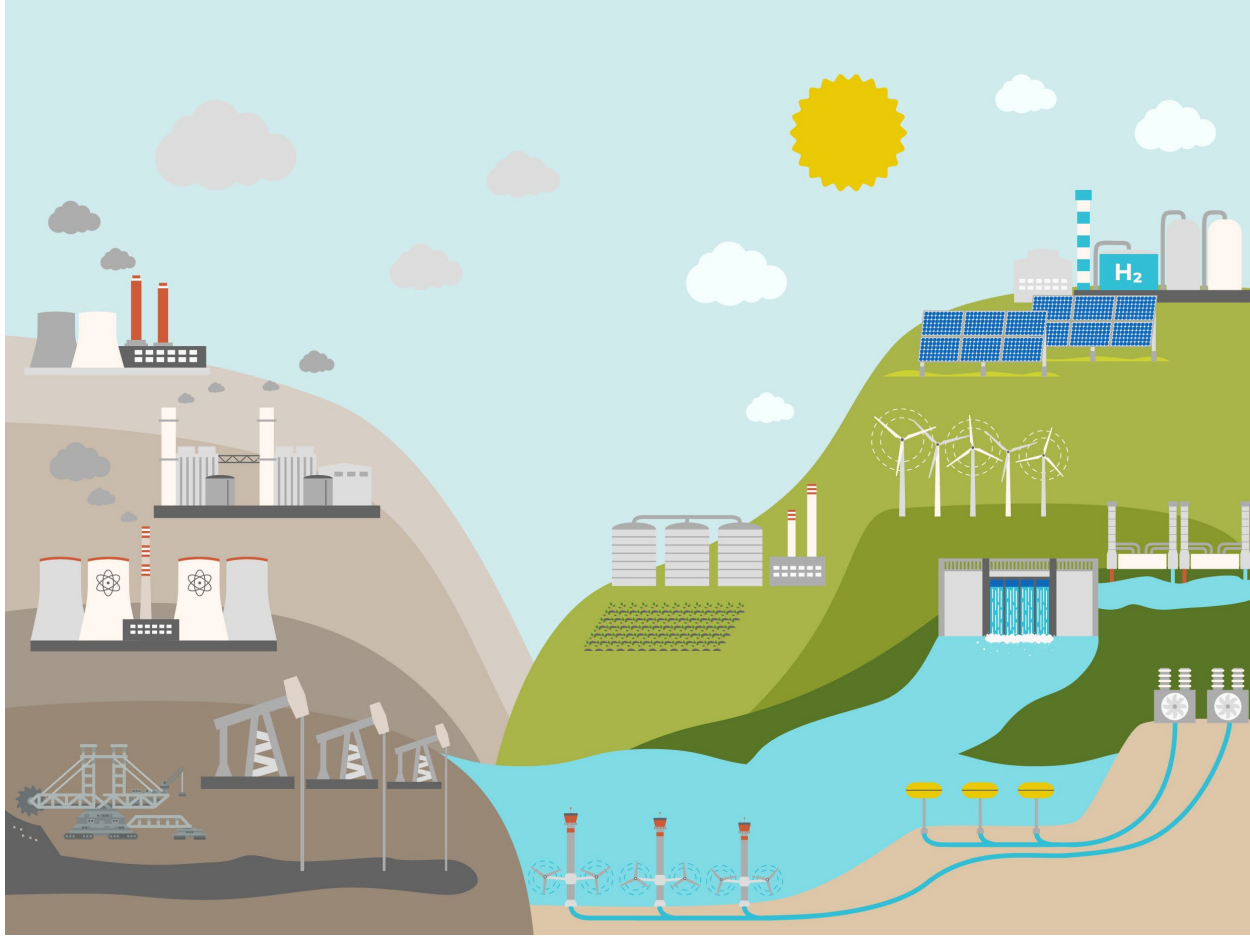
Can Construction & Demolition Activities Be Material Recovery Projects?

