

# OENG1118 Sustainable engineering practice and design

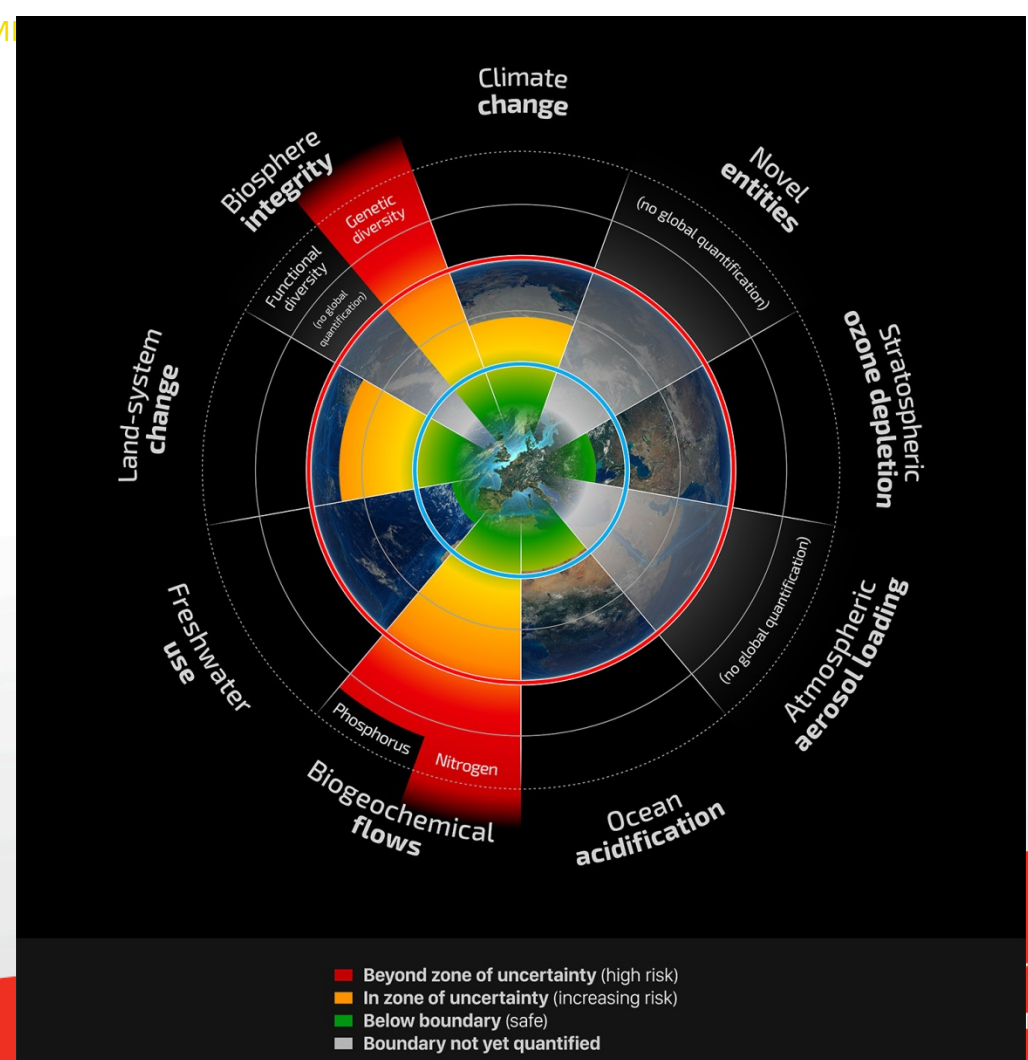
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Week 5: Life cycle assessment  
Introduction

