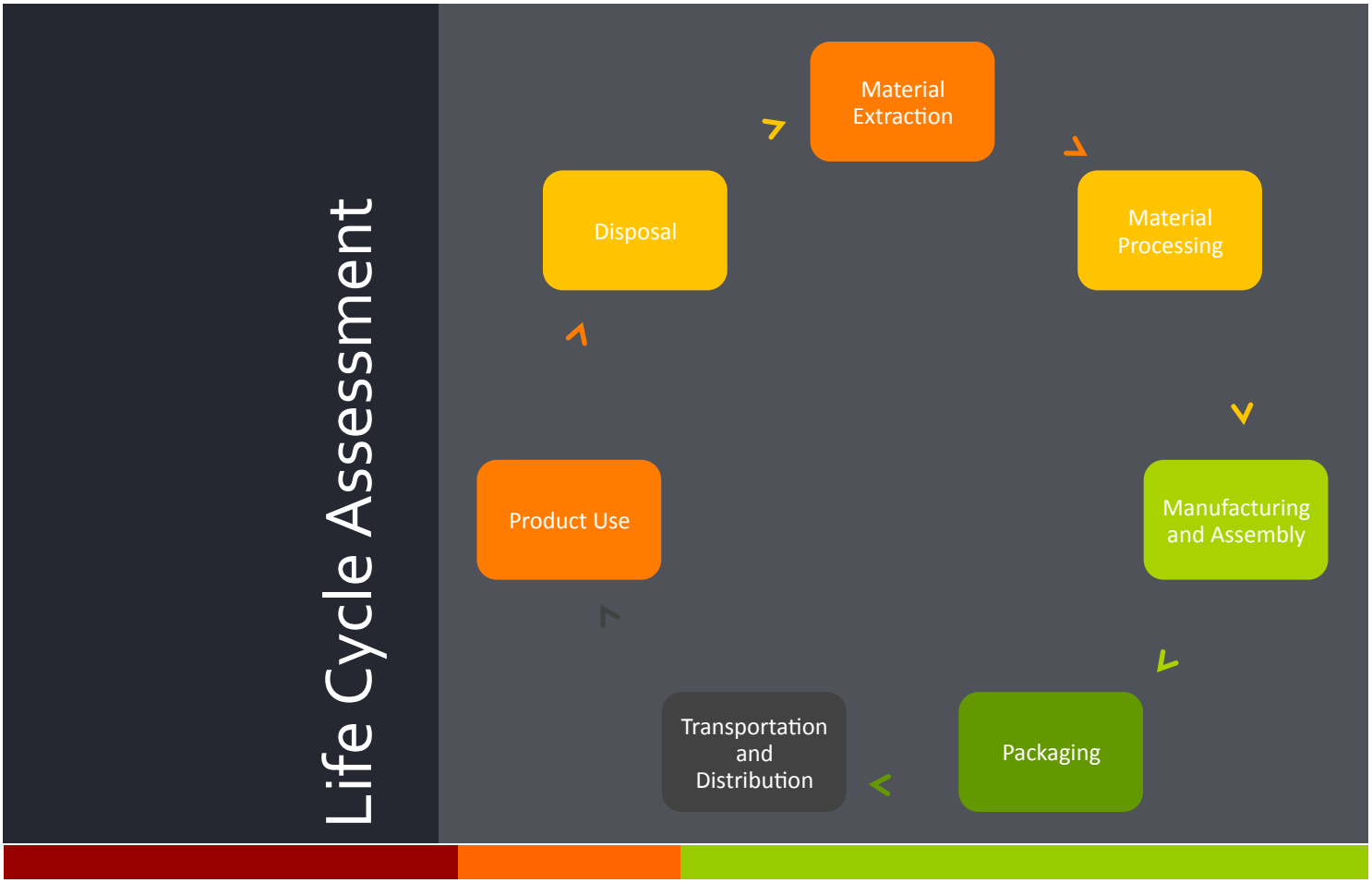
July 17, 2013



Informational Fact Sheet

By Emily Fish

Overview of Life Cycle Assessment (LCA)

- A tool to quantify life cycle thinking
- Assesses environmental impacts associated with all the stages of a product's life from-cradle-to-grave
- Used to compare similar products and production methods, improve a product's environmental value, and inform choices on products and production processes
- Can be modified to explore economic and social aspects of a life cycle
- Part of ISO 14000 Environmental Management Standards

Basic Phases of a Life Cycle

1. Material Extraction – raw materials are extracted from the earth
2. Material Processing – raw materials are processed into usable materials
3. Manufacturing and Assembly – materials are manufactured and assembled into a finished product
4. Packaging – finished product is prepared for transportation and consumer use
5. Transportation and Distribution – packaged product is distributed to consumers
6. Product use – consumer controls the use of the product
7. Disposal – product is broken down for recycling and/or disposal

Methodology

1. Goal and Scope Definition – identify purpose, spatial and temporal boundaries, assumptions, limitations and all involved life cycle phases
2. Inventory Analysis – define material flows, quantify inputs and outputs, compile data from databases and surveys
3. Impact Assessment – select relevant impact categories, use a functional unit to create common ground for data
4. Interpretation – summarize results from Inventory Analysis and Impact Assessment, identify most impactful phases of life cycle, evaluate accuracy of study, address limitations, make recommendations

Benefits

- Allows for estimation of cumulative environmental impacts
- Provides a comprehensive overview of a product or service and avoids simply shifting the source of the pollution from one life cycle stage to another
- Can influence company and consumer decisions

Limitations

- Potential for data gaps (limited comprehensive databases available)
- Arbitrary boundary lines
- Resource and time intensive
- Circularity effect – “In our modern world, it takes a lot of the same “stuff” to make other “stuff.” So, to make a paper cup requires steel machinery. But to make the steel machinery requires other machinery and tools made out of steel. And to make the steel requires machinery, yes, made out of steel. Effectively, one must have completed a life cycle assessment of all materials and processes before one can complete a life cycle assessment of any material or process.” - http://www.eicola.net/Method/LCAapproaches.html
- Not a complete evaluation