Data Requirements for Deployment of the UNFC



RESOURCE MANAGEMENT WEEK

2024

Julia Stegemann

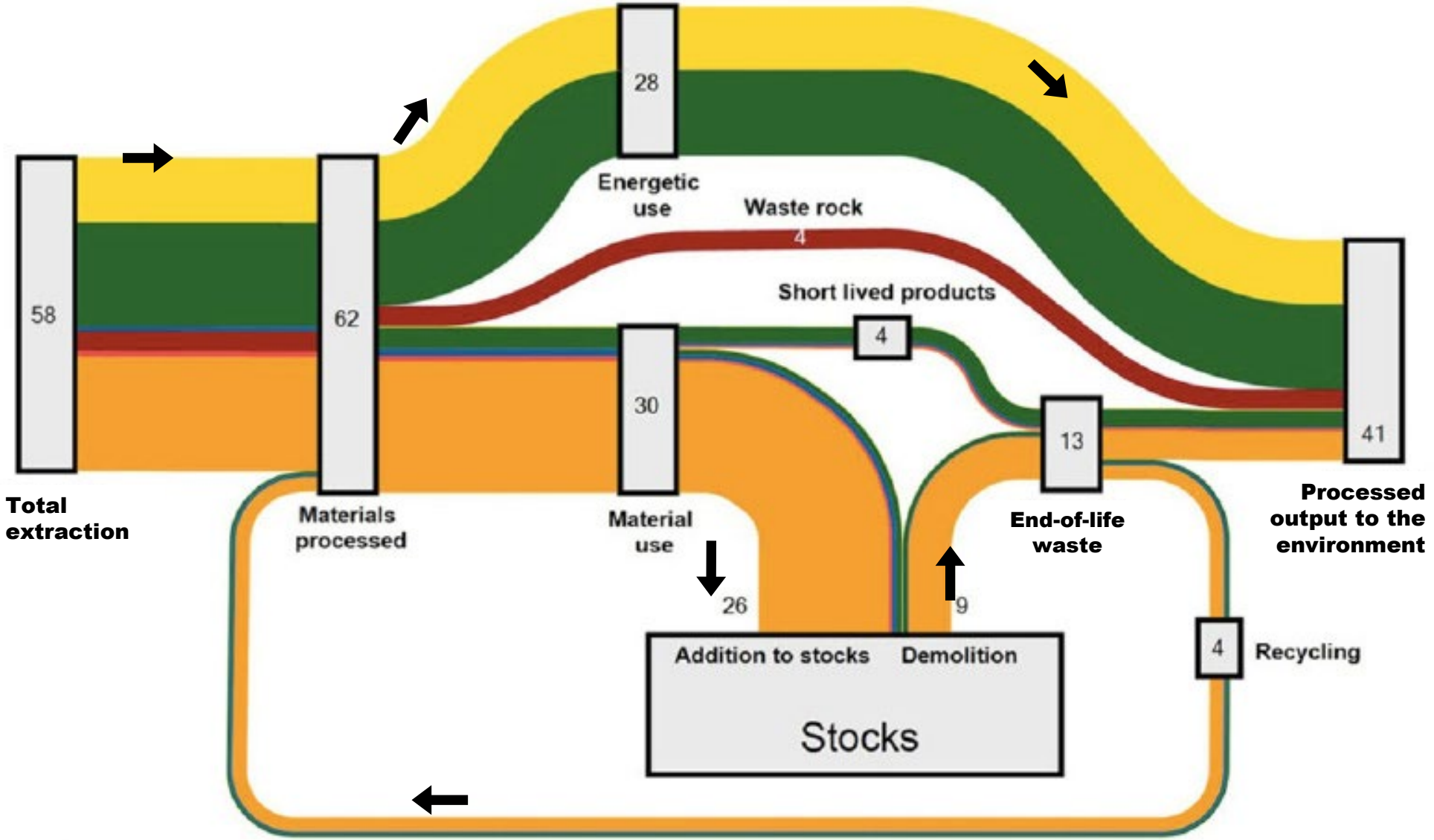