## Life cycle assessment

# Environmentally sustainable development

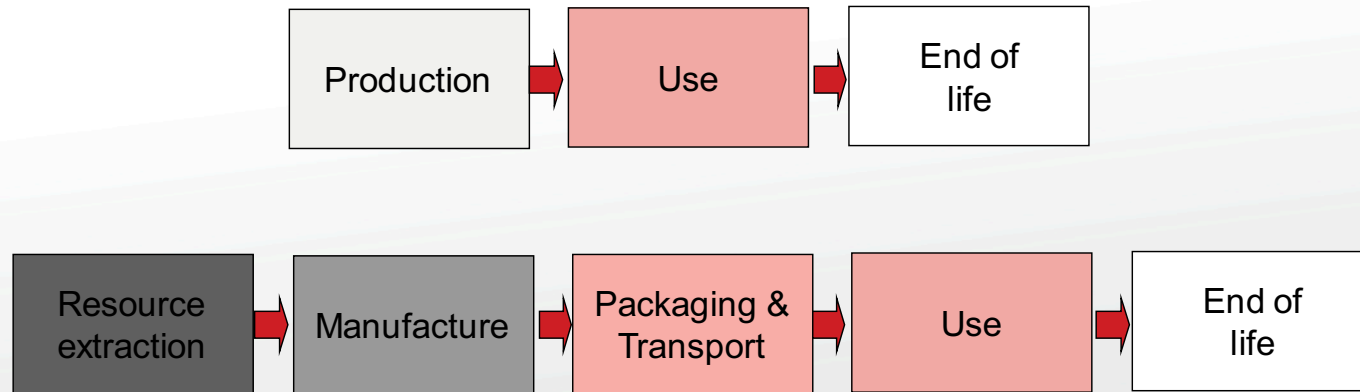
## Planetary boundaries



## What is a *life cycle*?

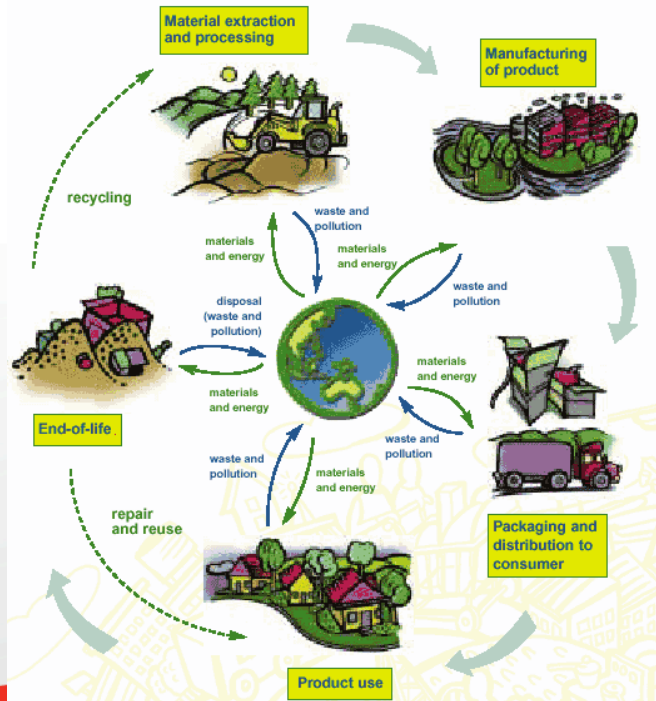
*Consecutive and interlinked stages of a **product system**, from raw material acquisition... to final disposal.*

– ISO 14040:2006



## What is *life cycle assessment*?

Compilation and evaluation of the **inputs** and **outputs** and the **potential environmental impacts** of a product system throughout its life cycle.



– ISO 14040:2006

Impact category	Typical units
Global warming	kg CO <sub>2</sub> -eq
Embodied energy	MJ
Acidification	kg SO <sub>2</sub> -eq
Eutrophication	kg PO <sub>4</sub> <sup>-3</sup> -eq
Ecological footprint	Ha.a
Water use	kL
Carcinogens	DALY

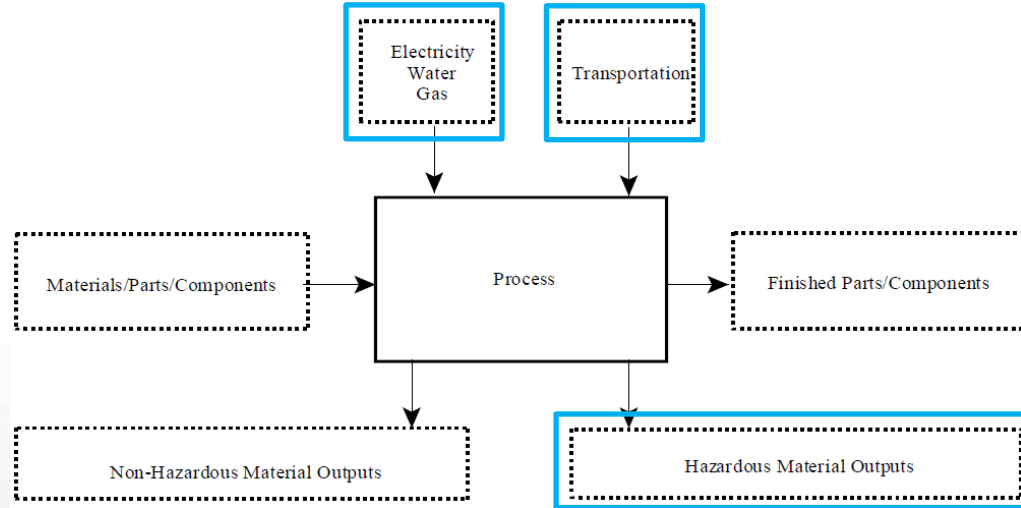
# What is *life cycle assessment*?

