Impact of Building Materials Reuse on Climate Change

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Eunomia Research & Consulting is a leading advisor on resource management and the circular economy

Since 2001, we have provided public, private and NGO clients with data driven solutions to deliver social, climate and environmental goals.

Our impartial, evidence-led approach combined with a long-standing sector knowledge gained from being at the forefront of environmental solutions for decades means clients have complete confidence in the integrity of our work.

Across policy, strategy, and practical implementation, we can help facilitate the positive change required to create a sustainable world

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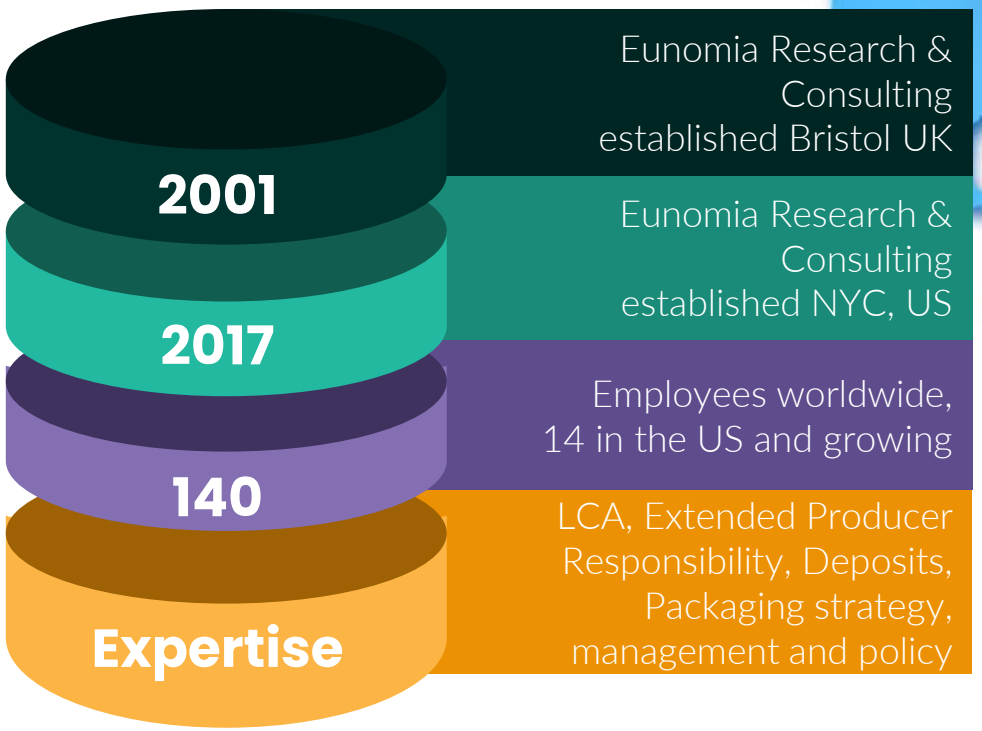
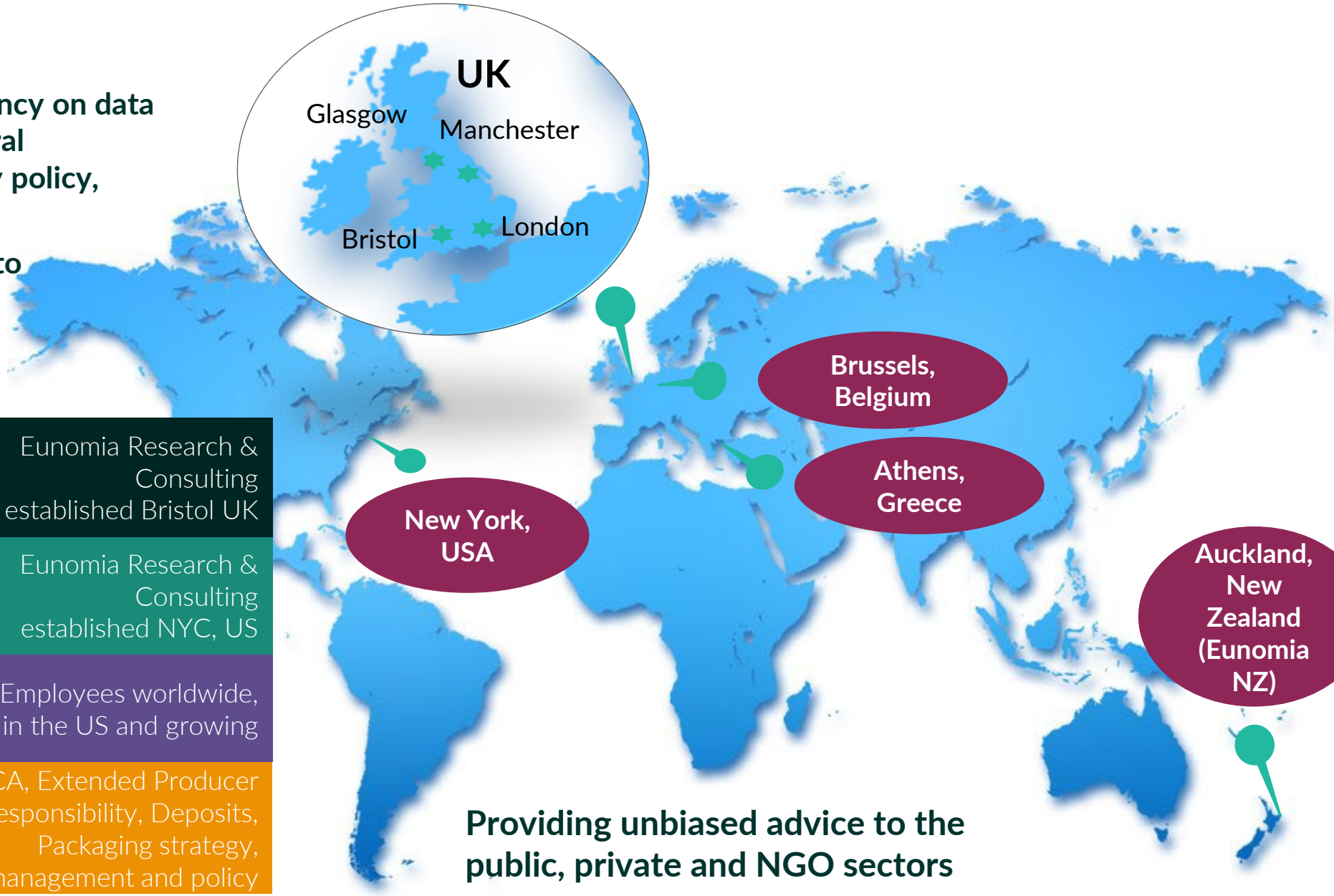
Leading international consultancy on data driven circular economy, natural economy and carbon economy policy, programs and systems

