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Consequential LCA modelling of building refurbishment in New Zealand- an evaluation of resource and waste management scenarios

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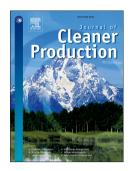
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11 Abstract

- 12 Large scale building refurbishments are likely to become more common in New Zealand's building sector, and 13 therefore it is relevant to assess the environmental impacts associated with these activities. The aim of this study 14 was to investigate the environmental impacts arising from the increase in demand for building refurbishments in 15 New Zealand using consequential Life Cycle Assessment (LCA). The study focused on the identification of 16 resource constraints and marginal suppliers of construction materials using market information specific to New 17 Zealand. Building refurbishment strategies related to waste minimization at construction sites and use of 18 recycled materials at production sites were compared. According to the results, increasing the rates of 19 construction waste recovery and re-use at site can reduce the overall environmental impact of a building 20 refurbishment by 15-25 % compared to use of construction materials with recycled content which only reduces 21 the environmental impacts by approximately 5%. The net impact results were sensitive to the quality of 22 recyclable material, location of the marginal supplier and marginal energy source. The study recommends 23 stakeholders involved during early building design to focus on material sourcing and quality; and practical 24 solutions to increase material recoverability at site e.g. planning for efficient on-site management for waste 25 disaggregation, recovery and re-use.
- 26 **Keywords:** refurbishment, consequential LCA, construction, waste management, marginal supply, recycling
- 27 potential

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