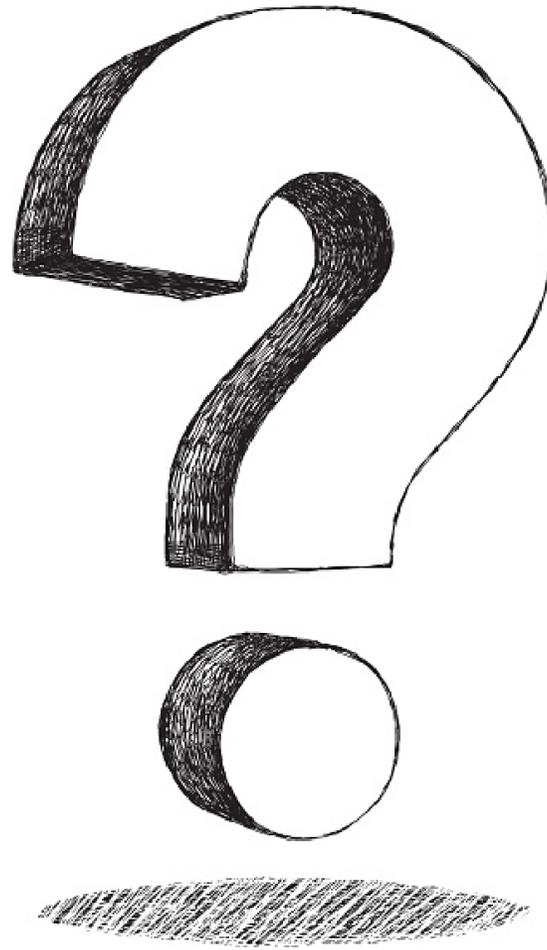




Maximising product stewardships learnings
from life cycle assessment

Craig Thomson – Associate Director



Environmental Focus...drivers for LCA

The collage consists of four main visual elements:

- Brand Impact:** A red square with a white border containing the text "brand impact." in a sans-serif font.
- Risk Management:** A hand-drawn diagram with "RISK" in a central red oval. Four arrows point to boxes labeled "Reduce", "Transfer", "Accept", and "Avoid". In the background, a bar chart shows "v mater", "Demod", and "Turkey".
- Compliance:** A circular seal with "COMPLIANCE" written around the perimeter and a blue banner across the center with the word "COMPLIANCE" in white.
- Trade-off Graph:** A chalkboard-style graph with three lines: a red line decreasing (labeled "COST"), a green line fluctuating upwards (labeled "EFFICIENCY"), and a yellow line increasing (labeled "QUALITY").

