

User Requirements and Software Capabilities for AEC Life Cycle Assessment

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Abstract

Designers, contractors, and owners of sustainable buildings want to select the most environmentally responsible materials. Life Cycle Assessment (LCA) provides such a methodology, casting a wide net to calculate environmental impacts from cradle to grave. The methodology is gaining momentum in manufacturing; however, the AEC industry is only beginning to ask how LCA might be used in building design.^{1 2} Before LCA can gain industry wide support, we need a thorough understanding of AEC practitioners' needs, and a demonstration of how these needs align with available LCA tools. To help develop such knowledge, we propose to perform a needs and tools assessment structured around the design and construction of a sustainable mixed-use dormitory and laboratory.³ We will focus on the choice between a steel or wood structural system, investigating how quantities of materials can be minimized, or substituted with ecoPreferred products.

Researchers from academia and industry will collaborate to:

- Interview designers, contractors, sustainable building experts, and LCA practitioners to learn what is needed for effective scope definition, inventory analysis, impact assessment, and interpretation.
- Apply four leading LCA tools on our case study, carefully documenting the information and processes involved for each software tool.
- Construct a matrix that assesses each tool with respect to its ability to meet the AEC practitioners' needs.

The results of this research will be a carefully executed case study that illustrates to AEC practitioners the costs and benefits of performing an LCA study, and a gap analysis to inform software providers of improvements for next generation LCA tools.

1 Howard, Nigil and Tom Dietsche. USGBC's "LCA into LEED" Project.

2 Trusty, Wayne and Michael Deru. The U.S. LCI Database Project and Its Role in Life Cycle Assessment

3 <http://greendorm.stanford.edu>