

Life Cycle Analysis Concluded

1. Important points:

- a. Goal...Functional unit....scoping/system boundaries....input/output assessment....impact assessment.....interpretation
- b. Can be applied at many levels, from the part for a heat pump, to the heat pump, to the whole house or community.
- c. Require data and extra time...put “nuts and bolts” to concepts of sustainable engineering, embodied energy, material minimization, ecosystem impacts

2. Examples

- a. State of Minnesota. This example shows how the state has tried to do the hard work for green builders by helping them translate the theory into practice.
http://www.buildingmaterials.umn.edu/MBMD_Presentation.pdf
- b. Australia <http://buildlca.rmit.edu.au/>
- c. Athena (Canada) three conventional residential home types (see p. 7)
http://www.environmental-expert.com/articles/article1157/ATH_AIA_paper.pdf
- d. Athena (Canada) Artificial turf greenhouse gas offset analysis – see projects
<http://www.athenasmi.ca/index.html>

3. Environmental Performance Data Sheet (EPDs), modeled after MSDS.

4. Other excellent resources

- a. California <http://www.ciwmb.ca.gov/greenbuilding/Materials/>
 - i) See Matrix/Site Construction
- b. Environmental Building News & Building Green
<http://www.buildinggreen.com/index.cfm>
- c. US Dept of Energy design guidelines, toolbox, case studies
<http://www.eere.energy.gov/buildings/highperformance/>

5. Overall Resource Efficiency

- a. **Resource efficient manufacturing process:** Products manufactured with resource-efficient processes including reducing energy consumption, minimizing waste (recycled, recyclable and or source reduced product packaging), and reducing greenhouse gases.
- b. **Locally available:** Building materials, components, and systems found locally or regionally saving energy and resources in transportation to the project site.
- c. **Durable:** Materials that are longer lasting or are comparable to conventional products with long life expectancies.
- d. **Natural, plentiful or renewable:** Materials harvested from sustainably managed sources and preferably have an independent certification (e.g., certified wood) and are certified by an independent third party.

- e. **Recycled Content:** Products with identifiable recycled content, including postindustrial content with a preference for postconsumer content.
 - f. **Salvaged, refurbished, or remanufactured:** Includes saving a material from disposal and renovating, repairing, restoring, or generally improving the appearance, performance, quality, functionality, or value of a product.
 - g. **Reusable or recyclable:** Select materials that can be easily dismantled and reused or recycled at the end of their useful life.
 - h. **Recycled or recyclable product packaging:** Products enclosed in recycled content or recyclable packaging.
6. **Construction and Demolition Wastes –**
- a. Studies conducted by the Solid Waste Department of Portland, Oregon (Metro), estimated that approximately 4 lbs. of waste is generated for every square foot of new residential construction
 - b. Excerpt from California fact sheet for construction site management

A case study of Cornerstone Material Recovery in McHenry, Illinois highlighted one method that may make site separation more likely. In lieu of large drop boxes used for disposal at a development of single family homes, Cornerstone used small temporary bins made of plywood or plastic fencing in front of each home. Each site was serviced at least once a week. As a result, the workers did not have to transport the waste to a centralized drop box and illegal dumping by the public was limited as there were no familiar roll-off boxes. The frequent service and small containers resulted in almost "automatic" site separation due to the inherent stages of construction.

The materials most often separated and recovered from general construction and renovation activities include wood waste, drywall, metal, paper, and cardboard. The economic practicality of on-site separation and recovery would of course depend on local markets and processors of the materials.

At the beginning of each job, bins or other means of containment should be set up to hold separated scraps and the contractor should identify processors in the area that are interested in the materials. The paper, cardboard, and metal packaging that the building materials and major appliances come in should also be separated and stored. There are well established markets for these materials that could both generate income and reduce disposal costs. Recyclers for these materials can be found in the telephone directory Yellow Pages under "recycling centers" or "scrap metal." Lists of manufacturers, processors, and receivers of construction and demolition materials are referenced in the publications section at the end of this fact sheet.

- c. **North Carolina** <http://www.sustainablenc.org/thewaytogo/main/cd.htm>

7. Deconstruction

- a. <http://www.lifecyclebuilding.org/resources/DFD.pdf>