Adapting global best practice to provide evidence-based solutions





Providing unbiased advice to the public, private and NGO sectors

The Facts

2018:

- Construction sector contributed $1.61 trillion to the US GDP in 2018
- Generated more that 600 million tons of construction and demolition waste – 2x's the amount of municipal waste
- Globally the build environment accounts for 39% of global carbon emission and industries responsible for manufacturing building and construction materials are responsible for 10% of all GHG emissions
- Construction materials account for half of all of raw materials used

Reducing the embodied carbon impacts from the construction cycling including:

- **Raw material sourcing**
- **Manufacture**
- **Use; and**
- **Disposal**

is critical to reducing global emissions by 1.5 degrees centigrade by 2030!

Importance of Reducing New Material Production Impacts

Industries contributing greatest to GHG emissions = aluminum, concrete, steel and plastics.

2050 net zero plans in these sectors are not enough

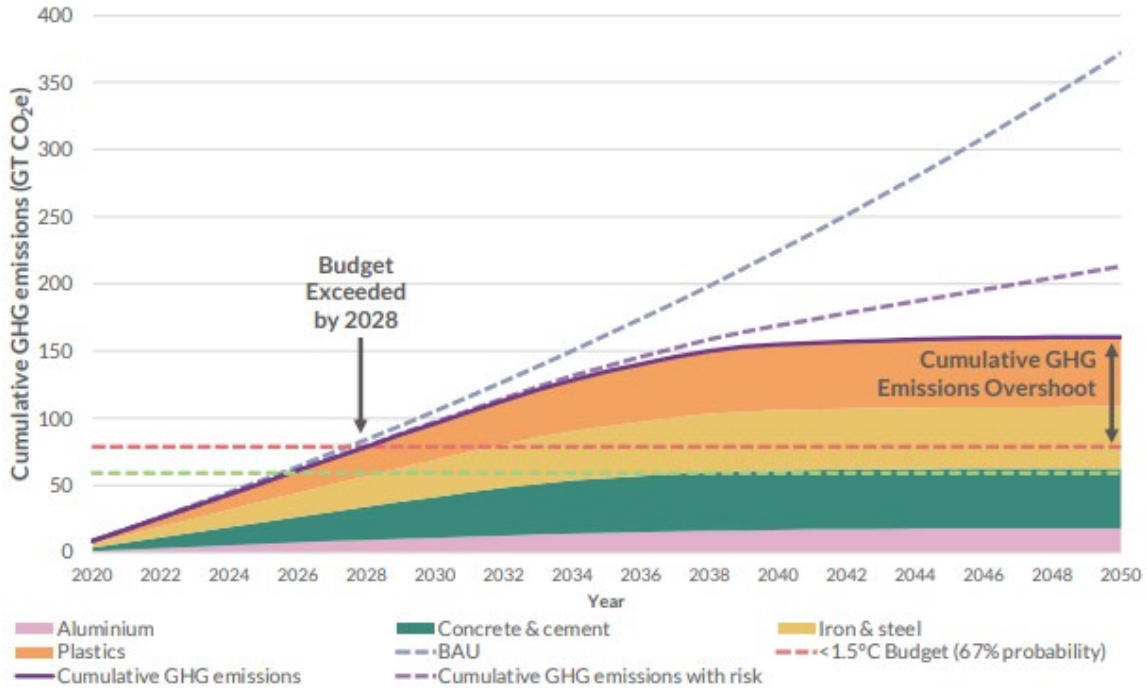
Industry Actions:

- **Aluminum: Rapid adoption of existing technologies**
- **Concrete: Carbon Capture, Utilization & Storage (not proven)**
- **Steel: Reliant on hydrogen (not yet produced and needed for other sectors)**

Policy Interventions :

- **Reduce material consumption**
- **Drive shift in material use to less carbon intensive sectors**

Resource use policy needs to be integrated with policy on waste, recycling and product design



High recycling rates and circularity at the material level needed but this is to be supported by product circularity through reuse.

Material switching is critical: Timber replaced concrete, plastics by paper

https://www.eunomia.co.uk/urgent-action-is-needed-to-reduce-material-use-in-key-industries/

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Product Policy Framework to Support Circularity

Client: European Commission

Objective: Identify policies to support the CE for specific products

Focus:

- Energy related (appliances and electronics) and batteries
- Chemical products (paints, detergents and hygiene)
- Construction products (precast concrete, steel beams, insulation, windows and doors)
- Transport and automotive
- Textiles
- Toys

Opportunities in construction product:

Concrete:

- Replace in-situ with precast concrete
- Increase recycled content in precast
- Repair
- Reuse and design for reassembly
- Increase recycling

Steel beams and frames:

- Reuse and redistribution
- Recycling
- Lightweight design

Eunomia Drive - Final Report - Product Policy Framework.pdf - All Documents (sharepoint.com)

Product Policy Framework to Support Circularity

Opportunities in construction products:

Windows and door:	Insulation:
• Recycling of flat glass • Design for disassembly, repairability and recyclability • Direct reuse • Alternative sustainable material	• Reuse • Recycling • Use of recycled content • Alternative sustainable material e.g. biobased.

Country/State Level Construction Circular Economy Opportunities

Client: Scottish Government

Objective: Identify CE opportunities = high economic value and/or environmental benefits

Requirement to:

- Identify materials and products with highest CE potential
- Identify opportunities in subsectors, housing commercial education
- Match ambition to resources and timescales
- Identify and address barriers
- Engage with stakeholders

Focus:

- Developing a list of construction, refurbishment and demolition projects
- Review of high impact CE opportunities
- Deep dive into shortlist opportunities

Opportunity analysis used hierarchy of actions to asset and resource efficiency:

- Design and material choice
- Sourcing e.g. recycled content, refurbished
- Lower in use impacts, e.g. reduced energy
- Disposal options, takeback, reuse

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Country/State Level Construction Circular Economy Opportunities

Opportunity 1: Modular design, (including design for deconstruction and material passports)

Opportunity 2: Circular timber in construction

Opportunity 3: Circular aggregates (including concrete, brick, soils and stones)

