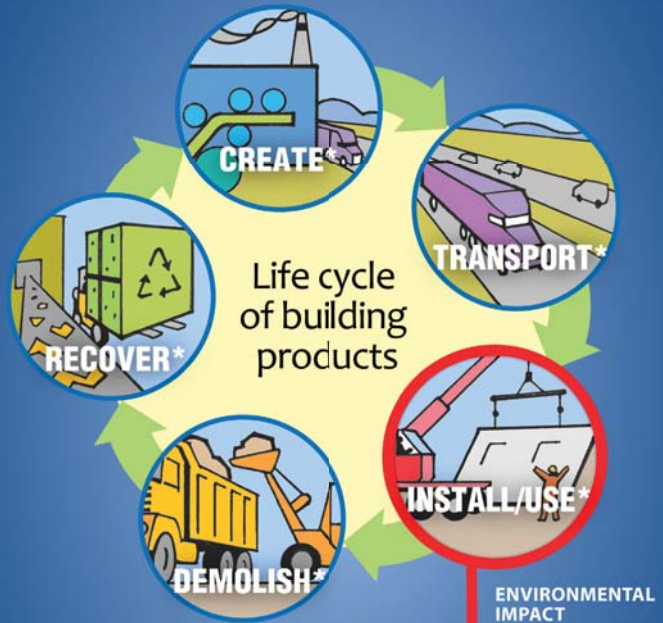


# Life Cycle Assessment: A Comprehensive Approach to Environmental Assessment of Materials

Green building components can play a critical role in reducing the environmental footprint during the entire life cycle of a commercial building:



Life cycle of building products

ENVIRONMENTAL IMPACT  
(Figures are approximate)



### \* Each Product Stage Measures:

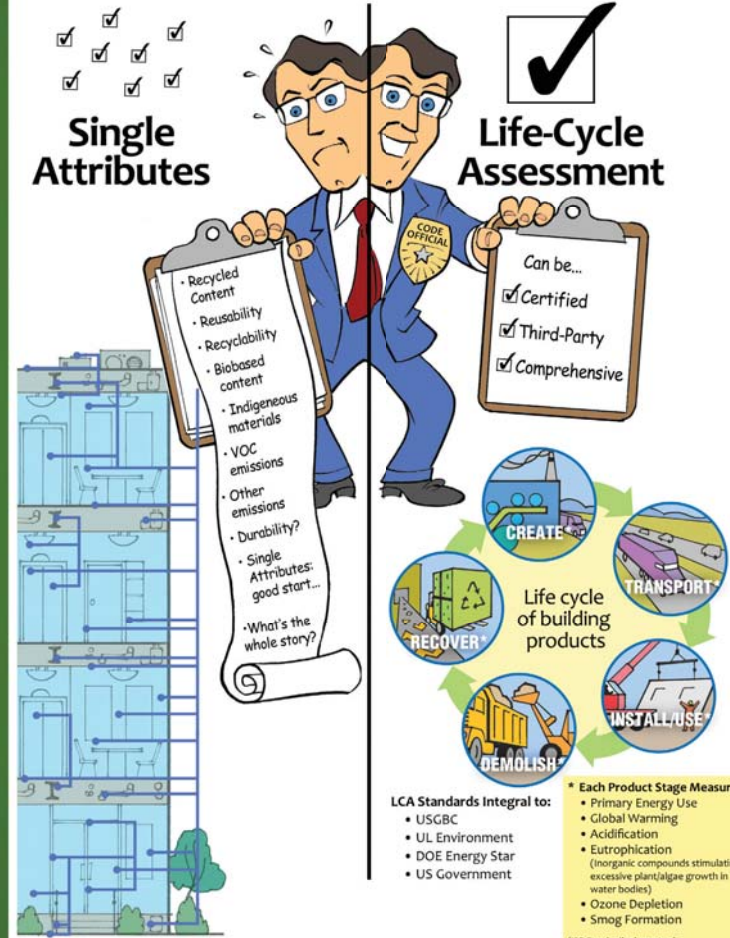
- Primary Energy Use
- Global Warming
- Acidification
- Eutrophication  
(Inorganic compounds stimulating excessive plant/algae growth in water bodies)
- Ozone Depletion
- Smog Formation

(ISO Standard's elements of Life Cycle Assessment)

# Life Cycle Assessment = A Comprehensive Environmental Impact of Materials

Single Attributes

Life-Cycle Assessment



- Recycled Content
- Reusability
- Recyclability
- Biobased content
- Indigenous materials
- VOC emissions
- Other emissions
- Durability?
- Single Attributes: good start...
- What's the whole story?

- Can be...
- Certified
- Third-Party
- Comprehensive



### LCA Standards Integral to:

- USGBC
- UL Environment
- DOE Energy Star
- US Government

### \* Each Product Stage Measures:

- Primary Energy Use
- Global Warming
- Acidification
- Eutrophication  
(Inorganic compounds stimulating excessive plant/algae growth in water bodies)
- Ozone Depletion
- Smog Formation

(ISO Standard's elements of Life Cycle Assessment)

# Single Attribute and Life-Cycle Assessment Compared

*One is a Fraction of the Other*

## SINGLE ATTRIBUTE APPROACH

a small part of the picture



Recycled Content  
Recyclability  
Biobased Content  
Manufacturing Emissions  
VOC Emissions

## LIFE-CYCLE ASSESSMENT

a comprehensive picture



LCA Standards  
Integral to:  
• USGBC  
• UL Environment  
• DOE Energy Star  
• US Government

Each Product Stage Measures:

- Primary Energy Use
- Global Warming
- Acidification
- Eutrophication (Inorganic compounds stimulating excessive plant/algal growth in water bodies)
- Ozone Depletion
- Smog Formation

(ISO Standard's elements of Life Cycle Assessment)

## International Standards already exist to implement Life Cycle Analysis:

The International Organization for Standardization (ISO)  
14000 Environmental Management Family of Standards

Plastics Division Building and Construction Team, American Chemistry Council. Copyright © American Chemistry Council, October 2011

For More Information : [greenbuildingsolutions.org/lca](http://greenbuildingsolutions.org/lca)

# Green Construction

*Now Get the Entire Picture*

Life Cycle Assessment indicates green construction means far more than using recycled or bio-based materials. The USE phase of buildings can be more important than the manufacture and disposal phases combined.

## True Green construction conserves resources during the manufacture, use and end-of-life of each building part

Life Cycle Assessment (LCA) measures (with verifiable metrics) how resources and energy are saved throughout each part of a building's entire life:



*"Life Cycle Assessment is an internationally recognized approach to evaluating the impacts that a product or process has on the environment over the course of its entire life. It is widely accepted as one of the best ways to assess and compare the environmental impacts of alternate building materials."*

—Athena Sustainable Materials Institute, 2011

Plastics Division Building and Construction Team, American Chemistry Council. Copyright © American Chemistry Council, October 2011