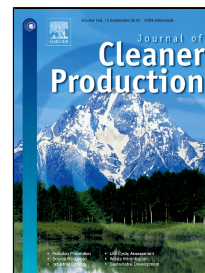


Accepted Manuscript

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PII: S0959-6526(18)32161-9
DOI: 10.1016/j.jclepro.2018.07.172
Reference: JCLP 13626
To appear in: *Journal of Cleaner Production*
Received Date: 21 February 2018
Accepted Date: 16 July 2018

Please cite this article as: Khoa N. Le, Cuong N.N. Tran, Vivian W.Y. Tam, Life-Cycle Greenhouse-Gas Emissions Assessment: An Australian Commercial Building Perspective, *Journal of Cleaner Production* (2018), doi: 10.1016/j.jclepro.2018.07.172

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Life-Cycle Greenhouse-Gas Emissions Assessment: An Australian Commercial Building Perspective

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ABSTRACT

To fulfil the hunger for sustainable development, Australian construction sector seems to contemplate toward green design. Green-Star environmental rating system, one of the active building rating systems in Australia, has also been employed in New Zealand, and South Africa. To help engineers and designers obtain comprehensive visualisation on sustainable projects, this paper develops a model to evaluate energy consumption and greenhouse-gas emissions based on typical Australian commercial building alternatives. From that, this paper explains how to achieve points for “Energy” and “Life-cycle impacts” categories of this rating system. The model uses GaBi 8.1 platforms and shows relationships between building’s energy consumption, and greenhouse-gas emissions released during the building lifetime.

This paper provides insight into life-cycle greenhouse-gas emissions assessment for several typical commercial building fabrics in Australia. The developed model can also be conveniently modified to automate calculations for other credits under the Green-Star environmental rating system, and other environmental rating systems around the world. The study suggests that designers should consider the inverse relationship between building envelopes’ total R-value with energy consumption and greenhouse-gas emissions. Another finding shows that materials used for building envelopes play a significant role to manage energy consumption as well as greenhouse-gas emissions amount during the building’s life-cycle.

Keywords: Commercial building, Environmental impacts, GaBi 8.1, Green building, Greenhouse-gas emissions, Green-Star

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