Opportunity 4: Structural steel and aluminum reuse

Opportunity 5: Closed loop and lean design and construction for plasterboard

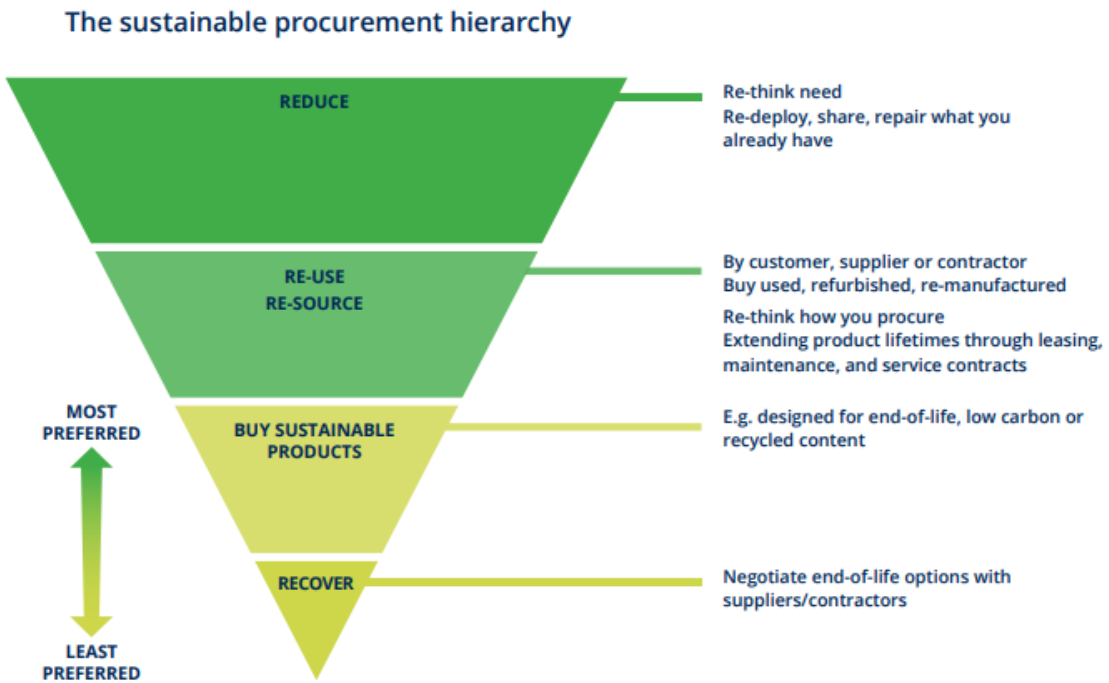
Opportunity 6: Making retrofit and refurbishment (including repair and maintenance) more circular

Opportunity 7: Large infrastructure and regeneration projects – circular scoping studies, material banks/ reuse hubs

