



Looking for a Sustainable Future

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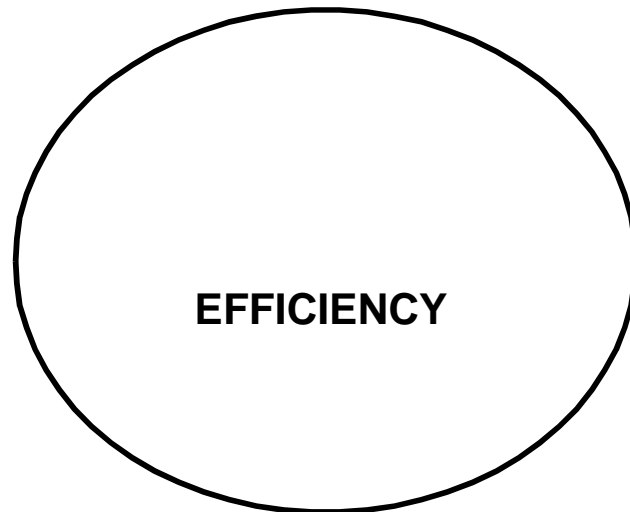
President of the International Society for
Industrial Ecology



TIM JACKSON

“Sustainability is the art of living well
within the ecological limits of a
finite planet.”

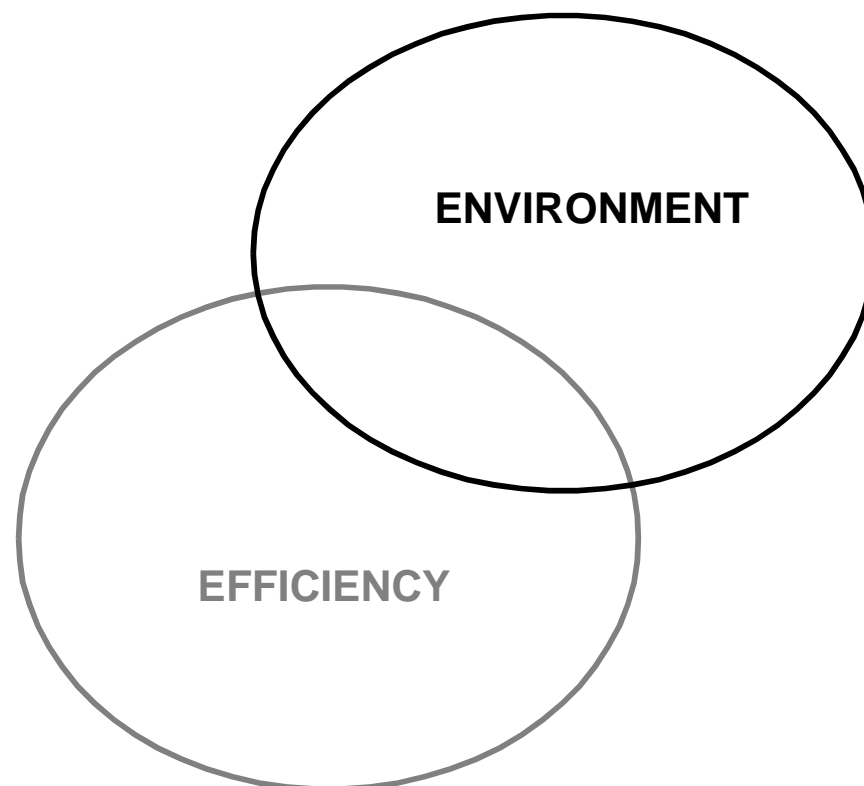
EFFICIENCY



- The traditional domain of engineering
- Activities constrained by :
 - scientific laws including thermodynamics
 - technological ingenuity
 - efficiency within the existing economic system

ENVIRONMENT

-Constraints imposed by the planet:

