

Accepted Manuscript

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PII: S0360-1323(18)30281-6

DOI: [10.1016/j.buildenv.2018.05.021](https://doi.org/10.1016/j.buildenv.2018.05.021)

Reference: BAE 5459

To appear in: *Building and Environment*

Received Date: 3 November 2017

Revised Date: 9 May 2018

Accepted Date: 11 May 2018

Please cite this article as: Shirazi A, Ashuri B, Embodied life cycle assessment comparison of single family residential houses considering the 1970s transition in construction industry: Atlanta case study, *Building and Environment* (2018), doi: 10.1016/j.buildenv.2018.05.021.

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EMBODIED LIFE CYCLE ASSESSMENT COMPARISON OF SINGLE FAMILY RESIDENTIAL HOUSES CONSIDERING THE 1970s TRANSITION IN CONSTRUCTION INDUSTRY: ATLANTA CASE STUDY

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Abstract: 20% of US energy consumption and their consequential environmental impacts are associated with building sector. Previous studies show that approximately 30% of a building's life cycle energy is attributed to its embodied energy. This study focuses on the residential buildings in the City of Atlanta and describes the trend of embodied energy and emissions of residential buildings in the city considering the 1970s transition in construction industry. The major objective of this research is to create a process-based Life Cycle Assessment (LCA) model to compare the embodied impacts of residential buildings constructed by two separate pre-1970s and post-1970s construction trends. For this purpose, the residential buildings have been categorized into two groups of buildings built before 1970s and built after 1970s. The 1-story and 2-story buildings have also been analyzed separately. The results indicated that residential buildings built before 1970s have lower embodied energy and impacts per square meter than residential buildings built after 1970s. This difference is in its highest for GWP which is 3.75-4.04 higher for buildings built after 1970s. AP, ODP and SP come next with approximately 72%, 45% and 22% increase respectively for their 1-story models built after 1970s and with approximately 75%, 75% and 15% increase respectively for their 2-story models built after 1970s. Additionally, 2-story residential

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