Life cycle assessment considerations of prefabricated construction

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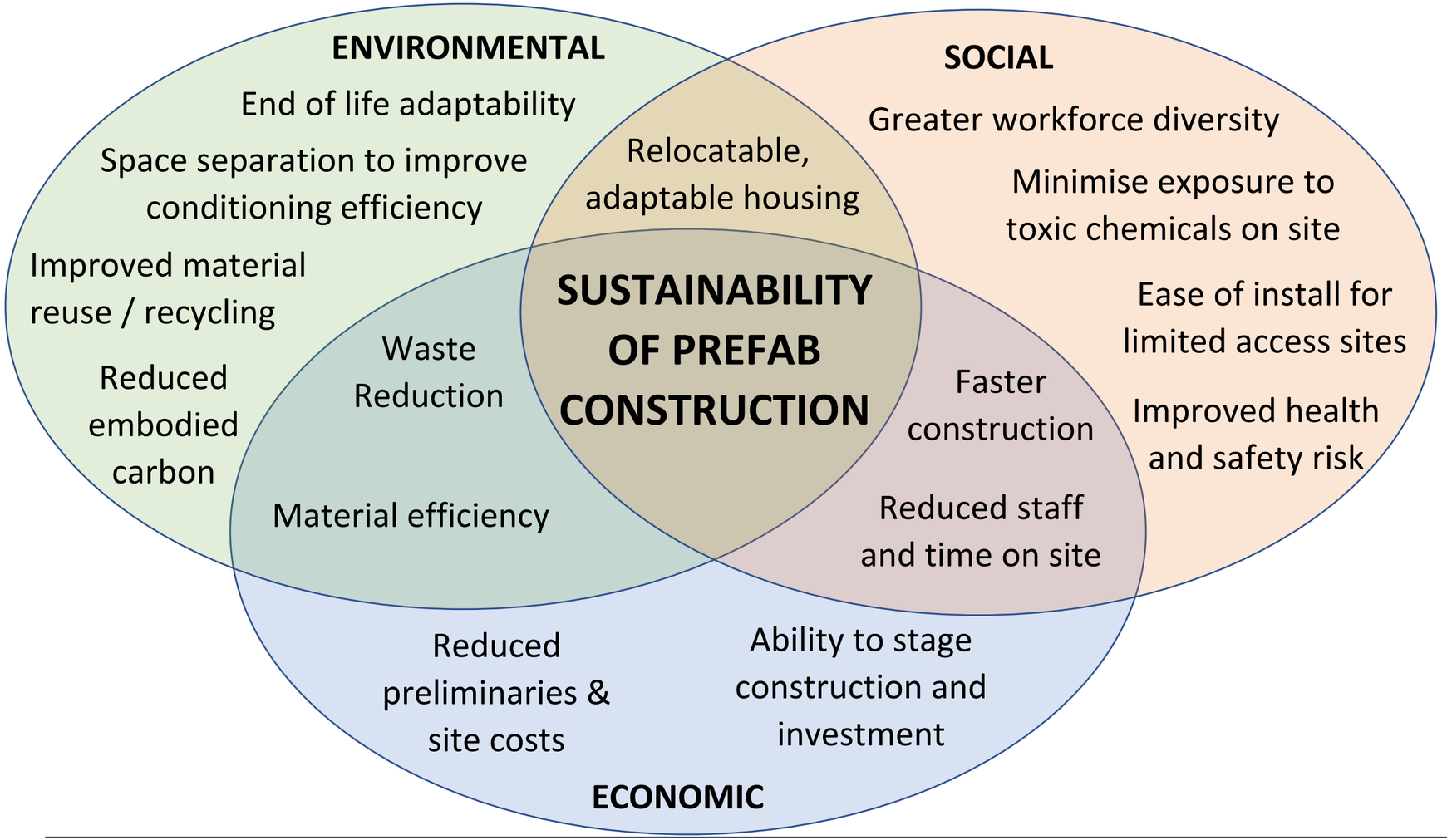
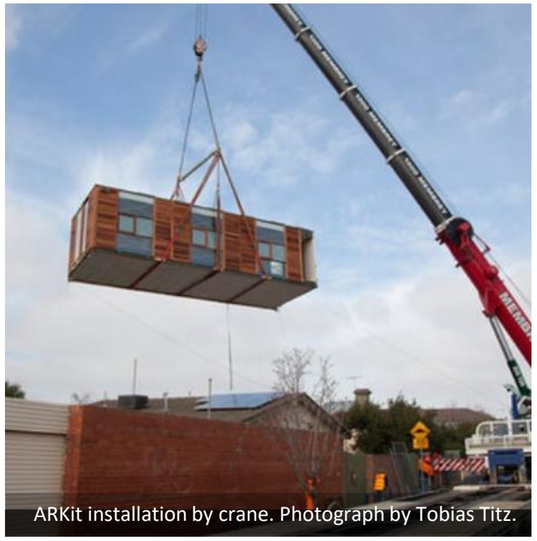
Sustainability of prefabricated construction