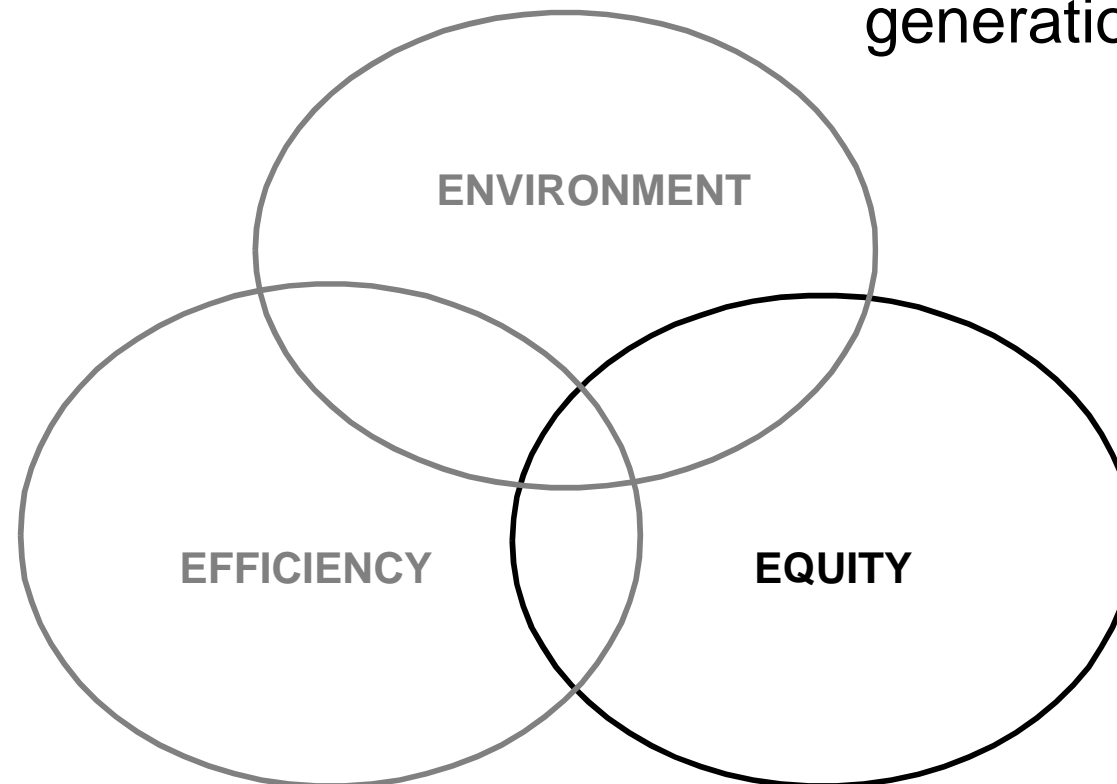


-Resource
availability

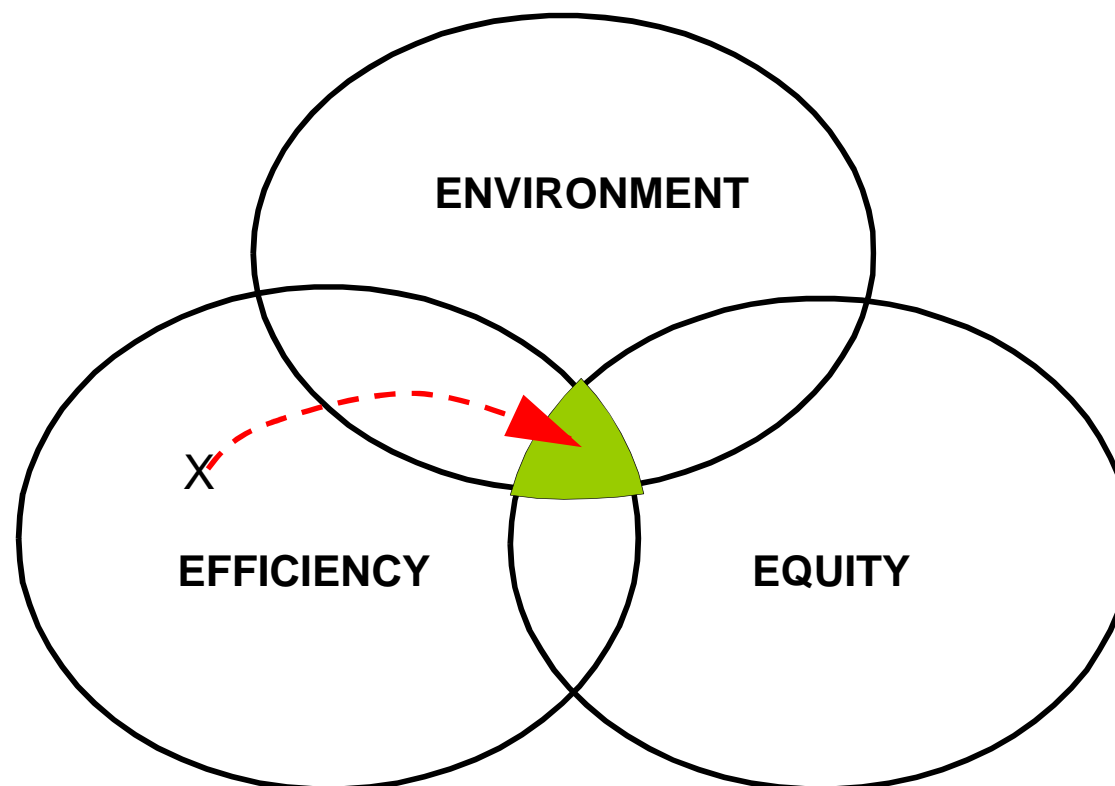
-Capacity to
absorb emissions,
the “excesses
of consumption”

EQUITY

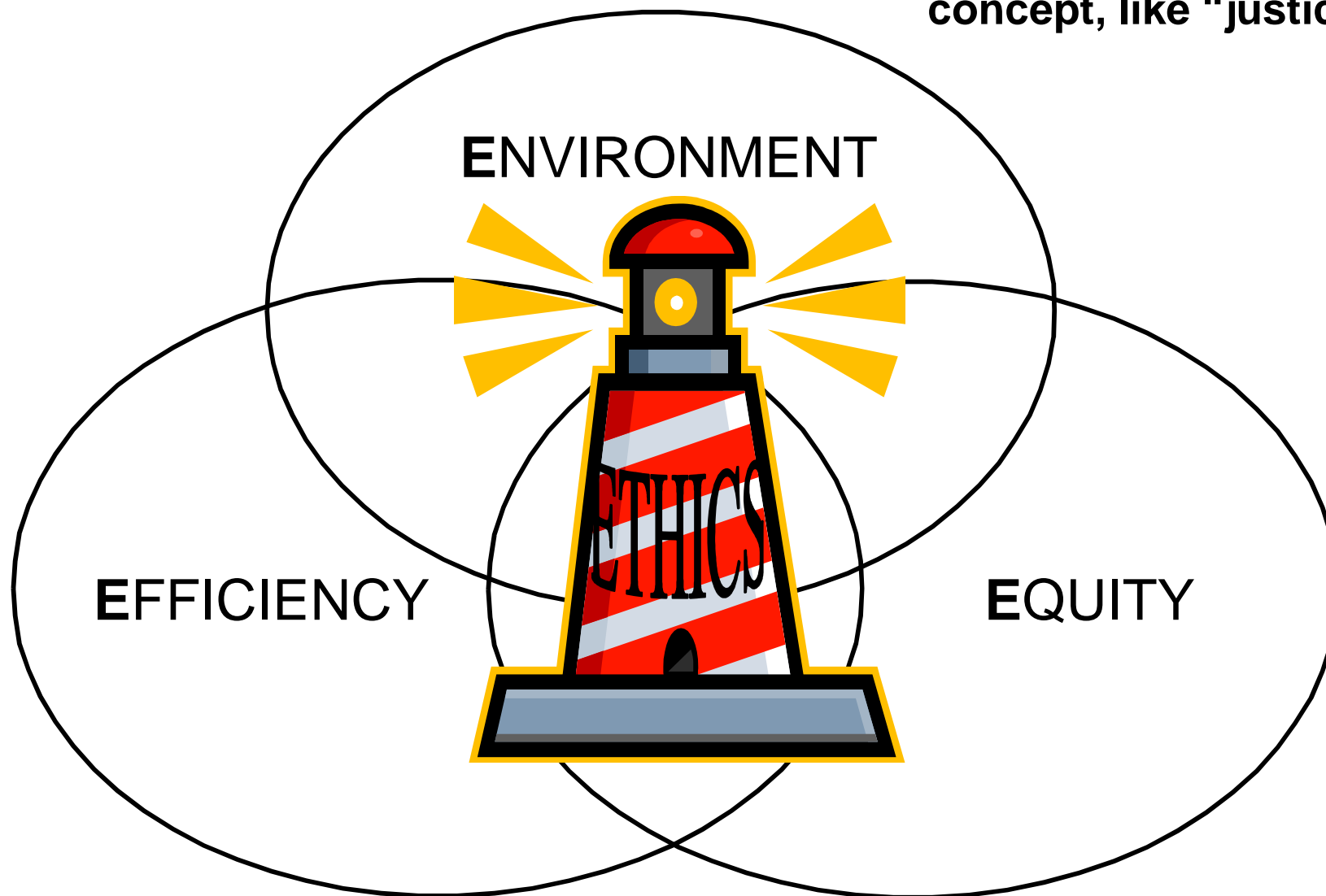
Ensuring a better
quality of life for
everyone, now and for
generations to come



