

## RP2007

# THE BALANCE BETWEEN GREEN HOUSE GAS EMISSIONS AND COST: A LIFE CYCLE APPROACH TOWARDS GHG REDUCTION AND FINANCIAL PERFORMANCE IN BUILDINGS

### Research Background

The uptake of **embodied** green house gas (GHG) emission reduction in buildings has been slow due to uncertainty towards **financial cost**. Homeowners and project developers are unsure of what the cost implications might be to include embodied emission reduction into the project and design team members do not have sufficient knowledge to answer their cost concerns.

### Research Aim

This research will aim to develop an approach to demonstrate the financial implications of reducing the embodied GHG emissions in buildings. This approach will be based on a **life cycle perspective** so as to ensure that reducing the embodied GHG emissions does not negatively affect the reduction of operational GHG emissions in buildings.

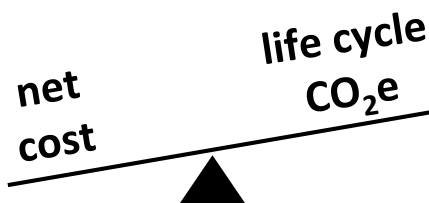


Figure 1: Research Aim

### Research Questions

- 1) What are the range of GHG emission reduction strategies for buildings?
- 2) What is the embodied GHG emission of these strategies?
- 3) What options are available to reduce the embodied GHG emissions of these strategies?
- 4) What is the net cost of reducing the embodied GHG emissions these strategies?
- 5) What is the operational GHG emission of the building if these lower embodied GHG emission strategies are included?

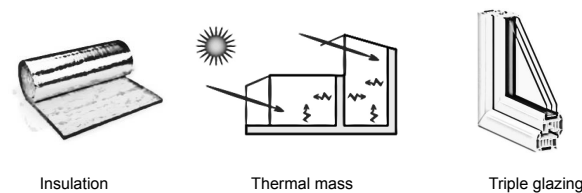


Figure 2: GHG emission reduction strategies

### Methodology

Due to the fact that embodied emissions are largely influenced by the type and quantity of material, two building typologies, residential (detached) and commercial (office), has been selected in order to incorporate different scales of development and typical building elements inherent in each typology. Figure 3 demonstrates the steps of research to be undertaken to address the research questions above.

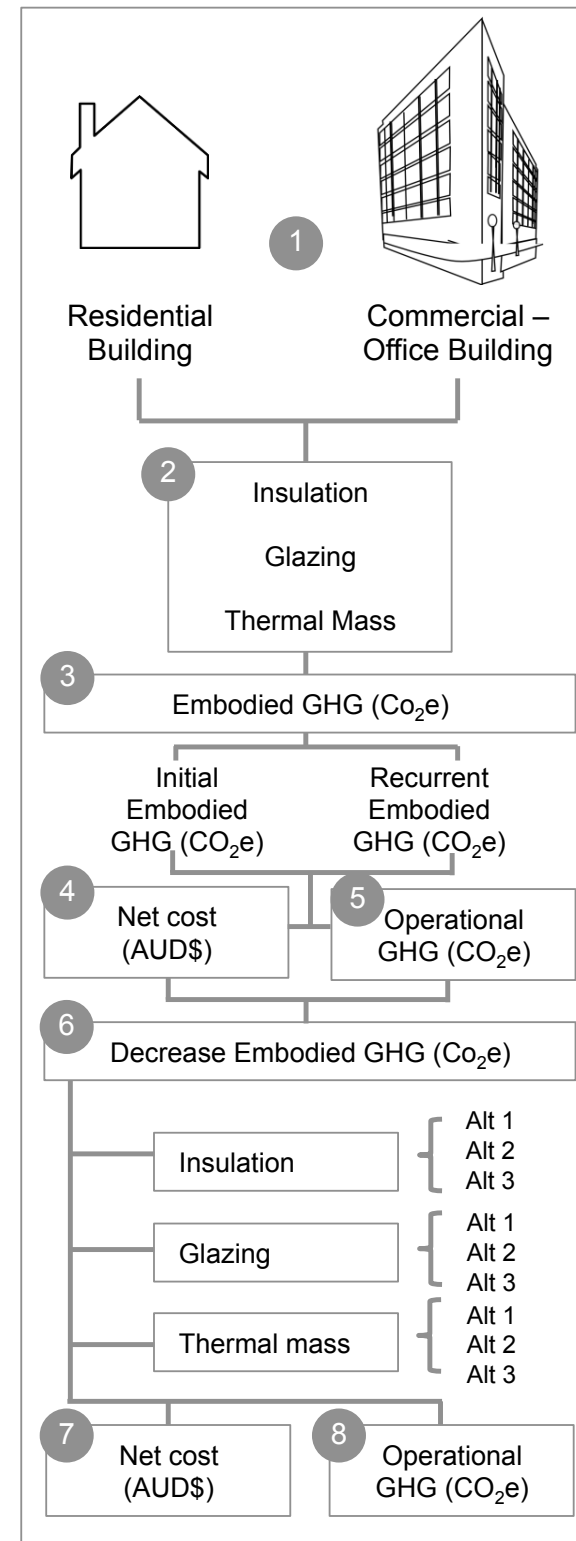


Figure 3: Research design

### Anticipated impacts

This research will demonstrate the **net cost and GHG reduction benefit** of a selected building strategy. The research approach will be based on the typologies and selected strategies identified in figure 3, but is intended to be adjusted and applied to a number of building strategies and different typologies in the future. This research will aid homeowners, project developers and designers to select building strategies that reduce not only the operational but also the embodied GHG emission of a building and identify the net cost of achieving this GHG reduction.

**A means to help decrease the life cycle GHG emissions in buildings.**

### Further information

*This research falls under the RP2007 Integrated Carbon Metrics project, a multi-scale life cycle approach to assessing, mapping and tracking carbon outcomes for the built environment.*

<http://www.lowcarbonlivingcrc.com.au/research/program-2-low-carbon-precincts/rp2007-integrated-carbon-metrics-multi-scale-life-cycle>

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