



What skills are needed to assess bio-based and upcoming materials?

Insights from the UK LCA Network working groups

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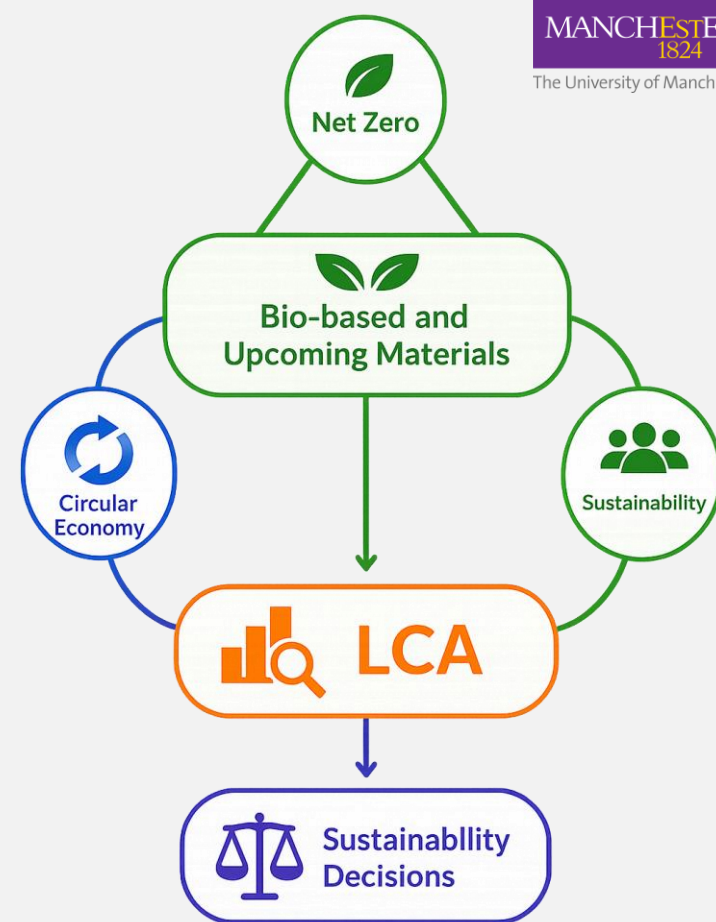


2026 LCN Symposium

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Introduction

- Bio-based and upcoming materials are often proposed as solutions to meet net-zero and circular economy targets.
- LCA is essential for informing technology development, policy, and investment decisions.
- Assessing these systems often involves greater complexity and uncertainty than conventional products, requiring expertise beyond traditional LCA practice.



UK LCA Network: Working Group 2

WG2: Bio-based and upcoming materials

Co-leads: Prof Marcelle McManus (University of Bath) & Dr Rosa Cuellar-Franca (University of Manchester)

Key questions:

- What guidelines, standards or regulations are needed to assess and compare LCA of bio-based and recycled materials with fossil-based materials?
- Does current LCA practice allow assessment of circular economy goals, and if not what guidelines and methodology developments are needed?



**LCA-RSIN
Working Group
2 Outputs
Report**

Bio-based and
Upcoming Materials

LCA-RSIN
LCA Regulatory Science and Innovation Network

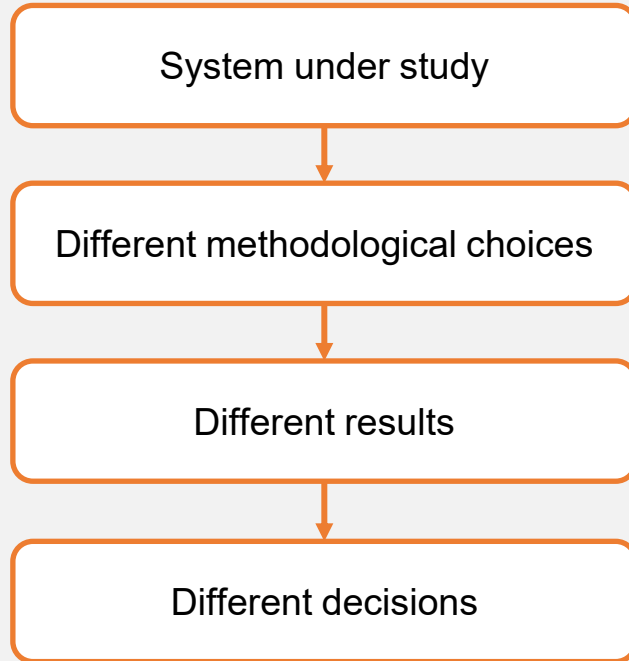
Core Team: 2 Academics, 2 PDRAs, 3 PhD students