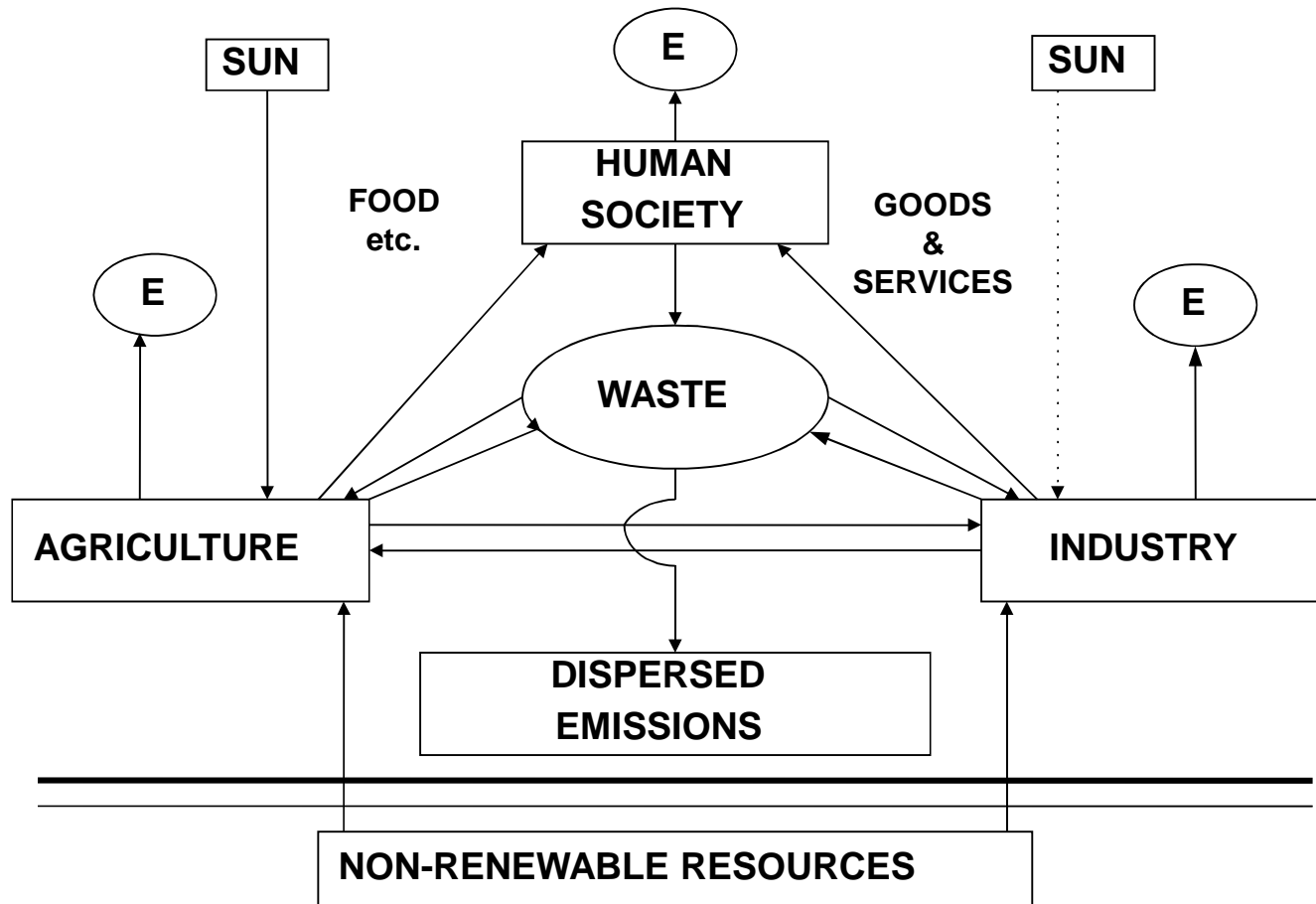
SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT



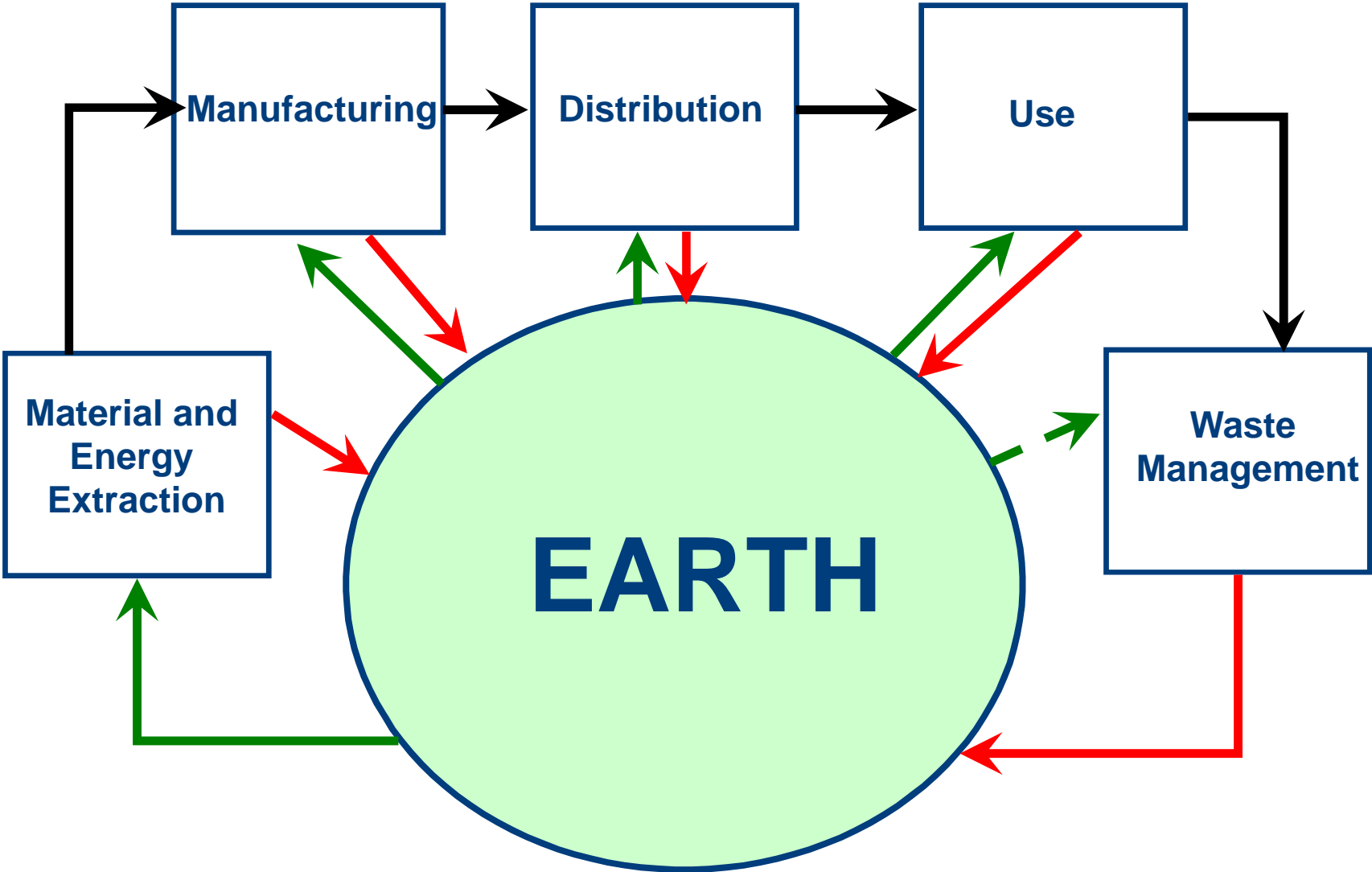
THE FOUR E'S: Sustainable development is an ethical concept, like "justice"