ARKit installation by crane. Photograph by Tobias Titz.


Fleetwood Factory, photo courtesy SBRC

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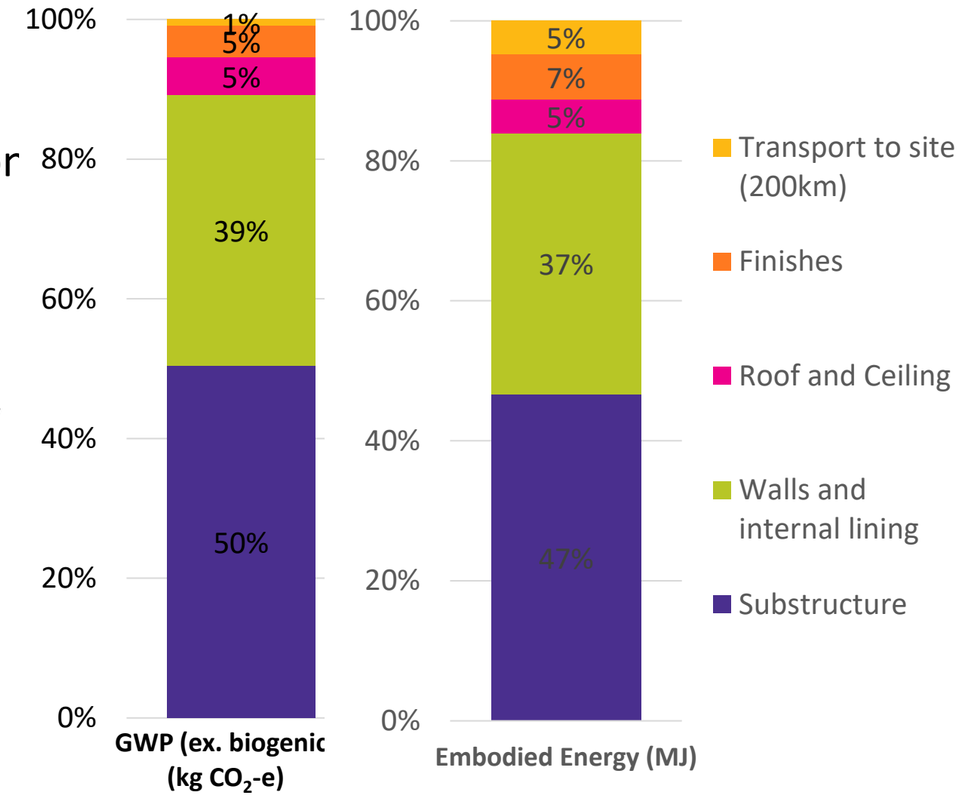
Life cycle assessment of prefab building

Goal

- To investigate how life cycle assessment could be used to quantify the sustainability benefits of prefab construction

Scope

- Prefab case study building – 85m^2 holiday cabin, volumetric prefab
- Includes all structural materials
  - Substructure
  - Super structure – floors, roof/ceiling and walls
  - Floor coverings
- Includes transportation of materials and final building
- Measured waste generation
- Exclusions
  - Internal furnishings fittings and finishes
  - Construction labour/ equipment
  - On-site installation
  - Operational energy consumption



