A Science-Based Target Approach for Buildings: the long wait is over

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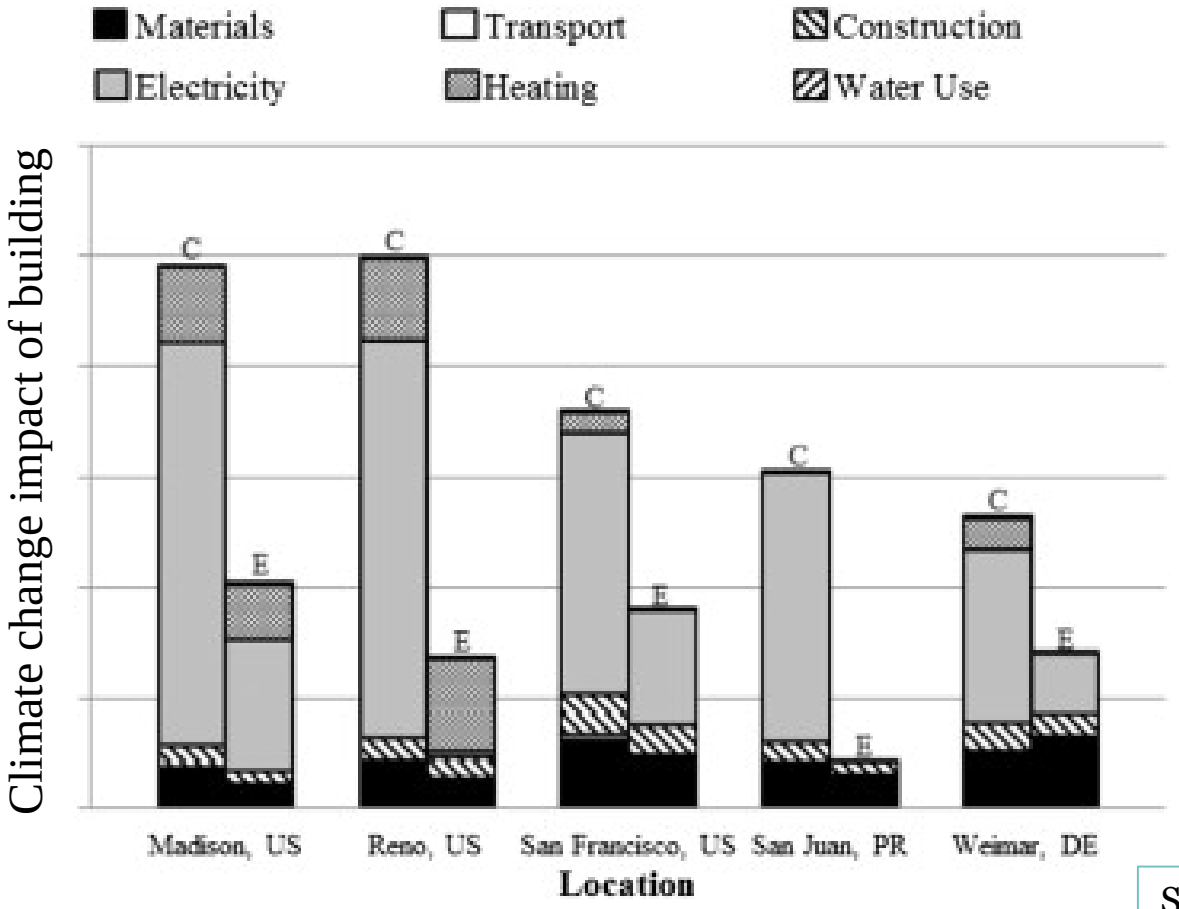
Q1) What does LCA mean to buildings?

A basis for relative improvements



Source: Russell-Smith et al., 2015

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Q2) Are relative improvements sufficient for achieving environmental sustainability?

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a) YES

b) NO

c) MAYBE

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Q3) What is the SOLUTION?