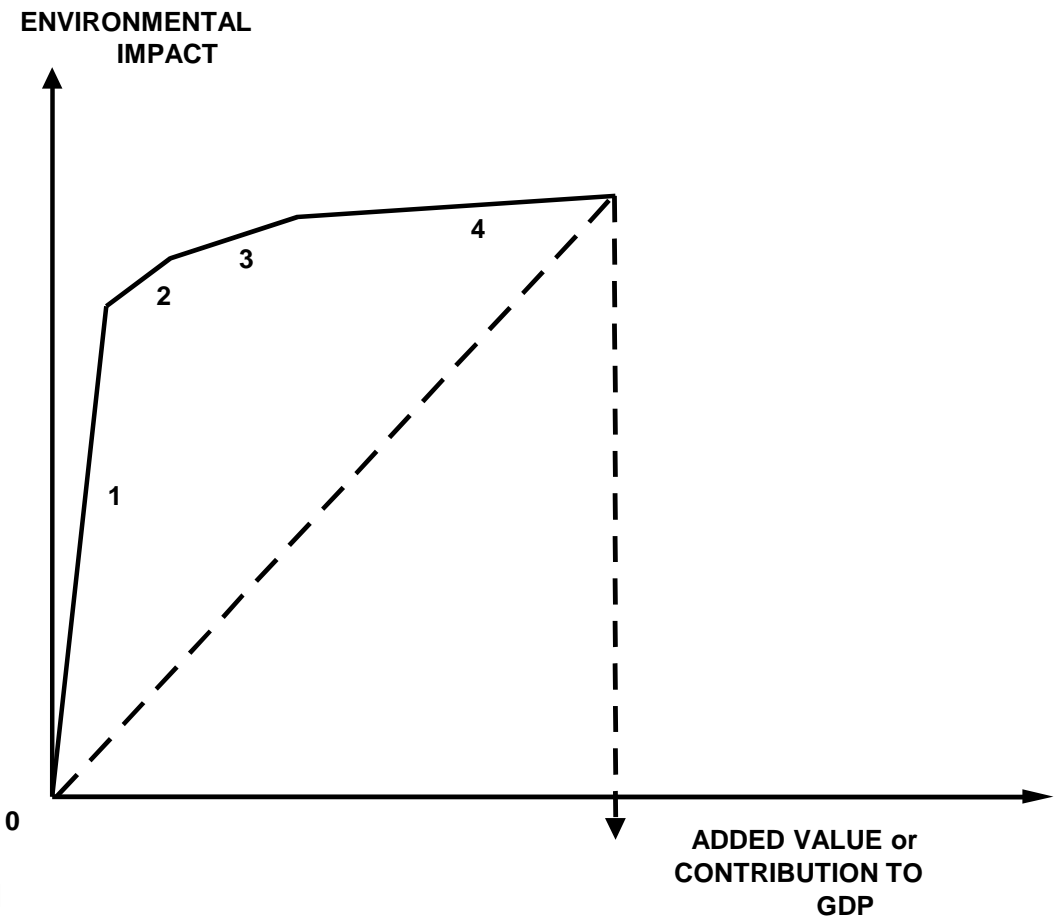
THE HUMAN ECONOMY



A SIMPLE SUPPLY CHAIN



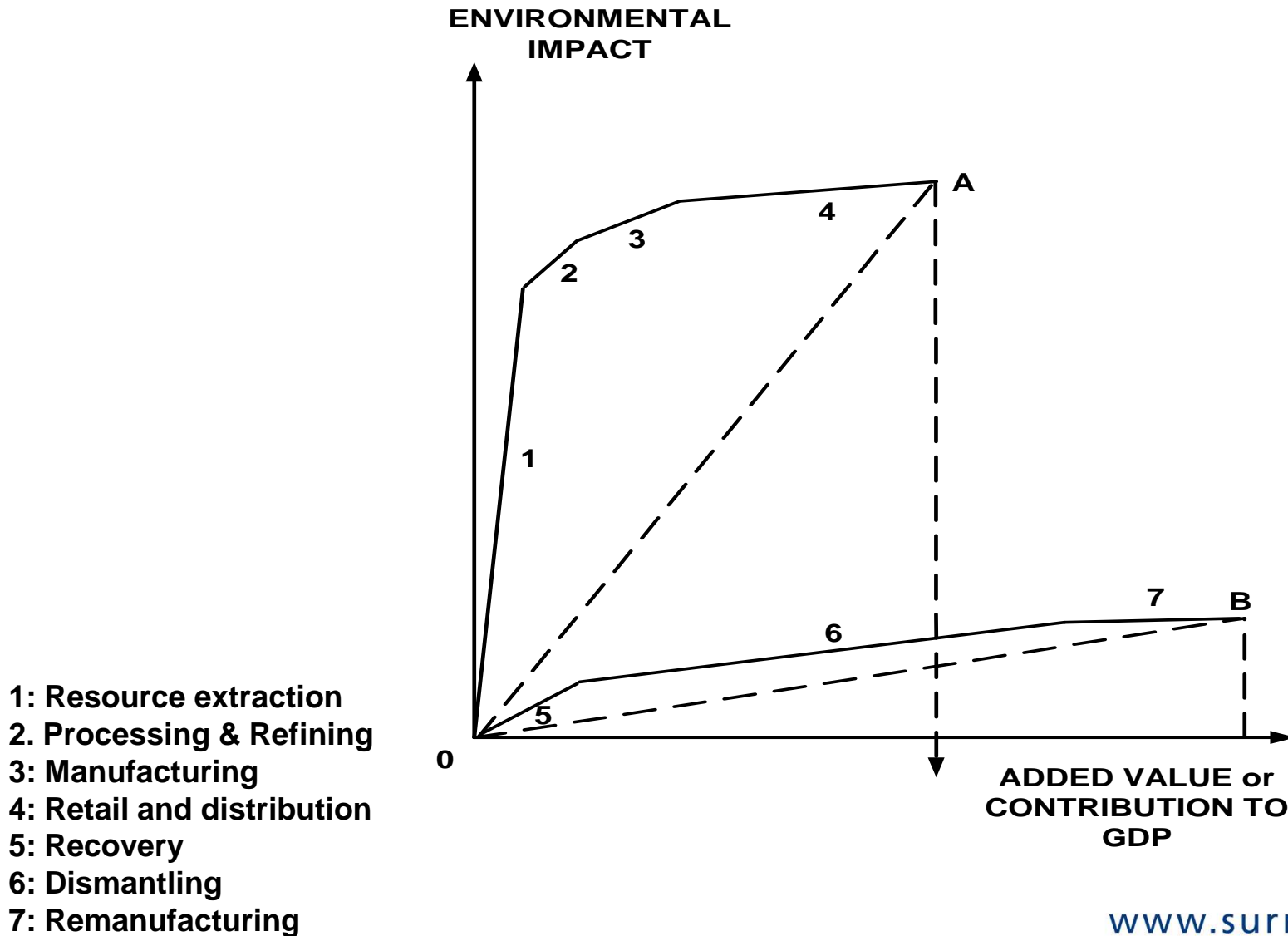
ACCUMULATION OF ECONOMIC VALUE AND ENVIRONMENTAL IMPACT ALONG THE SUPPLY CHAIN – MANUFACTURED PRODUCTS



- 1: Resource extraction
- 2: Processing & Refining
- 3: Manufacturing
- 4: Retail and distribution



FIRST USE VS. RECOVERY AND RECYCLING



ENVIRONMENTAL IMPACTS OF CONCERN

1. GREENHOUSE GASES

- “carbon leakage”
- Should accounts be on a production basis or a consumption basis?

2. LAND USE

- Land is a constrained resource
- Central issue in debate over biofuels

3. WATER

- “Virtual” or “embodied” water in products
- Concern over water-intensive products from water-stressed areas.

4. SCARCE MATERIALS

- Rare metals
- Land

Nos. 2, 3 & 4 require consequential analysis...

Methodological Issues 1: Attributional vs Consequential

Are we concerned with

- describing the supply chain and the associated impacts and risks?
or
- Asking “what if we produce this product rather than any other”?

Scale matters : total or marginal?

If comparative, comparing what with what?

The Attributional vs Consequential decision conventionally affects Inventory Analysis (e.g. biofuels)

but

for scarce abiotic resources it is also an
impact issue

Assessing resource depletion

We need to distinguish between

A. Relatively abundant metals ; e.g. Fe, Al
and “localised” metals; e.g. PGM

B. Mined metals; e.g. Fe, Al
and “co-products” or “hitch-hikers”

Where are In, Te.....?

Methodological Issues 2:

Is LCA

- an expert tool to guide technology management?
- an approach to structuring information to inform participatory deliberation?