Opportunity 8: Improving building utilization and usage

Circular Procurement Opportunities

The need to purchase new should be the last resort

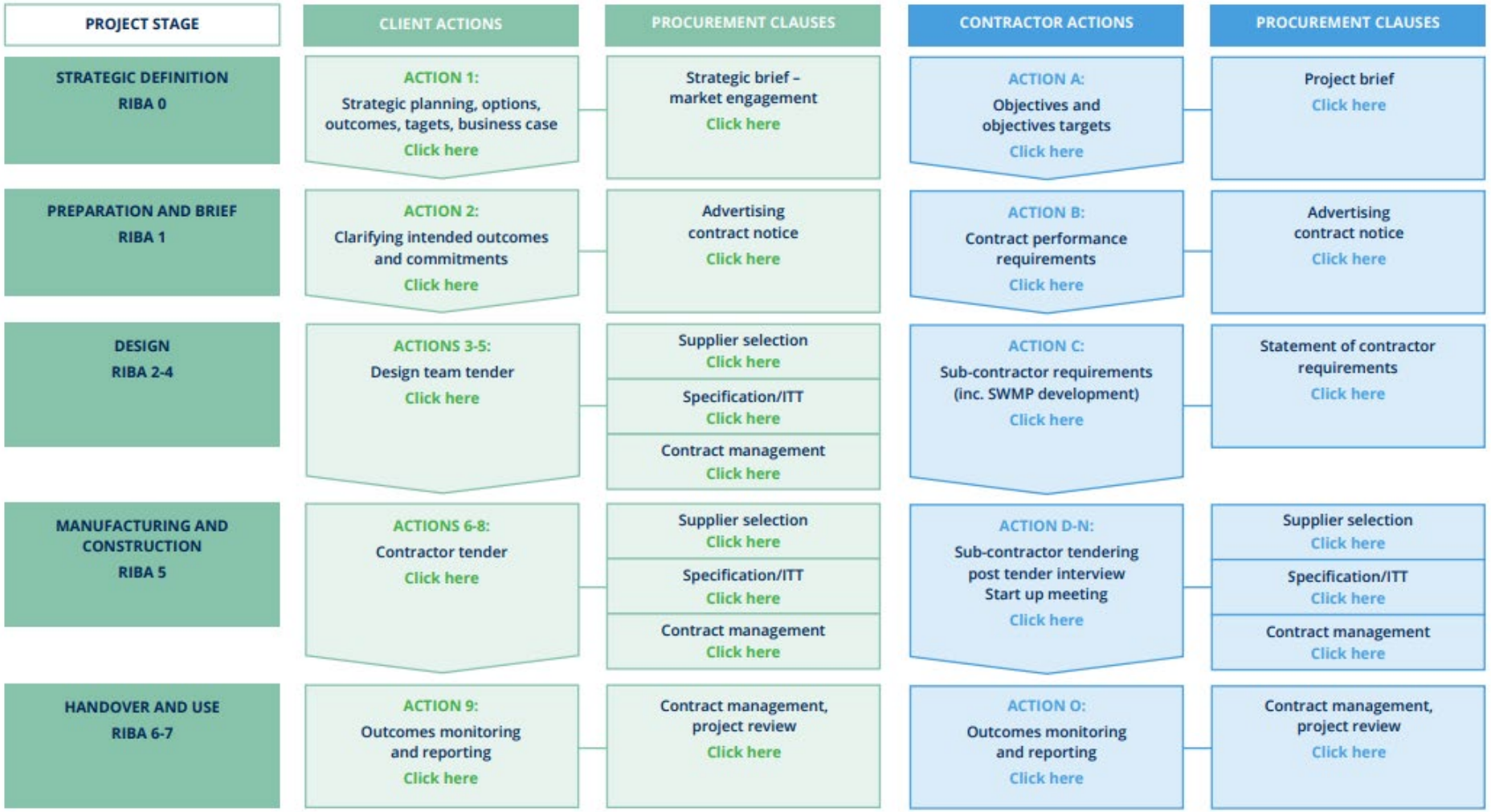


Procurement Guideline – Welsh Government:

- Advises procuring authorities on how to prepare for circular and low embodied carbon procurement (construction and engineering)
- Advises contractors on how to evaluate supply chain partners when responding to client requirements
- Provides contract clauses for clients and contractors

Source: Low Carbon & Resource Efficient Construction Procurement Guide_0.pdf (wrapcymru.org.uk) this guide is to support private and public sector clients and contractors