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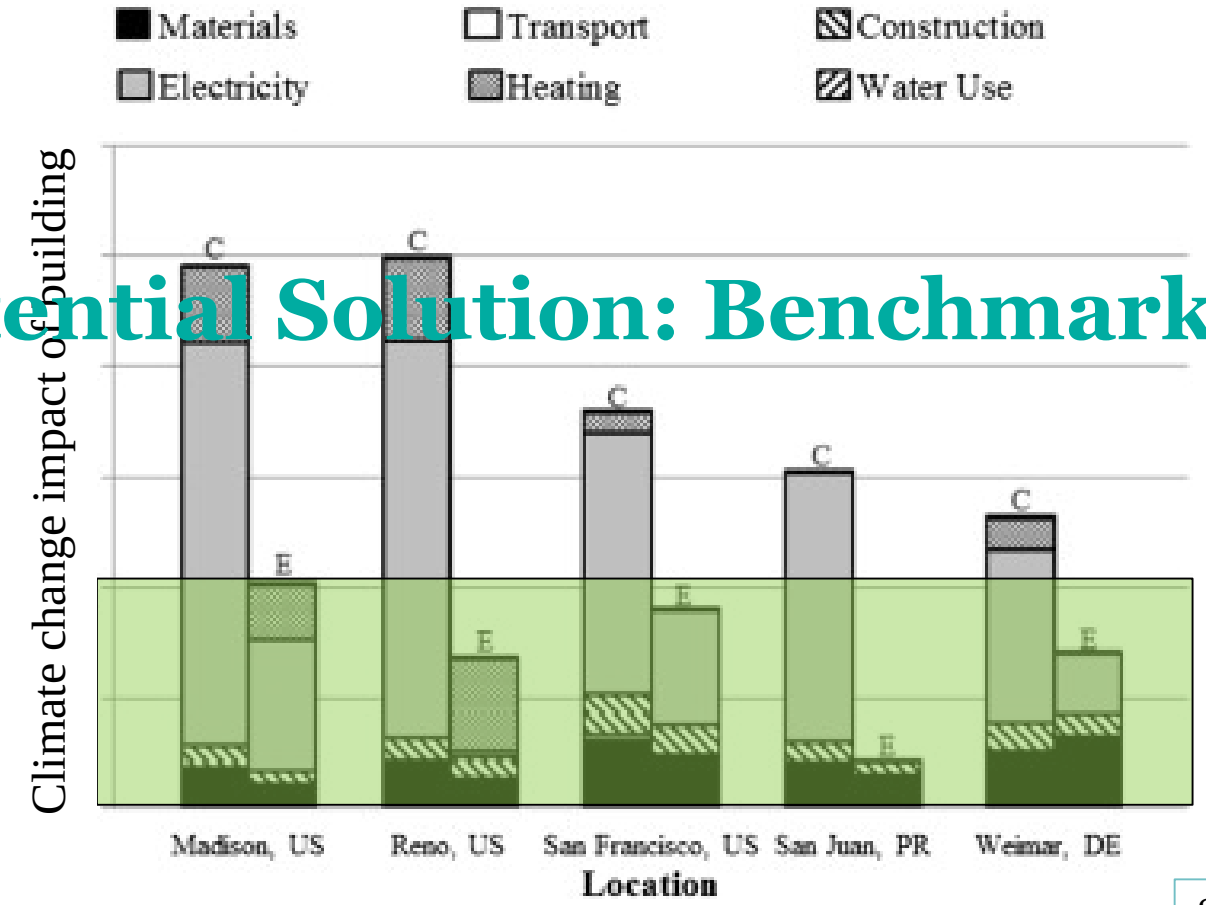
Potential Solution: Benchmarks



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Source: Russell-Smith et al., 2015