THE PRODUCT DEVELOPMENT PROCESS

Phase 0:
Idea

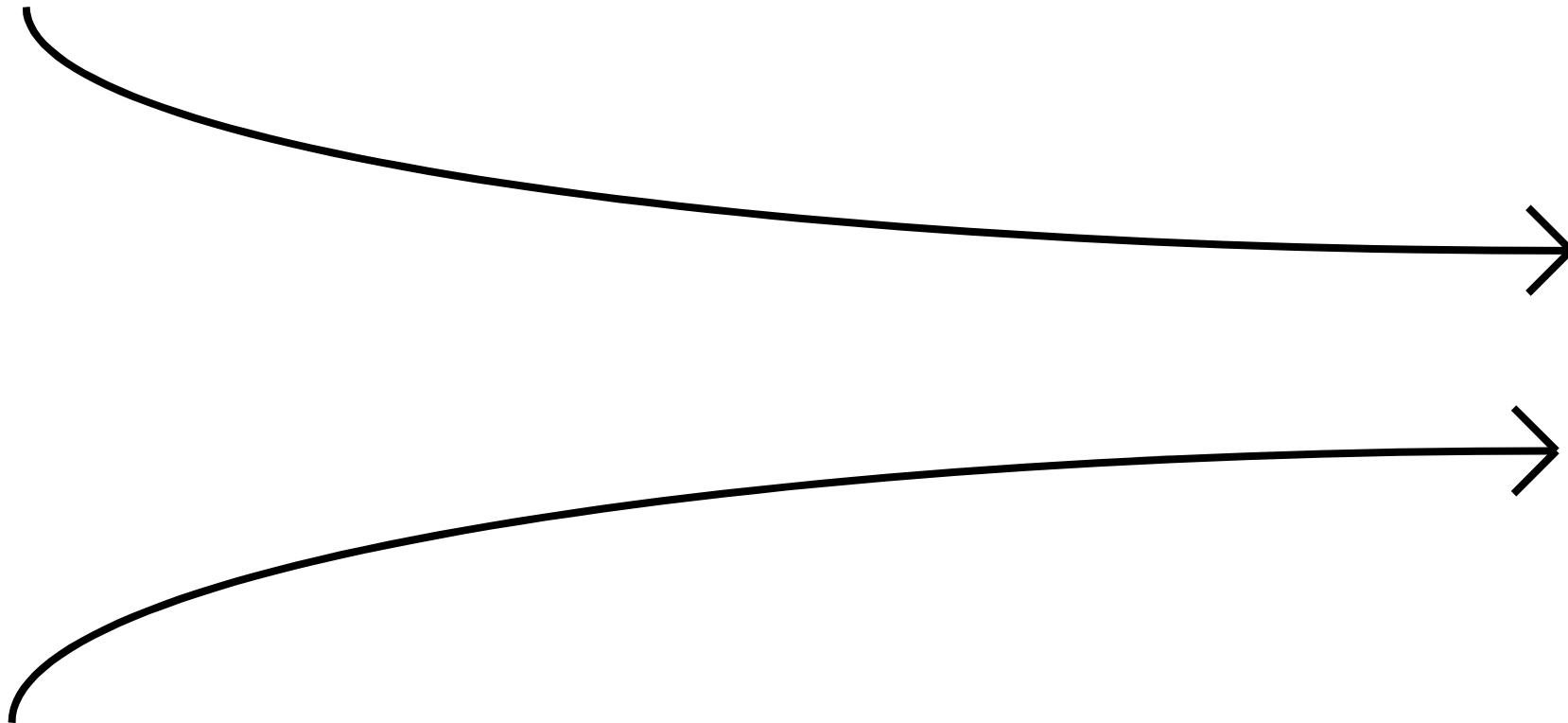
Phase 1:
Feasibility

Phase 2:
Proof of Concept

Phase 3:
Scale-up

Phase 4:
Pre- Commercial

Phase 5:
Commercial



THE PRODUCT DEVELOPMENT PROCESS

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1. Conventional use of DFE: detailed design

THE PRODUCT DEVELOPMENT PROCESS

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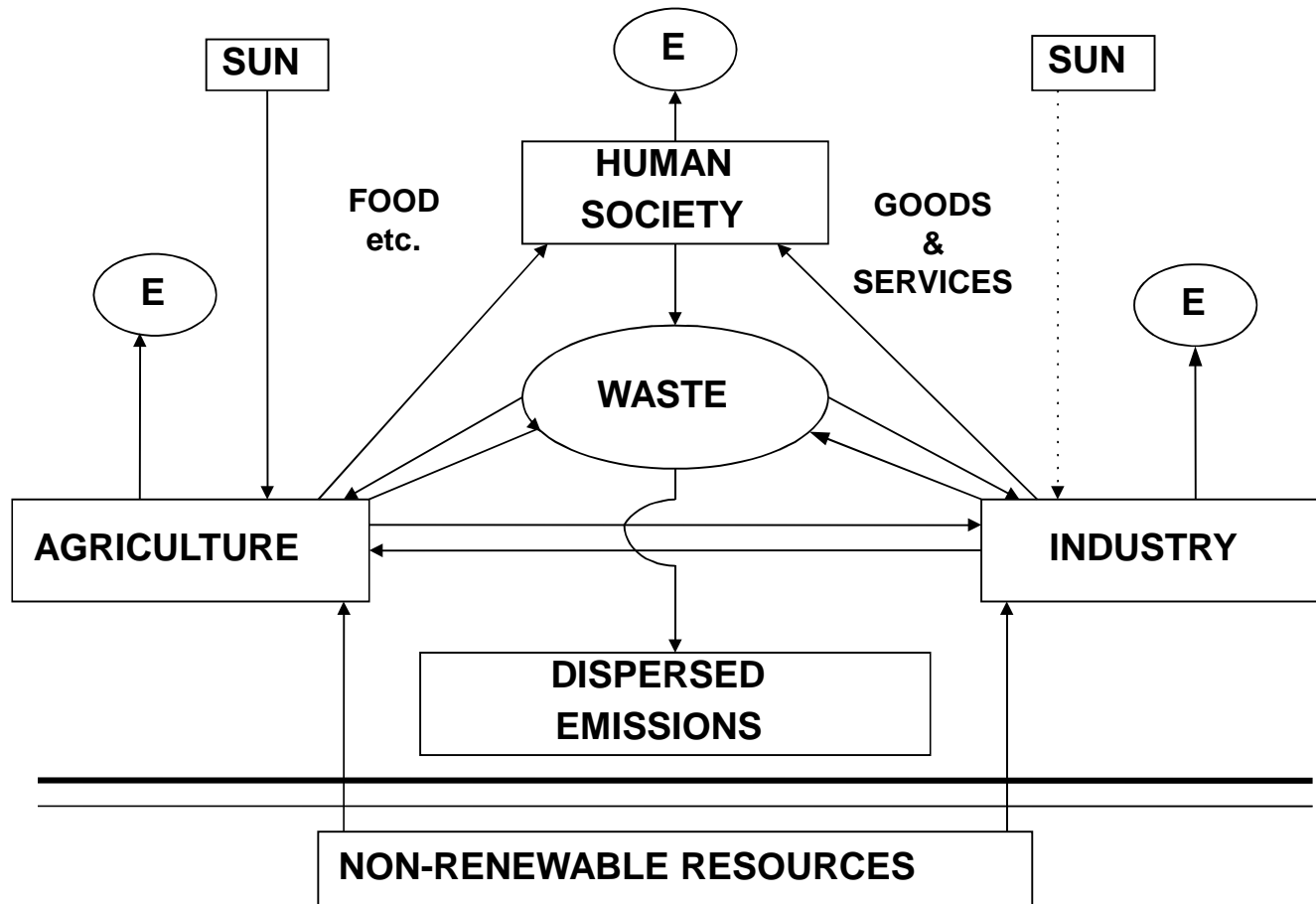
2. Strategic use of LCA



