

# Life Cycle Assessment

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# What is life cycle assessment?

Generally, life cycle assessment (LCA) is a process used to evaluate one or more impacts of a product or service.

The impacts are usually related to the conservation of resources (e.g., water, energy) or to environmental discharges.

The life cycle aspect means that the assessment should encompass all applicable stages in the life of the product or service; i.e., creation, use, and disposal or shutdown.

LCAs are often used to compare alternatives that provide the same or similar results (e.g., paper, plastic, or cloth bags to get your groceries home?)

# Why conduct an LCA?

- To respond to customer or client pressures
- To make a more informed decision
- To choose between alternatives based on more than lowest initial cost
- To optimize the use of limited resources
- To get more bang for your buck
- To assign costs or burdens correctly

# What are the steps in an LCA?

- Define the goal and scope
- Conduct the life cycle inventory
- Quantify the impacts
- Interpret the results

# Define goal and scope

- What do you want to know or compare?
- What is the functional unit?
  - 1 kg of XYZ packaging material made.
  - 1000 widgets delivered within specifications.
- Where are the boundaries?
  - Start with raw materials entering your plant or include growing, drilling, or mining to get the raw materials?
  - Stop when the product leaves your plant or when it is discarded and degraded to water, CO<sub>2</sub> and salts?
- What impact categories will be considered?
  - Water consumed.
  - Fossil fuel consumed.
  - Greenhouse gases discharged.
  - Several others are commonly used.

# Conduct the inventory

- Lay out the process flow diagram
- Make sure time and space boundaries are unambiguous
- Determine all relevant flows in and out
- Scale all flows to the functional unit

# Evaluate the impact

- Convert results to a form that allows you to quantify the impacts of interest
- Add up all contributions
- Allocate if more than one product or service is delivered

# Interpret the results

- Compare results to other alternatives
- Consider completeness, confidence level of assumptions, consistency of results, sensitivity
- State conclusions, limitations, and recommendations
- Anticipate challenges from the “losers”