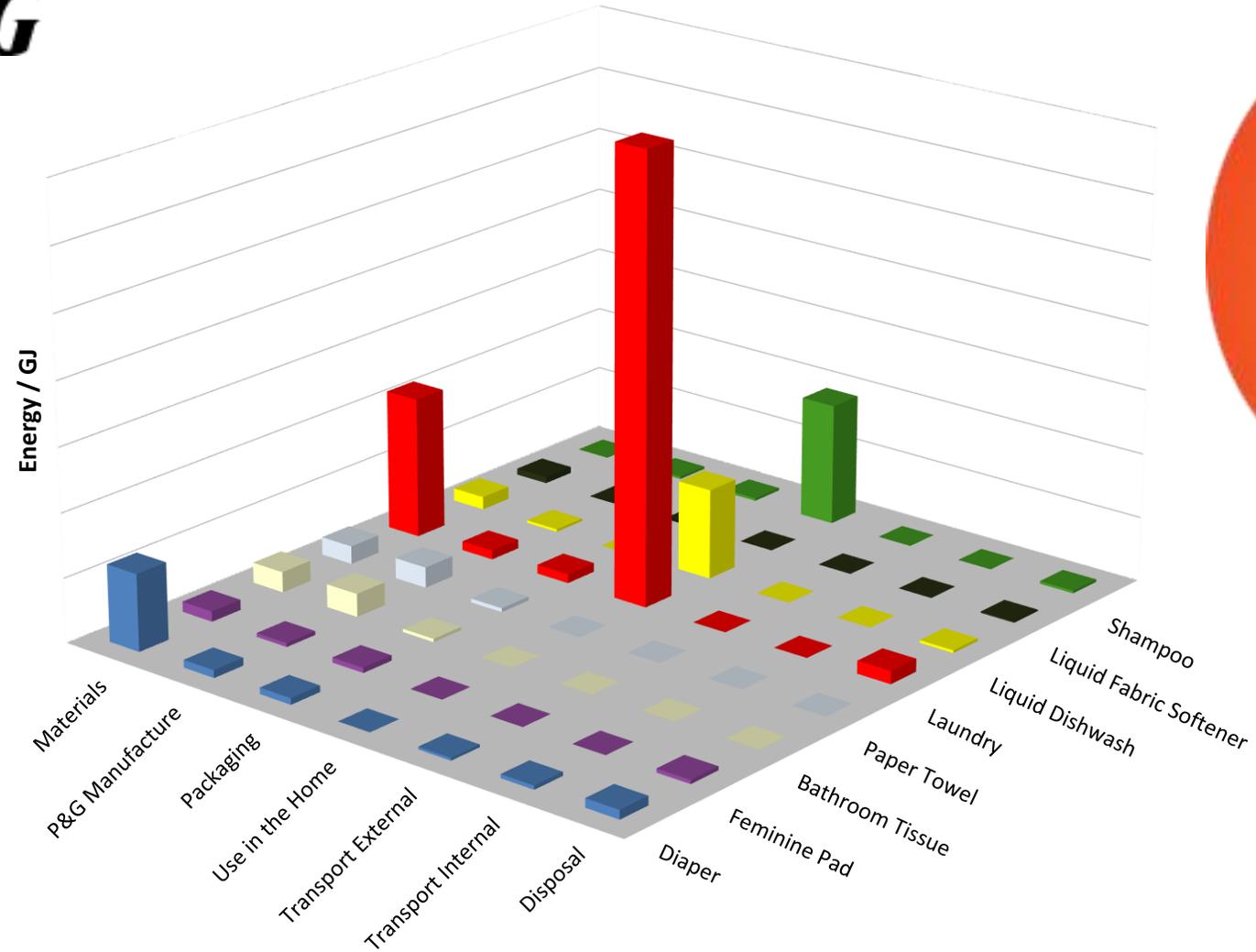
- Life cycle thinking – the background
- Life cycle assessment – the approach
- Practical approaches – how to do it?
- Case studies – some examples
- Summary – what you can do next