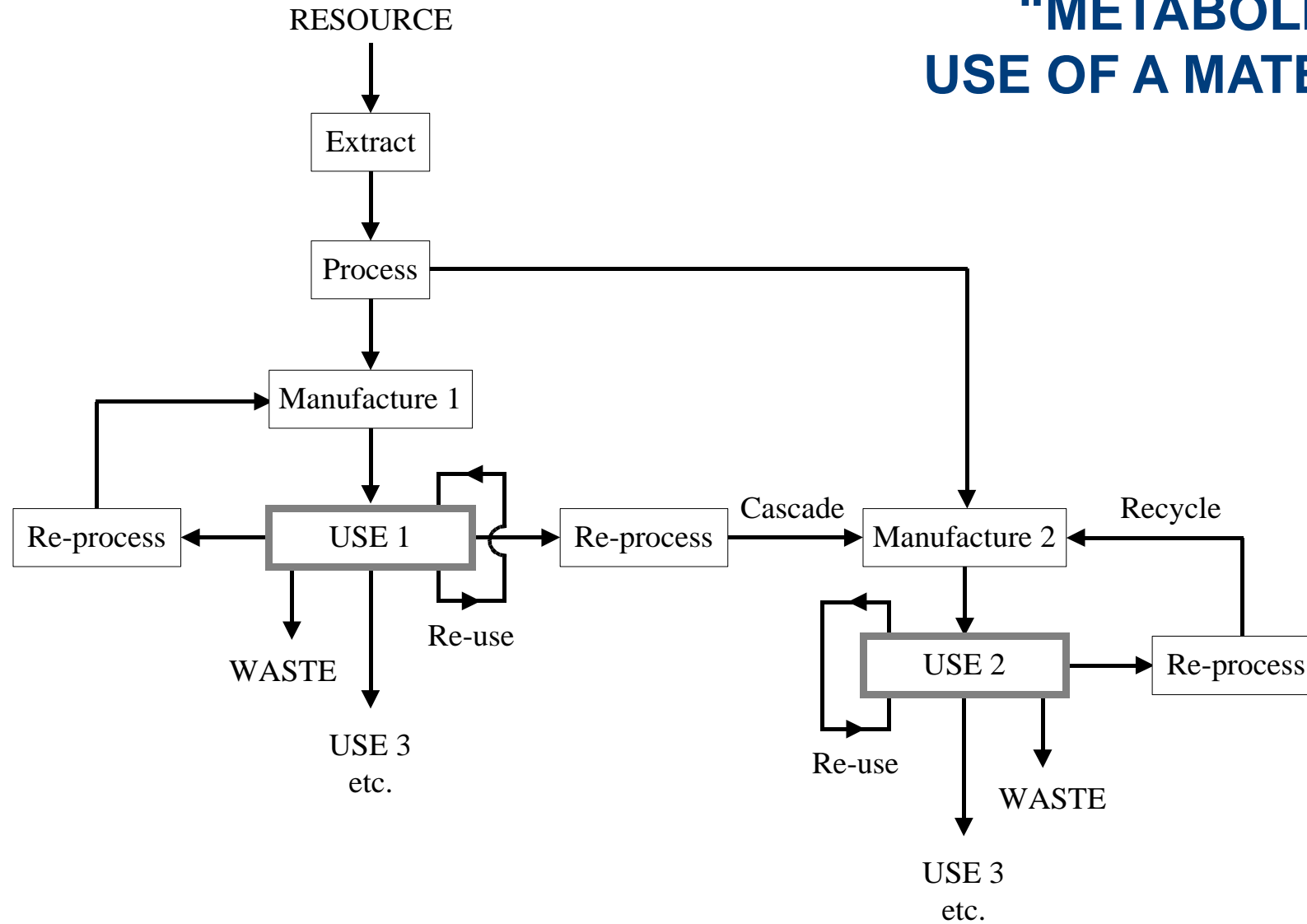
If we are serious about deliberative decision making, then we must stop thinking of LCA as an expert tool

- which probably means not using the conventional “mid-points”

