bio-based Curtain Walls
Modular wall system using a novel biobased Polyurethane curtain wall framing system to create energy efficient building exteriors.
Producer: INDRESMAT and LFE



8 Hybrid Straw-Clay Boards
A unique mix of straw and clay that offers natural insulation, utilising renewable resources.
Producer: Leipfinger – Bader



9 Recycled Concrete Blocks
Concrete made from demolition waste, lessening the need for new materials.
Producer: Feess



10 Recycled Paper and Textile Fiber Insulation Mats
Insulation solutions made from recycled paper and textiles for improved building thermodynamics.
Producer: BalticFloc

Approach

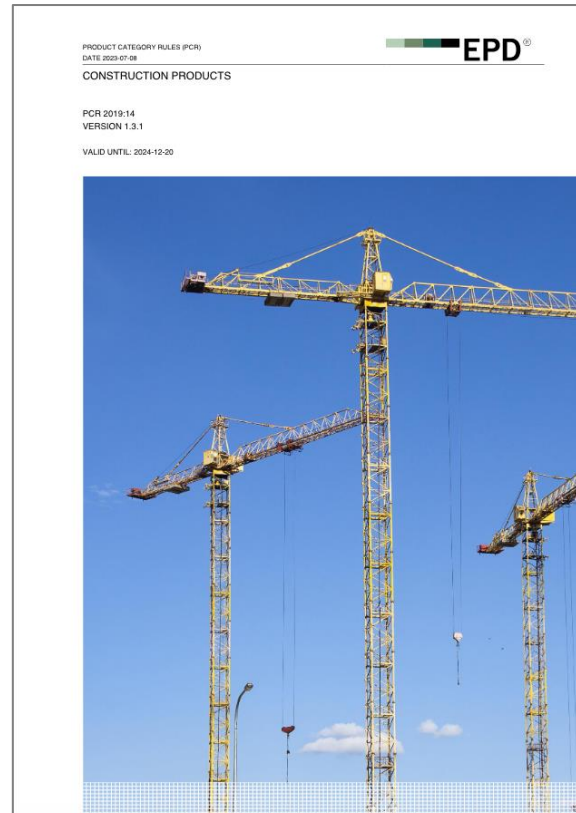
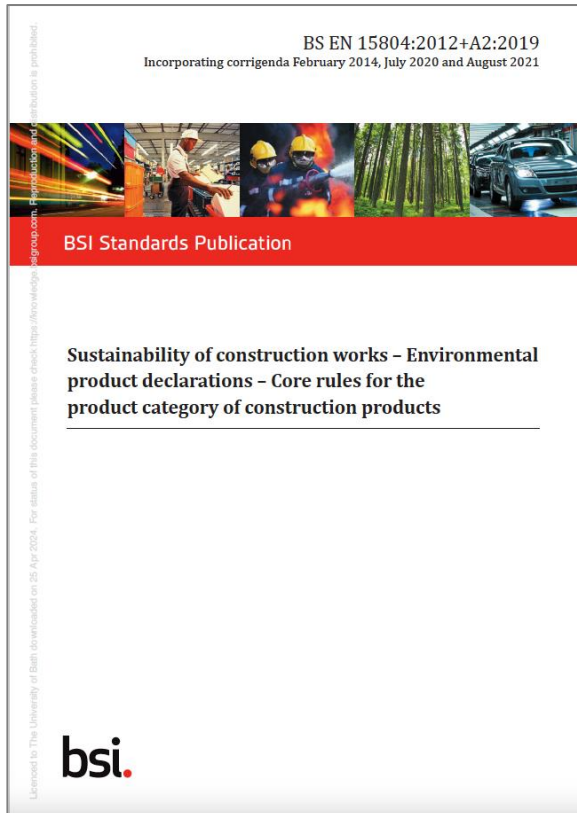


Table 1 — Application of generic and specific data

Modules	Module A1-A3		A4 and A5	B1-B7	C1-C4
	Production of commodities, raw materials	Product manufacture	Installation processes	Use processes	End-of-life processes
Process type	Upstream processes	Processes the manufacturer has influence over	Downstream processes		
Data type	Generic data	Manufacturer's average or specific data	Generic data		

Challenge:

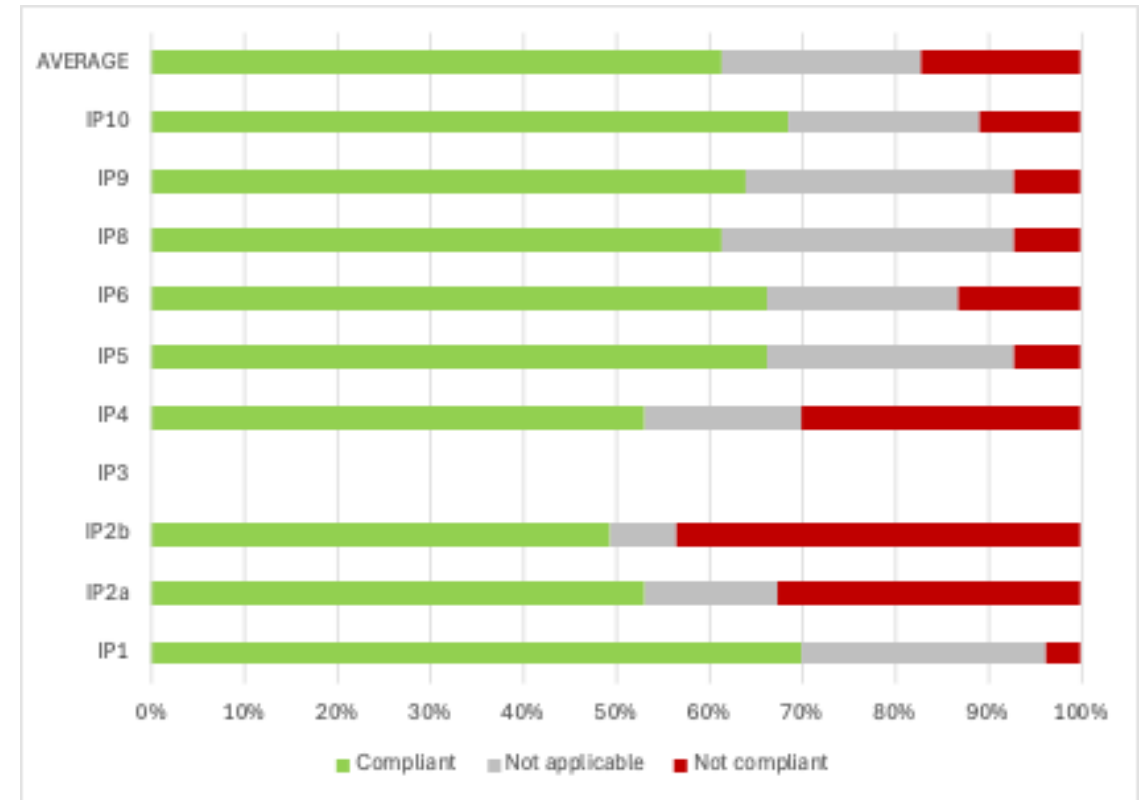
- We needed to be as robust as possible, but....
- Products under development during INBUILT, so inventory data changing and full compliance with standards not necessarily possible.

Hence:

- Two stage review process by task leader (UBath).
- Compliance summary to aid interpretation and use of the results.
- Scientific publications about novel aspects of the LCA are on the way.

Compliance summary

- There are 83 requirements to verify in the International EPD System
- **Average compliance: 61%, with a further 21% not applicable**
- **Average non-compliance: 17%.**
- **Some variance in self assessment.**
- **Compliance summary is useful:**
 - When interpreting and using results (e.g. in WP5 and the Digital Platform)
 - For IP developers to know how close they are to being able to produce an EPD
- **Full details at end of LCA reports**



Panel discussion: benefits and challenges of integrating LCA into sustainable product development

- **Donald Chimobi Nwonu**, Postdoctoral Research Associate, University of Bath
- **Andrea Klinge**, Professor of Construction and Design, Karlsruhe Institute of Technology
- **Fred Robinson**, Head of R&D, Mykor



COMMUNICATION

Giorgio Alessandro

g.alessandro@greenovate-europe.eu

COORDINATOR

Erwin Franquet

Erwin.FRANQUET@univ-cotedazur.fr

THANK YOU!



www.inbuilt-project.eu