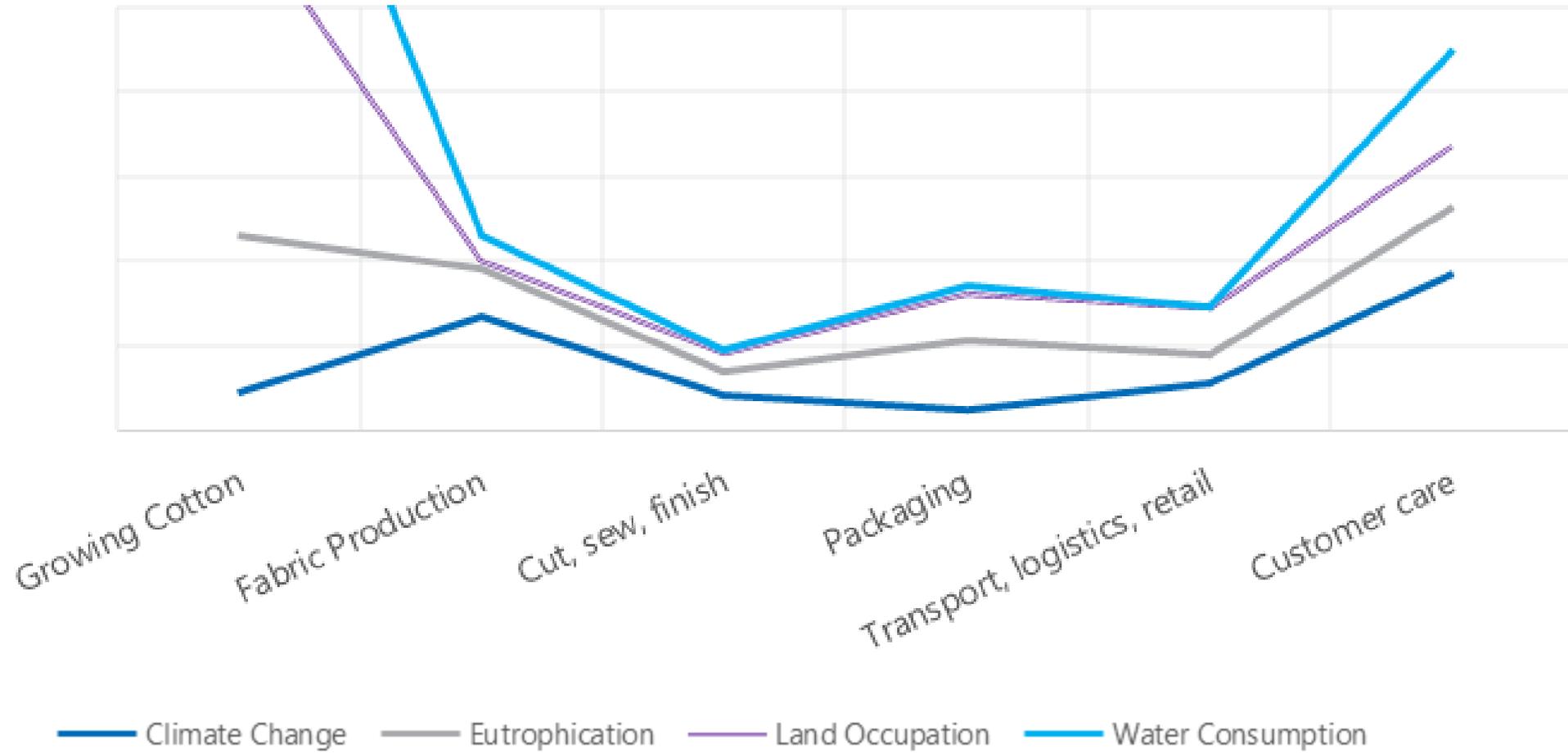
Life Cycle Thinking

Considering the whole life cycle

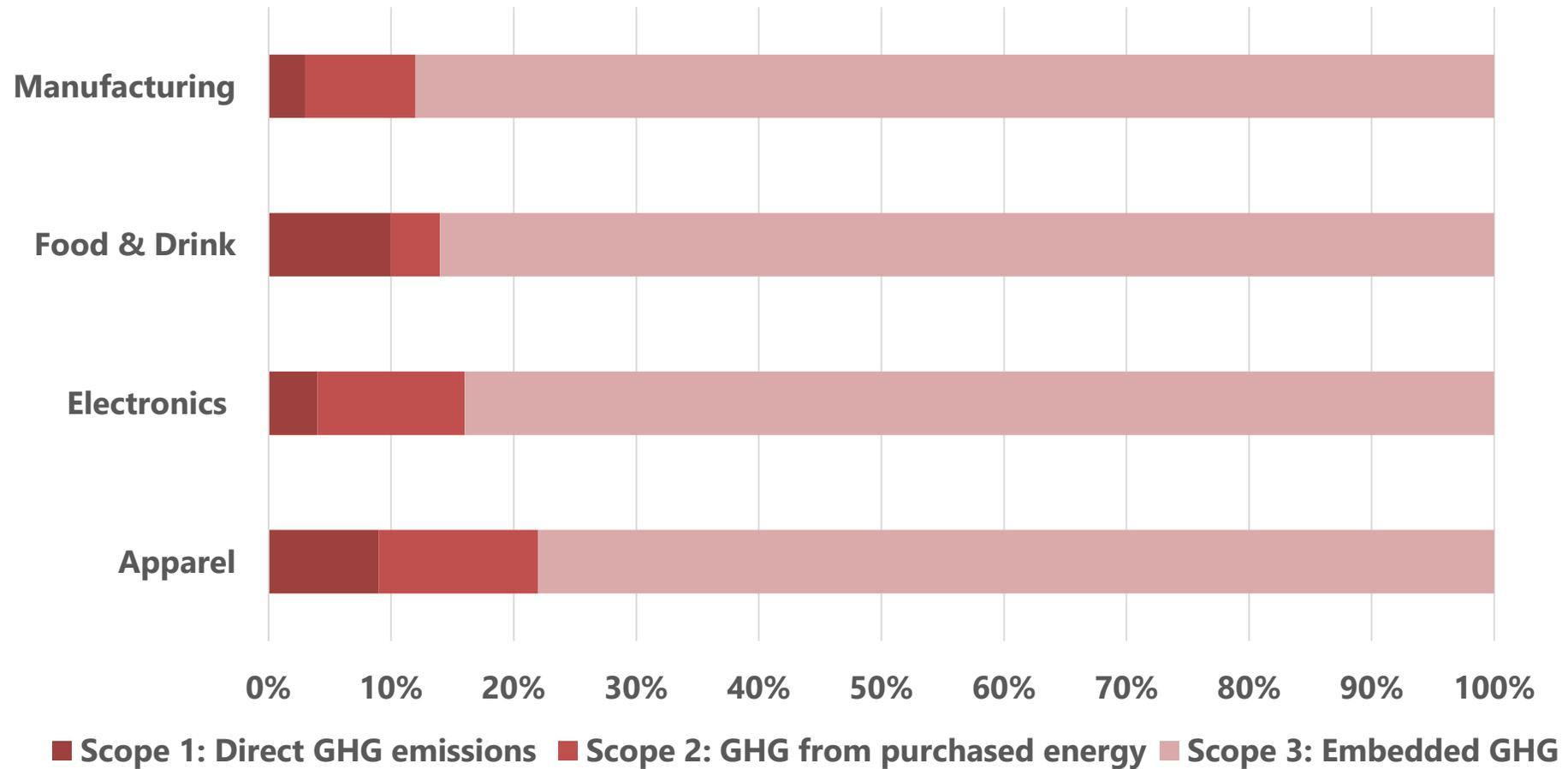
P&G



The whole life cycle



The whole life cycle



Life Cycle Costing







LCA			S-LCA		LCC
<p>3 GOOD HEALTH</p> 	<p>6 CLEAN WATER AND SANITATION</p> 	<p>7 RENEWABLE ENERGY</p> 	<p>2 NO HUNGER</p> 	<p>4 QUALITY EDUCATION</p> 	<p>1 NO POVERTY</p> 
<p>11 SUSTAINABLE CITIES AND COMMUNITIES</p> 	<p>12 RESPONSIBLE CONSUMPTION</p> 	<p>13 CLIMATE ACTION</p> 	<p>5 GENDER EQUALITY</p> 	<p>9 INNOVATION AND INFRASTRUCTURE</p> 	<p>8 GOOD JOBS AND ECONOMIC GROWTH</p> 
<p>14 LIFE BELOW WATER</p> 	<p>15 LIFE ON LAND</p> 		<p>10 REDUCED INEQUALITIES</p> 	<p>16 PEACE AND JUSTICE</p> 	 <p>THE GLOBAL GOALS For Sustainable Development</p>

Life Cycle Assessment

ISO 14040 defines Life Cycle Assessment to be the...

*“**compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle**”*

- *ISO standard defines a four step process...*

1. Goal and scope definition

- ✓ overall goal of study
- ✓ system boundary
- ✓ functional unit
- ✓ primary vs secondary data
- ✓ environmental criteria