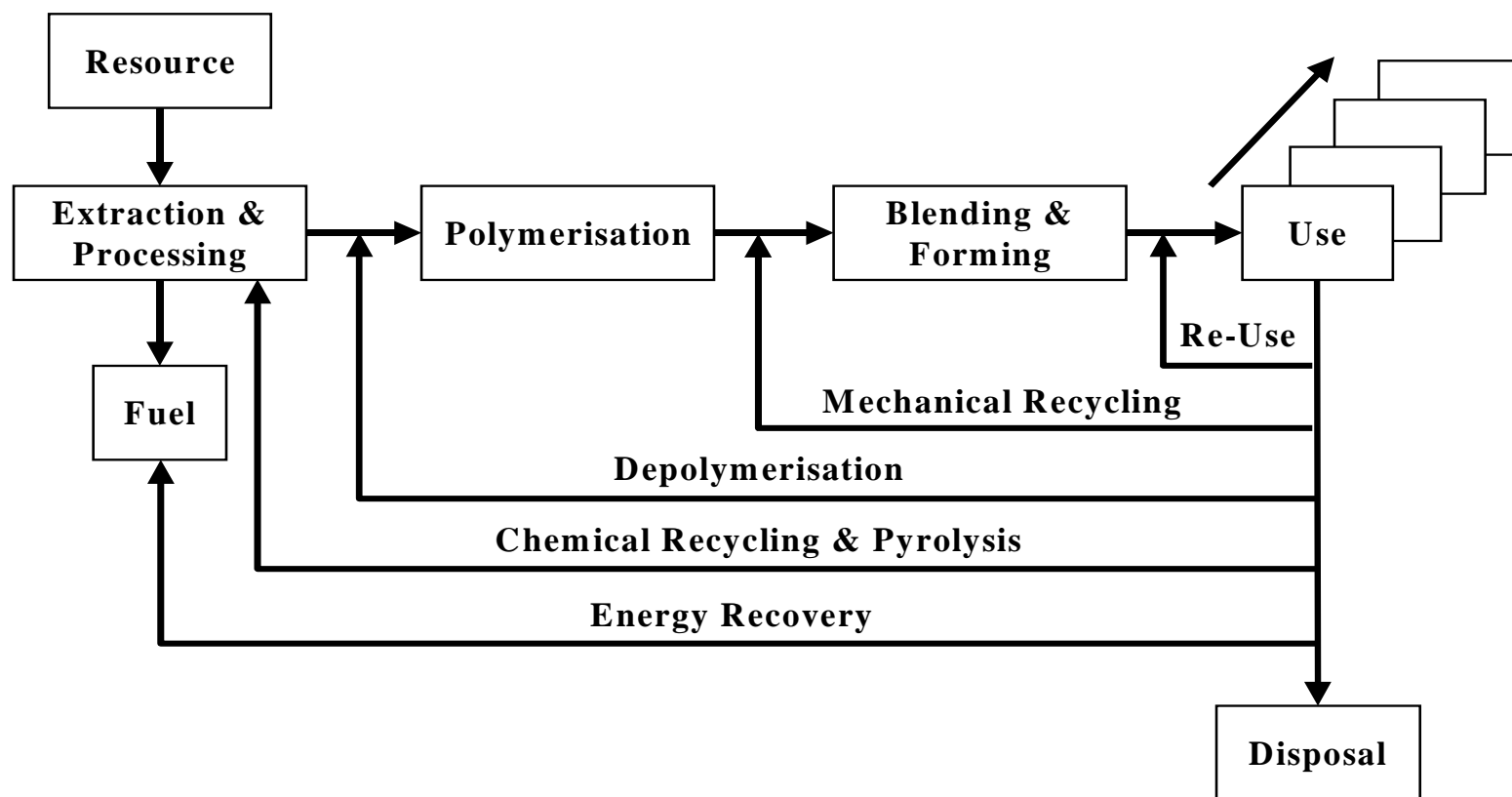
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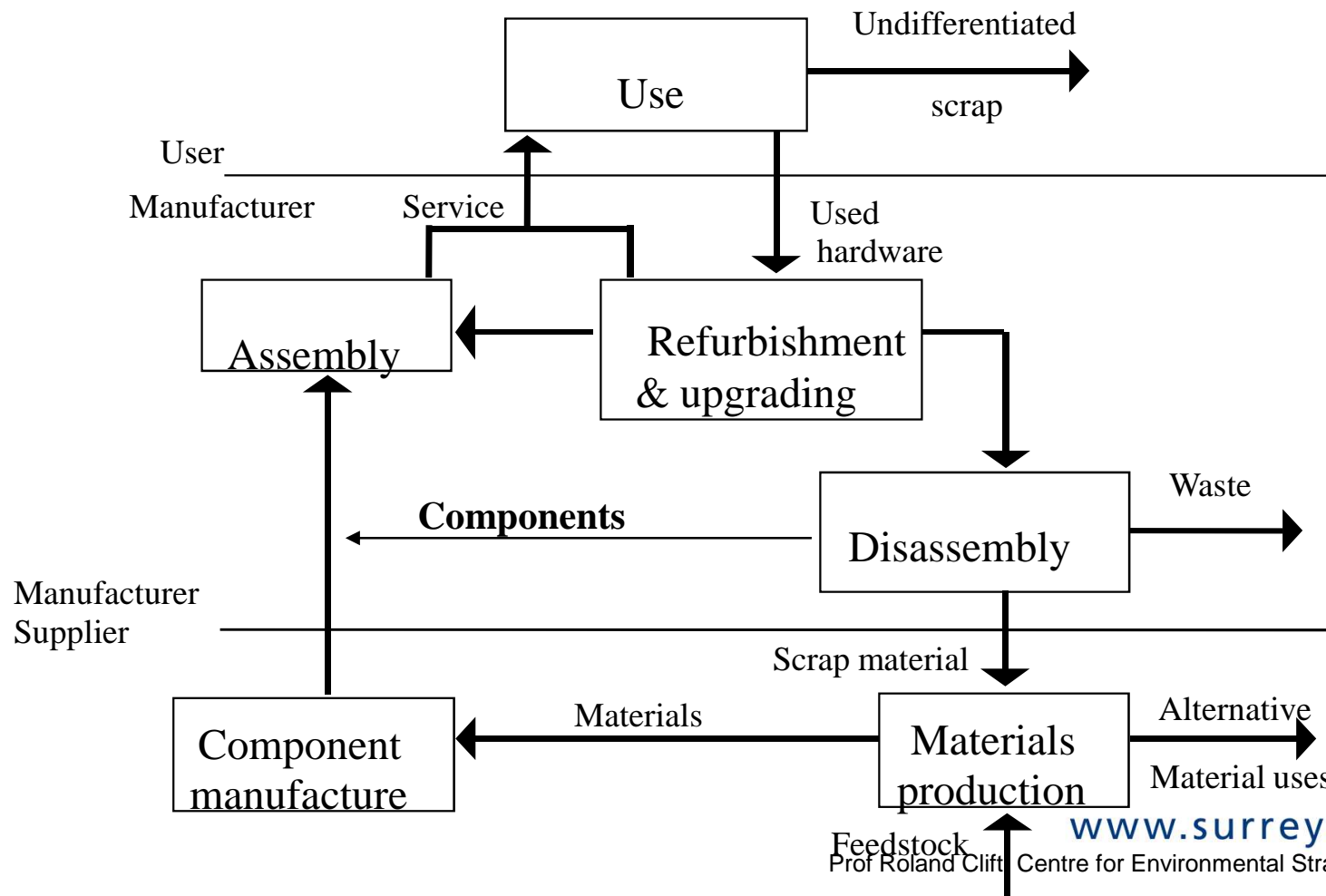
“METABOLISED” USE OF A MATERIAL



INDUSTRIAL ECOLOGY FOR PLASTICS



“METABOLISED” USE OF A MANUFACTURED PRODUCT



EXAMPLES OF SOCIAL IMPACTS OF CONCERN

1. LABOUR CONDITIONS

- No child labour
- Freedom of association

2. GENDER

- Equality of opportunity
- Equity of power

3. EDUCATION

- Opportunity
- Social mobility

4. HEALTH

Where does this point?

A redefinition of quality or luxury...

EQUITY includes:

- Equity along the supply chain
- Equity of access to “environmental services” between affluent and poor

This requires consumption in affluent societies to have low environmental impact per dollar spent and to provide social and economic benefits along the supply chain:

The “Fair Trade” principle and beyond...

A person wearing a long, light blue, hooded dress and a wide-brimmed hat stands in a grassy field. The background features trees and a fence. The text "Gucci is good for the earth and Angels wear Prada" is overlaid on the image.

**Gucci is good for the earth
and
Angels wear Prada**

BUT WHAT HAPPENS TO THE WASTE?