WG2 Members (23): Academia, SMEs, Industry,
Government (DESNZ & DSIT)

Meetings: Twice a month

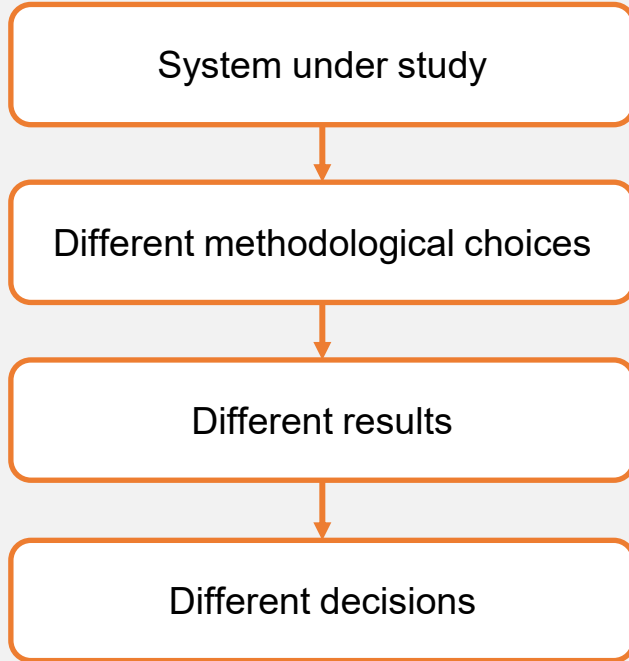
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Identified skills required for LCA practitioners working with bio-based and other materials



- **Compare** alternative approaches
- **Critically evaluate** the strengths and limitations of standards and frameworks
- **Understand** how methodological choices influence results
- **Recognise** when important aspects may not be captured

Exemplary case studies and skills required



Sustainable Aviation Fuel (SAFs)



Steel
(circular materials)