University College London

UNECE

Context

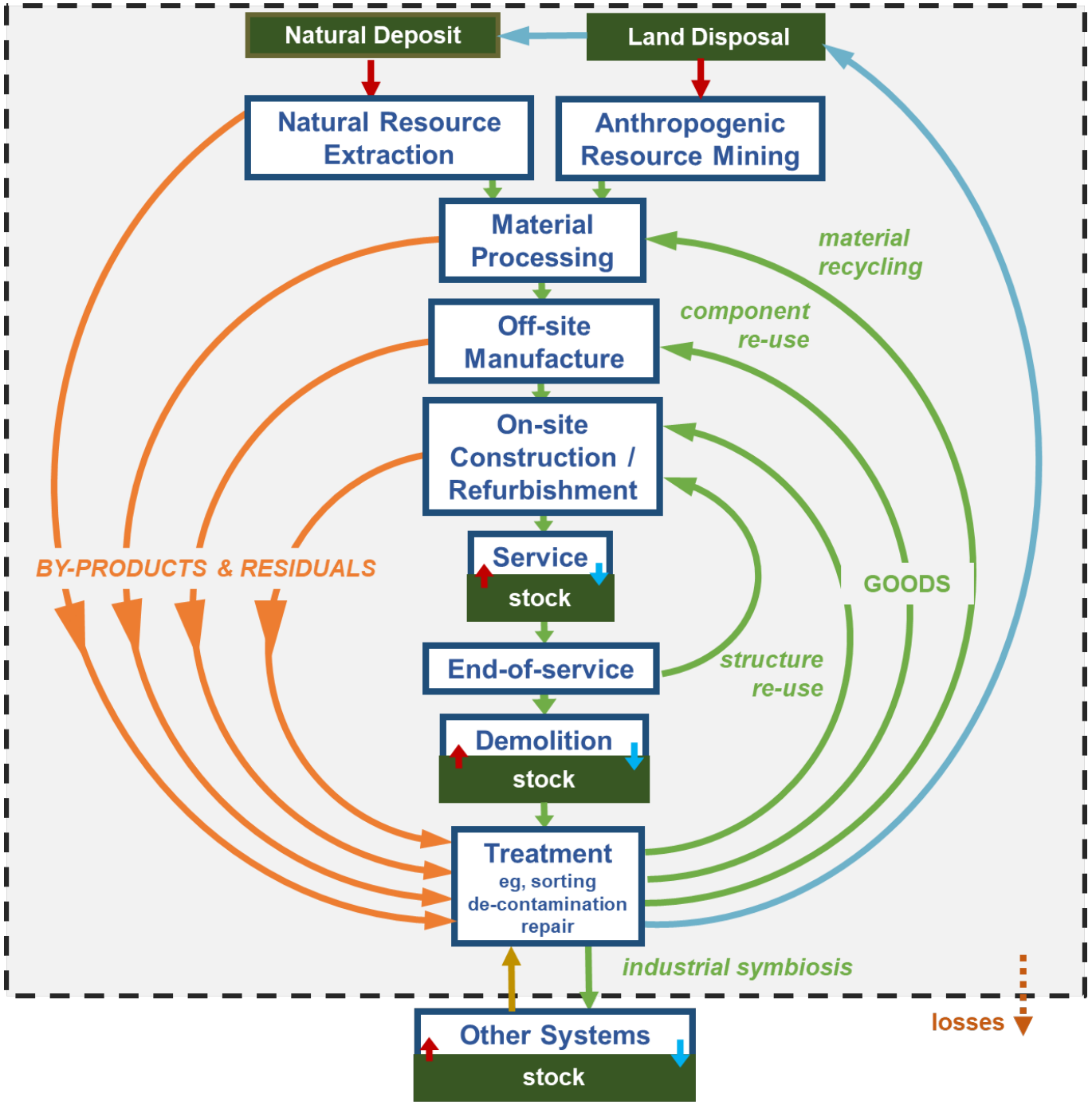
Sankey Diagram of Material Flows Through the Global Economy (Gt in 2005)