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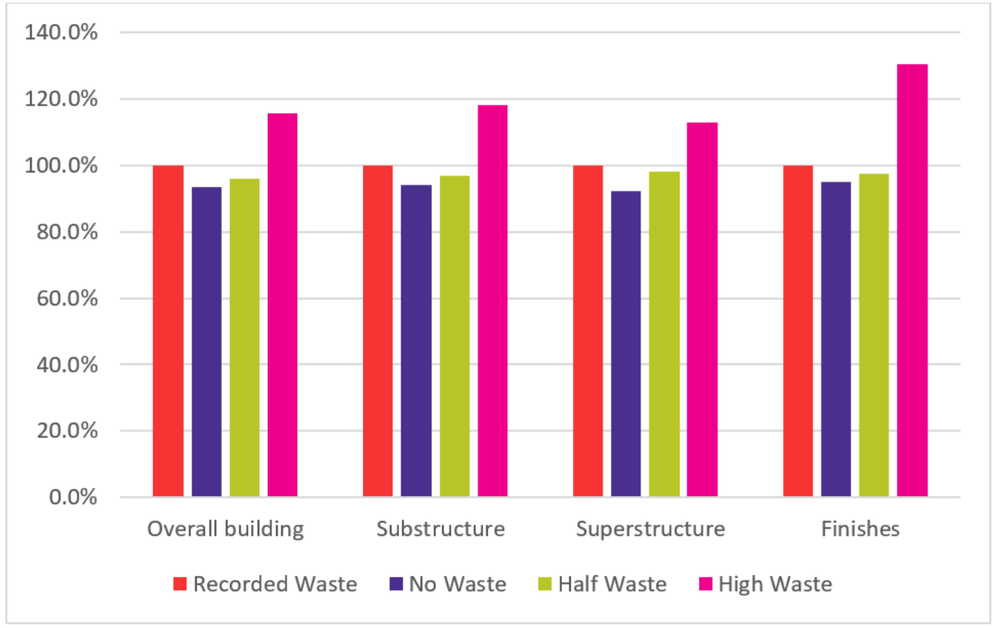
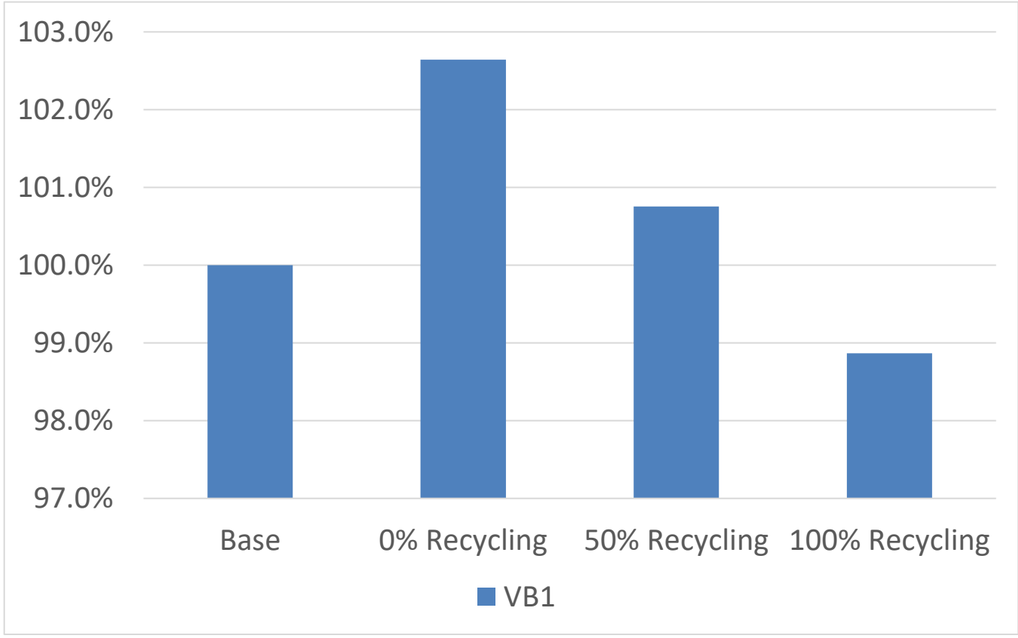
Impact of waste management from prefab

- Measured wastage was responsible for 6.4% of embodied GWP
- High waste rates of 30% increased embodied GWP by 15.7%
- Increasing recycling of easily segregated materials (steel, cardboard, plasterboard) could save 1.1% of GWP





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Summary

- Prefab construction may have sustainability benefits but they need to be better communicated and quantified
- LCA can provide a means to assess some environmental benefits such as reduced waste generation
- Improving generation of EPDs for prefab components would greatly increase uptake of LCA

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