Science-Based Targets

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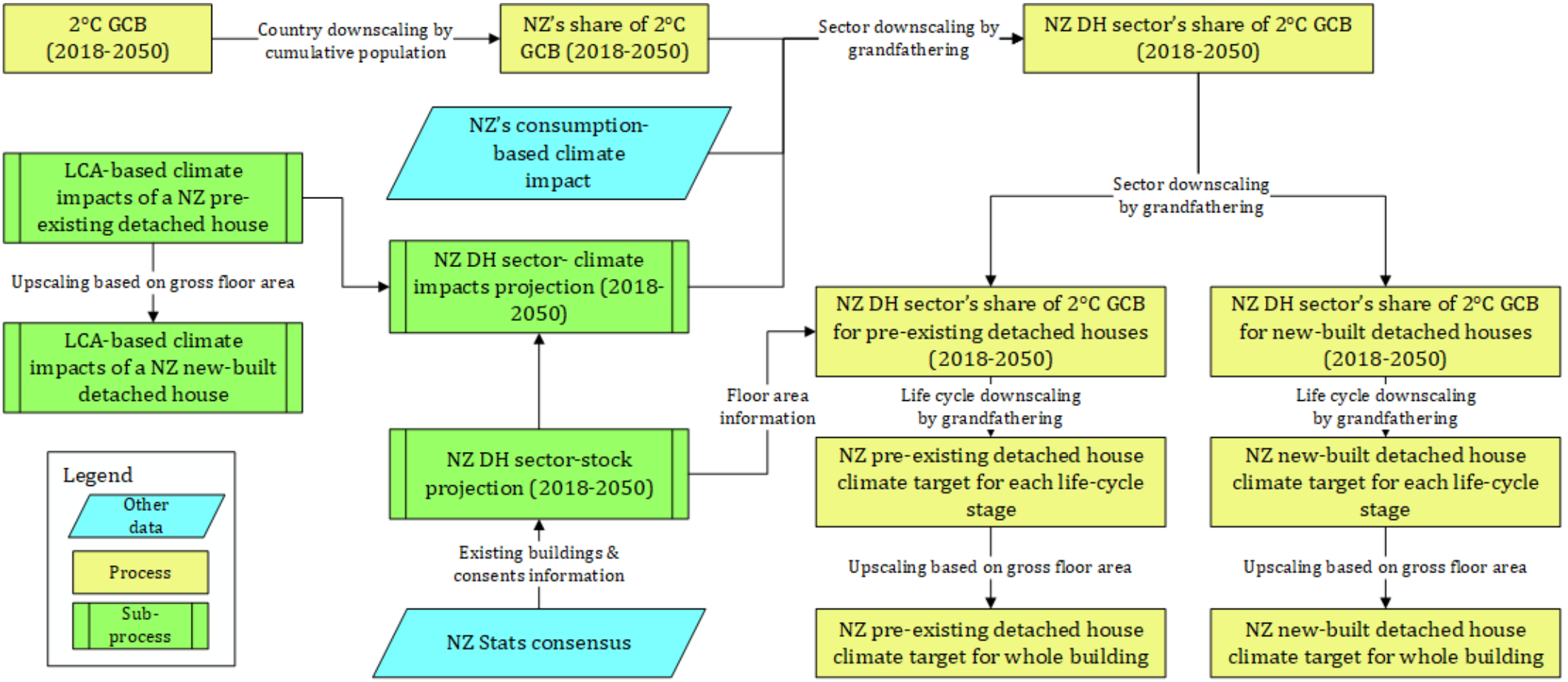
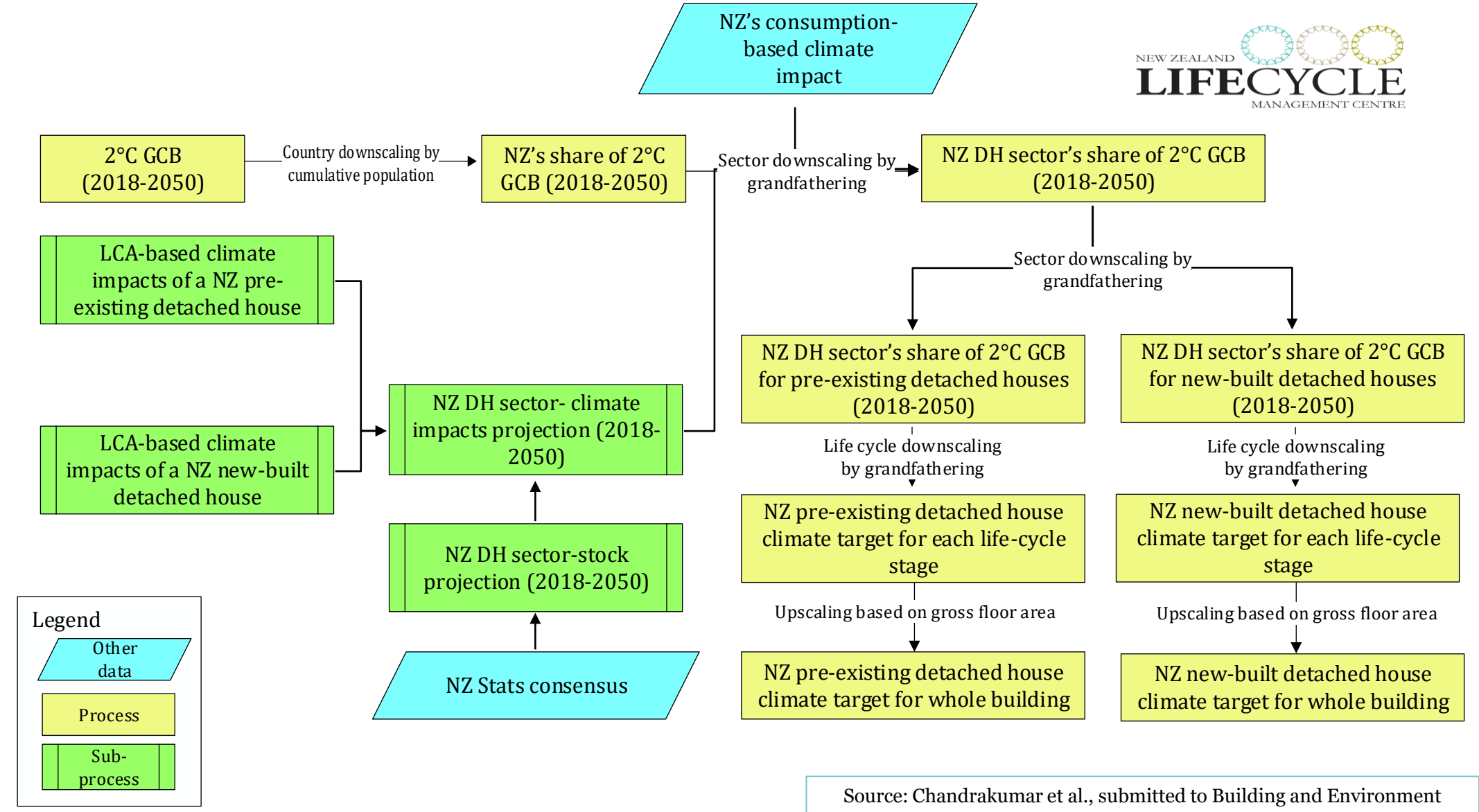
- Not straightforward for the construction sector
  - Complexity of buildings, materials etc.
  - Lifetime
- Benchmarks are available for both residential and commercial buildings (Hoxha et al. 2016; Zimmerman et al. 2005)
  - Estimated a share of the 2°C global carbon budget (i.e. a target) for a future building
- The existing approaches are limited
  - Targets are for the whole building
  - Overlook the growth in the number and size of buildings