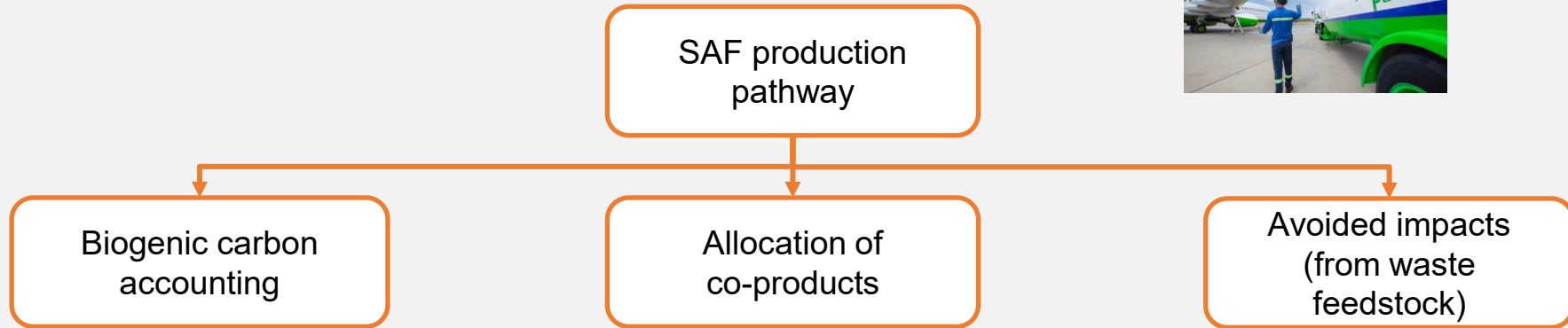


Construction materials



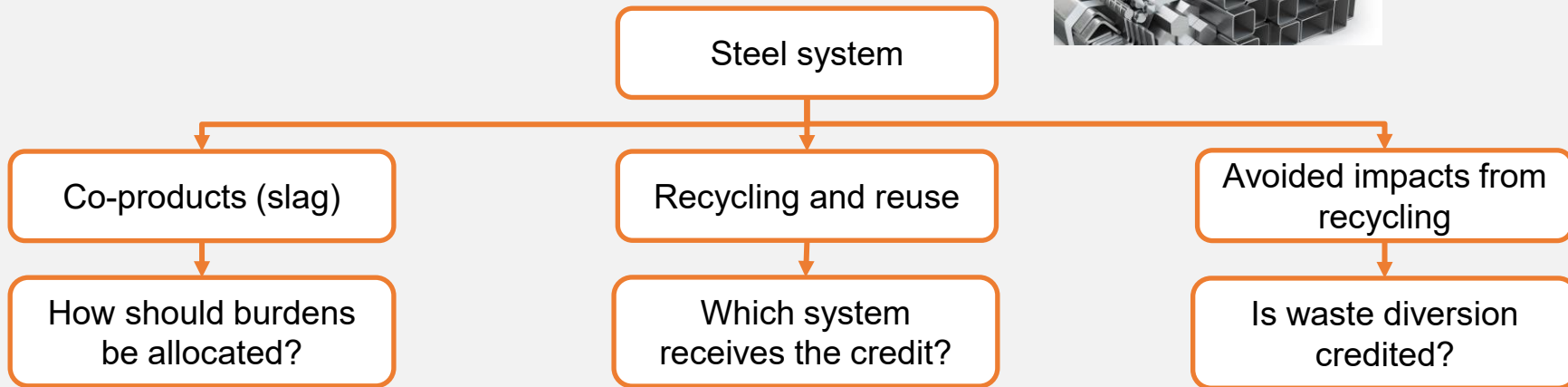
Novel materials

Sustainable Aviation Fuels (SAFs)



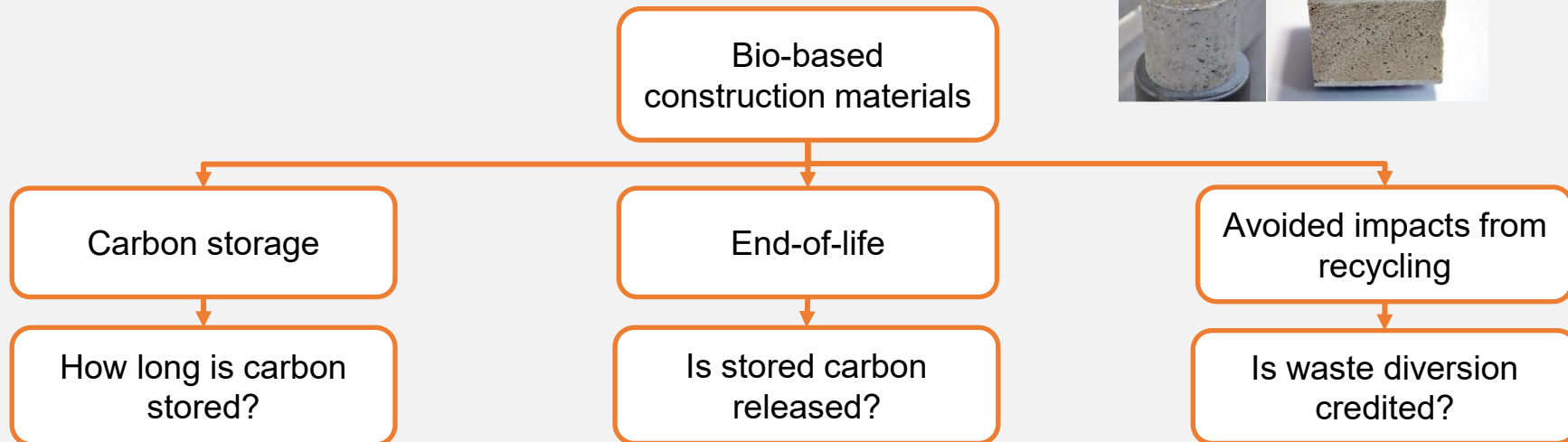
- **Compare** alternative approaches and **Critically evaluate** the strengths and limitations of standards and frameworks
 - CORSIA, RED II, ISO 14067
- **Understand** how methodological choices influence results
 - CORSIA and RED II do not allocate credits to co-products, preventing the attribution of “negative” emissions to the main product.
 - CORSIA allows “waste CO₂” utilisation credits.