Fossil depletion

Metal depletion

Water depletion

Land occupation &amp; transformation



Toxicity

Climate change

Ozone depletion

Terrestrial acidification

Ionising radiation

Photochemical oxidant &amp; particulate matter formation

Freshwater &amp; marine eutrophication

## What is *life cycle assessment*?

Familiar applications

- Carbon footprint
- Ecological footprint
- Earth Overshoot Day
- Food miles
- Mug vs. Styrofoam cup
- Green bags vs. plastic bag
- Doing X is equivalent to taking 100 cars off of the road

LCA is the parent technique for the analyses

# What is *life cycle assessment*?

Phases:

1. Goal and scope
2. Inventory analysis
3. Impact assessment
4. Interpretation

We iterate non-sequentially through the 4 phases



## LCA phases

Which phase of LCA is:

- Impact assessment

?

## LCA phases

Which phase of LCA is:

- Impact assessment – **3**

?

## LCA phases

Which phase of LCA is:

- Impact assessment
- Goal and scope

?

## LCA phases

Which phase of LCA is:

- Impact assessment
- Goal and scope – 1

?

## LCA phases

Which phase of LCA is:

- Impact assessment
- Goal and scope
- Inventory analysis

?

## LCA phases

Which phase of LCA is:

- Impact assessment
- Goal and scope
- Inventory analysis – **2**

?

## LCA phases

Which phase of LCA is:

- Impact assessment
- Goal and scope
- Inventory analysis

?

What is the remaining phase?

**Interpretation – 4**

Thanks!

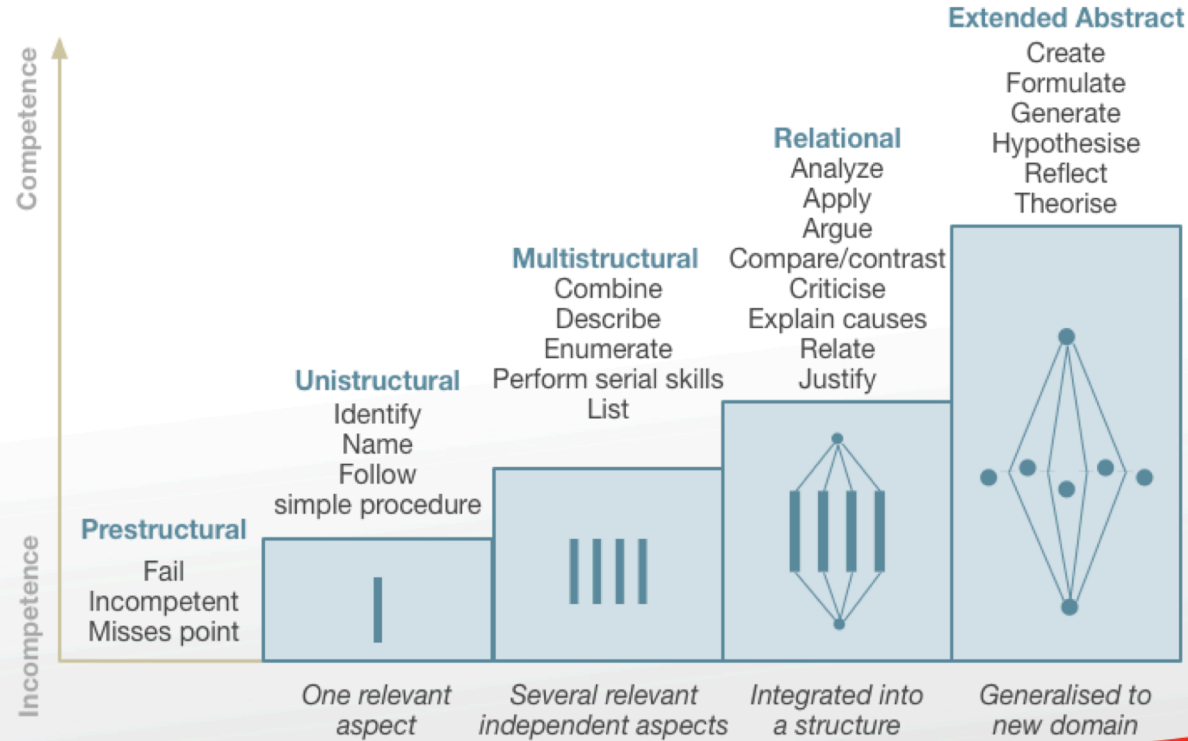


# Assessment standards

## SOLO taxonomy

[Video](#) (4 min)

[Text](#) (100 words)



Source: The Australian National University 2014, *Unravelling Complexity*, The Australian National University, Canberra. <http://vc-courses.anu.edu.au/uc/home>, viewed 4 March

2014.