

The below answer sheet is for your own self-assessment. Please keep your completed questionnaires and answers on file for your record. Sustainability Summit will send you a Refuel certificate once your questionnaire has been submitted.



Scan to claim your CPD Certificate

## The embodied carbon dilemma for commercial buildings: Demolish, retrofit, or rebuild?

**1. Outline two key methods used to evaluate the environmental impacts of demolishing, retrofitting, or rebuilding an existing commercial building.**

**Explain how these methods support sustainable decision-making in early design phases.**

Two key methods for evaluating the environmental impacts of demolishing, retrofitting, or rebuilding a commercial building are Life Cycle Assessment (LCA), which quantifies embodied carbon, energy use, and resource consumption across the building's full lifespan, and Material Flow Analysis (MFA), which tracks the inputs, outputs, and waste streams associated with construction materials. Applying these methods in early design phases supports sustainable decision-making by enabling architects and developers to compare options, select lower-impact materials, optimise reuse or recycling, and balance operational and embodied carbon, ultimately guiding choices that reduce environmental footprint and lifecycle costs.

**2. Retrofitting older buildings can preserve cultural value but poses design and technical challenges.**

**Discuss two major challenges faced when upgrading such buildings to meet modern performance standards.**

**Then, describe one example of a successful retrofit project and how it overcame these issues while addressing embodied carbon concerns.**

Two major challenges in retrofitting older buildings are structural limitations, which can restrict the integration of modern mechanical systems or energy-efficient upgrades, and heritage preservation constraints, which limit alterations to façades or interior layouts while maintaining cultural value. A successful example is the Brisbane's Brisbane Arcade retrofit, which upgraded HVAC, lighting, and insulation within the heritage envelope by using lightweight, modular interventions and locally sourced low-carbon materials, demonstrating that careful planning and sensitive design can achieve modern performance standards while minimising embodied carbon and preserving historical character.

**3. Which of the following factors is most critical when assessing whether to retrofit or demolish a commercial building from a sustainability perspective?**

- A. Availability of construction workers
- B. Age of the building
- C. Embodied carbon in the existing structure
- D. Proximity to retail and services

Correct Answer: C