Circular Procurement Guidelines: Navigation Map



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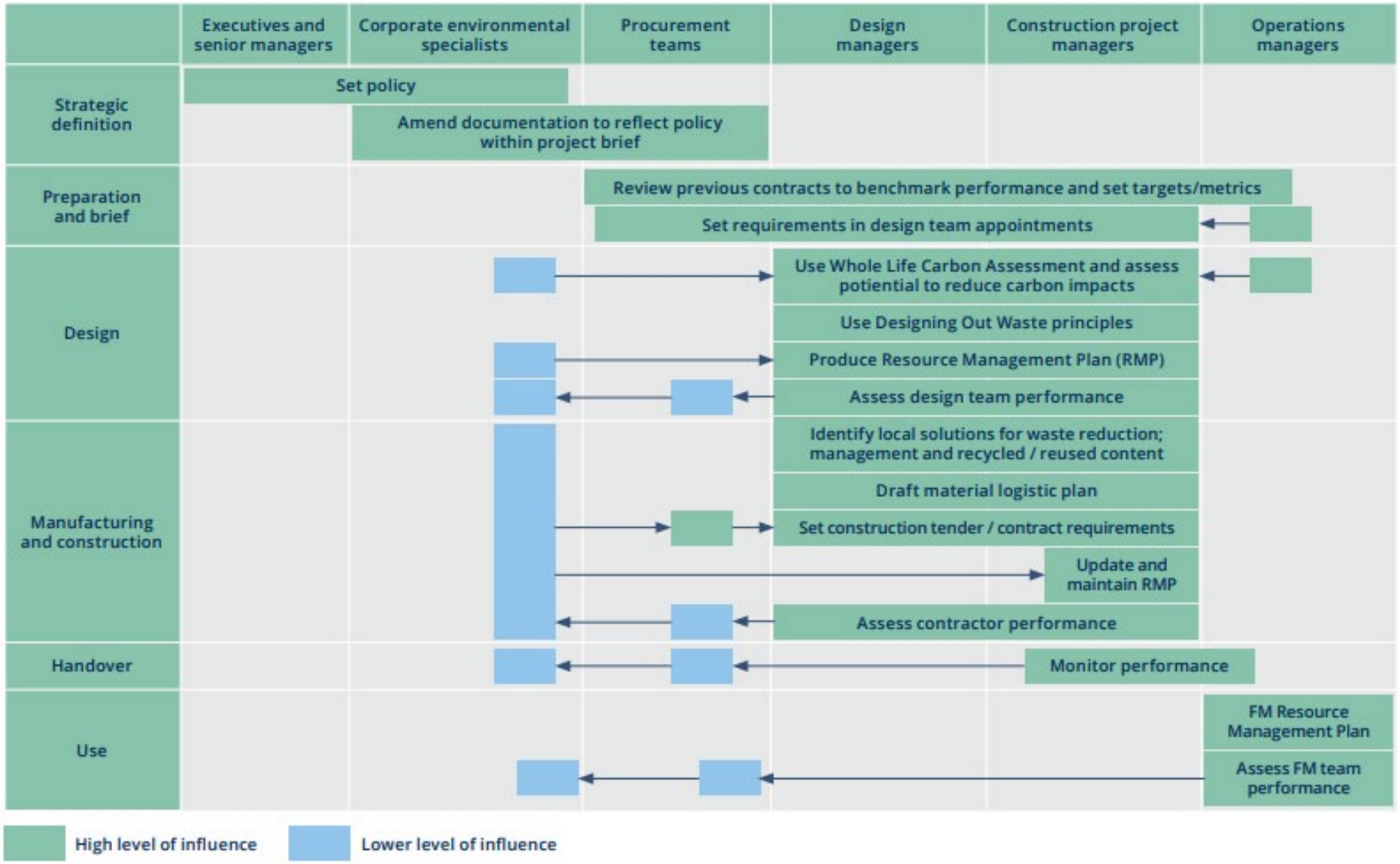
Circular Procurement Guidelines: Roles



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Eunomia Reports

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Links to Select Eunomia Reports

Low Carbon and Resource Efficient Construction Procurement: Report Here

Is Net Zero Enough for the material Production Sector: Report Here

Circular Economy Opportunities in the Construction Sector : Report Here

Support for the Commission Initiative towards an EU Product Policy Framework Supportive of a CE: Report Here

50 States of Recycling - A State-by-State Assessment of Containers and Packaging Recycling Rates: Report Here

Relevance of biodegradable and compostable consumer plastic products and packaging in a circular economy: Report Here

Flexible Films Market in Europe: State of Play: Report Here

Plastics: Can Life Cycle Assessment Rise to the Challenge? Report Here

EPR and DRS in Washington State: Report Here

European Commission Waste Framework Directive EPR Recommendations for Guidance: Report Here

Waste in the Net-Zero Century: How Better Waste Management Practices Can Contribute to Reducing Global Carbon Emissions: Report Here

Report to be released soon: Measuring Statewide Impacts of Reuse for Reuse Minnesota

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What Next

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Quantifying the Current and Future Economic, Social and Environmental Benefits of Reuse in the Construction Sector

Objective: Demonstrate the benefits of reuse and highlight the future potential it can provide making the case for policy and investment in reuse activities.

Study overview: Quantify and assess the economic, social, and environmental opportunities for reuse in the construction sector within the United States of America.

Output: Report that will:

- Analysis of the current and potential economic, environmental, and social benefits of the construction reuse sector
- Missed opportunities – what is possible and where
- A set of policy, and investment recommendations

Working with Build Reuse and looking for funders!

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