Our Approach for detached houses

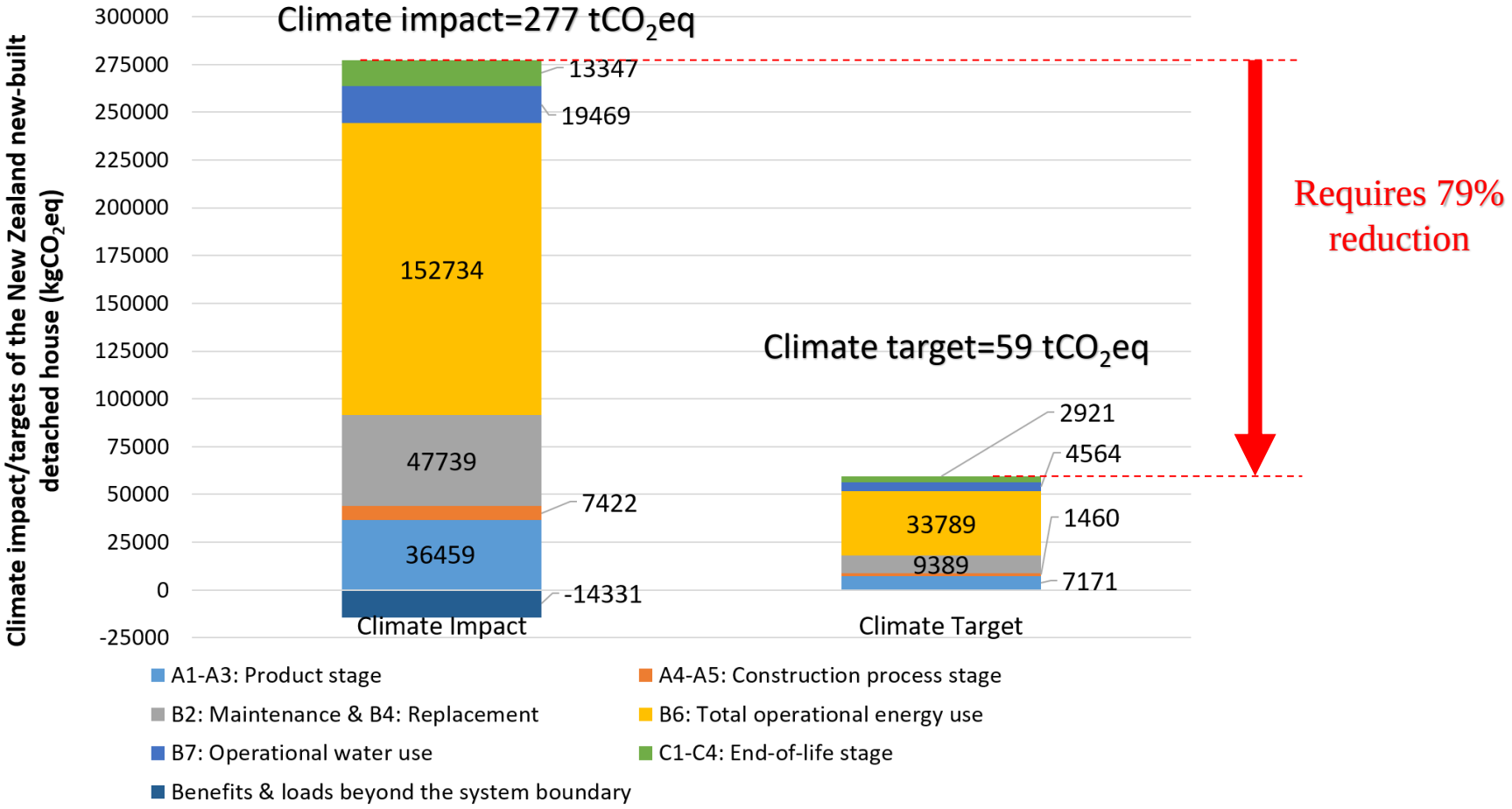


Source: Chandrakumar et al., submitted to Building and Environment



Source: Chandrakumar et al., submitted to Building and Environment

Results-new built detached house



Source: Chandrakumar et al., submitted to Building and Environment

Conclusions

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- Greater scale of change required than currently envisaged in building design and management
- Further research:
  - Update the analysis using actual carbon footprints of townhouse and apartments
  - Sensitivity analysis for global carbon budget, sharing principles
  - Scenarios for different climate zones, electricity mixes, functional units
- Potentially this approach can stimulate disruptive change in sectors by refocusing attention on the scale of change required to limit the future impacts of climate change

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