Steel (circular materials)



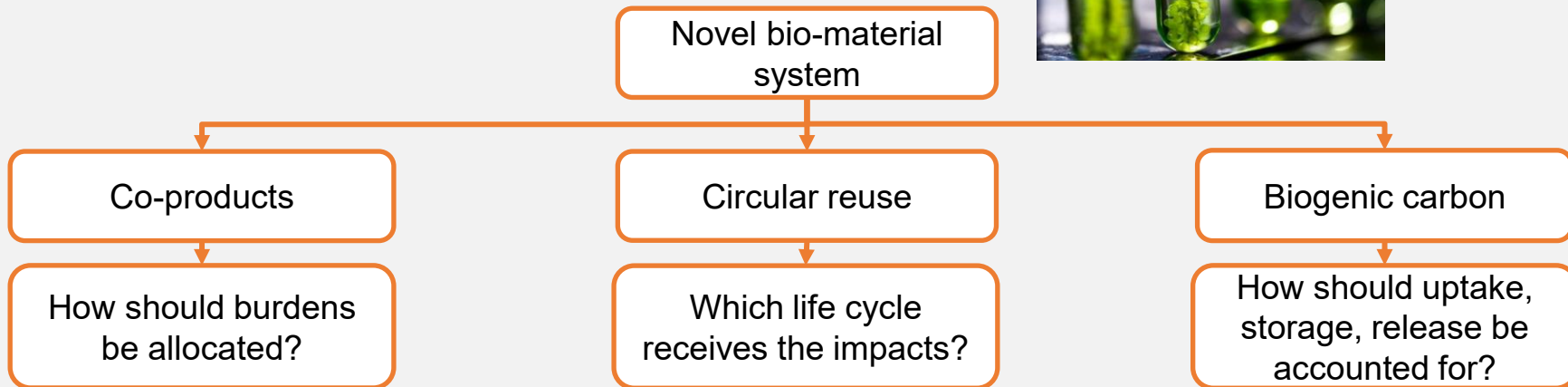
- **Compare** alternative approaches and **Critically evaluate** the strengths and limitations of standards and frameworks
 - ISO 15804, GHG protocol, ISO 14067, ISO 20915 etc.
- **Understand** how methodological choices influence results
 - Discrepancies of as much as 56% in GHG emissions reported for ground granulated blast furnace slag based on different allocation methods
- **Recognise** when important aspects may not be captured
 - Avoided impacts: Limits recognition of low-carbon innovations.

Bio-based construction materials



- **Compare** alternative approaches and **Critically evaluate** the strengths and limitations of standards and frameworks
 - ISO 15804, GHG protocol, ISO 14067, EPD, PAS 2050 etc.
- **Understand** how methodological choices influence results
- **Recognise** limitations and potential gaps in assessments
 - Short vs long term storage construction materials
 - Definition of storage duration

Upcoming bio-based materials



- **Critically evaluate** the strengths and limitations of standards and frameworks
 - No dedicated standards for the assessment of novel bio-based materials
- **Understand** how methodological choices influence results
 - Results are influenced by allocation methods



Key takeaway messages

- Good LCA practice requires interpretation, critical evaluation, and life cycle thinking.
- Ability to compare alternative approaches and critically evaluate the strengths and limitations of standards and frameworks is as important as conducting the LCA
- Different approaches can lead to different results; therefore, practitioners should understand how methodological choices influence them.
- Future education should prepare practitioners to make informed decisions, not just run LCA models.

Acknowledgements

UK LCA Network

Working Group 2 members:

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Working Group 2 Report