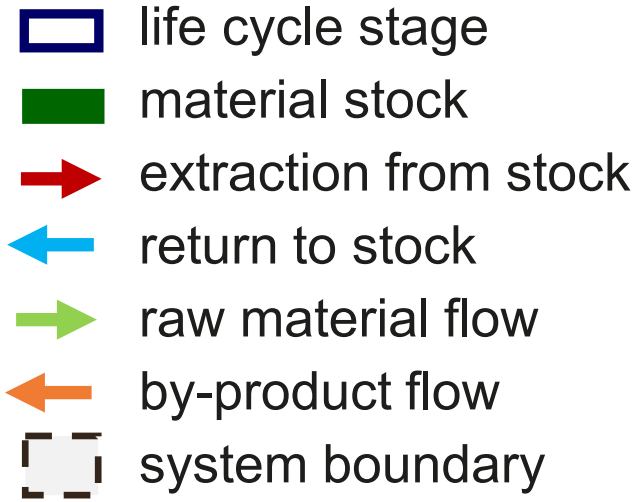
~28 Gt in 2005
➔ 45 Gt in 2014
➔ ~80 Gt in 2025?



Haas et.al. (2015) How Circular is the Global Economy?: An Assessment of Material Flows, Waste Production, and Recycling in the European Union and the World in 2005 DOI: 10.1111/jiec.12244.

CIRCULAR RESOURCE FLOWS IN THE CONSTRUCTION MATERIAL LIFE CYCLE





UKRI Interdisciplinary Circular Economy Centre for Mineral-based Construction Materials

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icec-mcm@ucl.ac.uk

bit.ly/icec-mcm-register

@icec_mcm

FutuRaM

Future availability of secondary raw materials

Get Involved | FutuRam

www.futuram.eu

@FuturamProject

FutuRaM project

Case Study: Material recovery from 2021 basement demolition & sustainable office building construction

Aggregation of Material Recovery Subprojects:

1. Concrete
2. Brick
3. Tiles & ceramics
4. Mixed stony waste
5. Mixed metal
6. Timber

JJ Mack Office Building, London, UK

Acknowledgement: Mace Group

Zhang, C, Stegemann, J.A., 2024. Resource recovery of construction and demolition waste: A case of an office building in London (in preparation)

G-axis: Degree of confidence

- Case study uses company records of construction waste and demolition material quantities → high confidence for mixed material categories (G1)
- Lower confidence for separated higher quality materials, e.g., Cu from Al and steel, or cement powder from crushed concrete

Better Data Sources: pre-demolition audits, building information management (BIM) systems

F-axis: Technical feasibility

- Identification of technologies for recovery of each material at the desired quality
- Different technology readiness levels for common practice vs potential for better products
- Transfer coefficients for all materials to enable assessment of product quality
- Existence of infrastructure: transport, energy, water, etc.

E-axis: Environmental-social-economic viability

Economic Viability

- Capital and operating costs of recovery of the target material streams, e.g.,
  - market prices (usually costs) for recovered materials
  - costs and payback period for equipment to internally process materials for higher value recovery
  - labour and costs for management of residual materials and externalities, etc.

Environmental and Social Viability

- Compliance with the UK planning regime
  - Public consultation
  - Environmental Impact Assessment (EIA)

Additional aspects:

emissions savings, worker safety, jobs and economic opportunities, community stability …?

Thank you!

Please get in touch
if you have a UNFC case study for a construction material recovery project …
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THE VIEWS EXPRESSED ARE THOSE OF JULIA STEGEMANN AND DO NOT NECESSARILY REFLECT THE VIEWS OF THE UNITED NATIONS.

UK ICE SRM Circular Economy

University of Exeter

Brunel University London

BGS British Geological Survey

Swansea University Prifysgol Abertawe

UCL