1. Goal and scope
definition

2. Inventory
analysis (LCI)

List of the actual “flows”
within the system boundary

- ✓ materials
- ✓ emissions
- ✓ energy
- ✓ waste

In effect, a mass and energy
balance

1. Goal and scope
definition

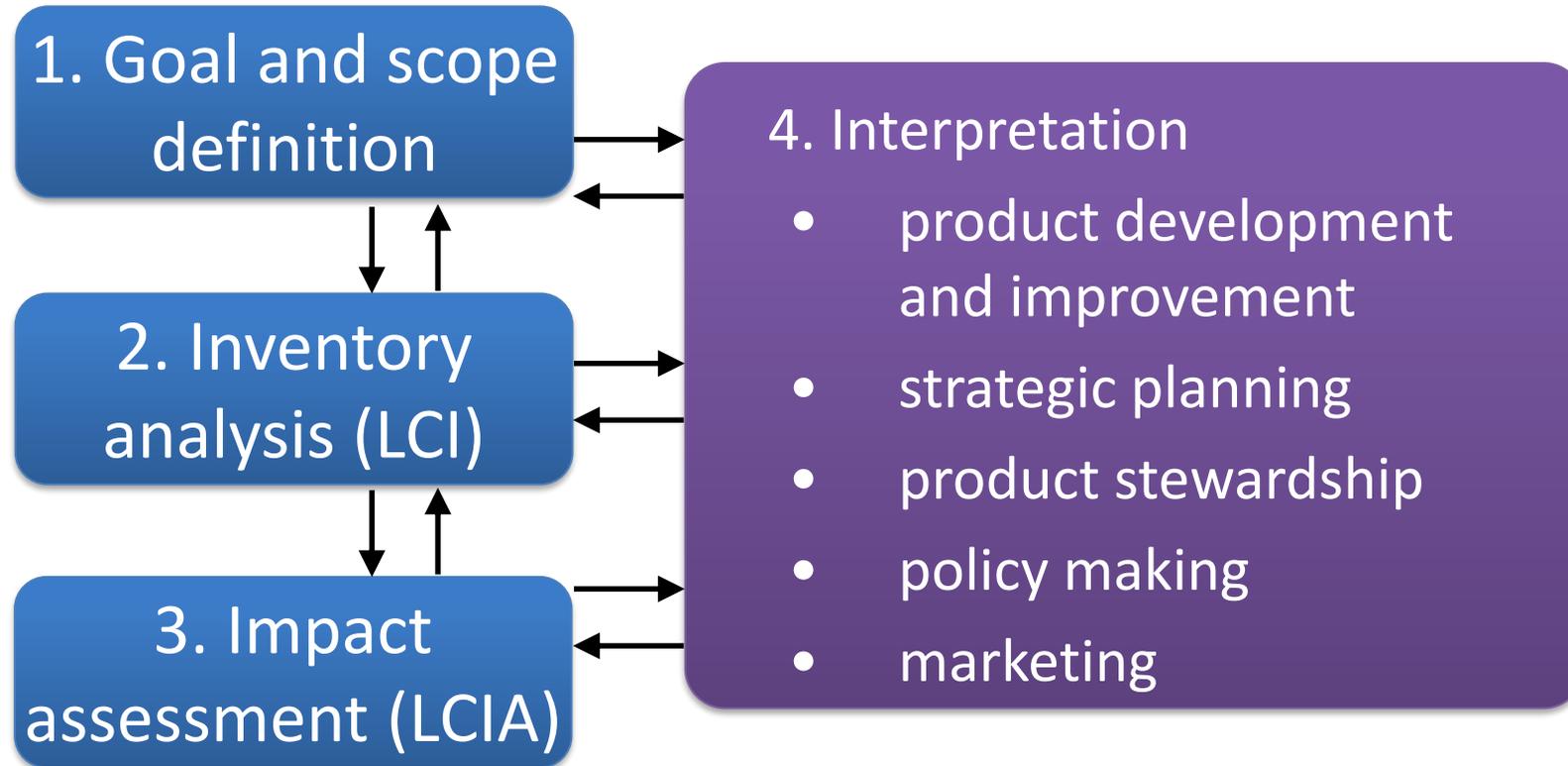
2. Inventory
analysis (LCI)

3. Impact
assessment (LCIA)

Translates flows into environmental
impacts:

- ✓ acidification
- ✓ ozone depletion
- ✓ global warming potential
- ✓ human toxicity
- ✓ water footprint
- ✓ resource depletion

Can also explore social impacts and potentially
risk factors and REACH.



- Should we make car bodies from steel or aluminium?
 - The ISO standards for LCA are *very* flexible
 - Two studies from 2016...



“The efficient steel designs show a consistent pattern of lower emissions...”

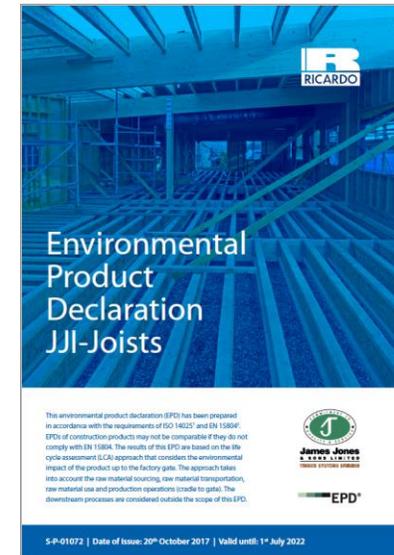
http://www.worldautosteel.org/download_files/Auto%20Mass%20Benchmarking/07_WorldAutoSteel_AutoMassBenchmarking_LCA_20160125.pdf
[accessed 09-Apr-2019]



“A car made out of a high content of aluminium will generate... a lower impact in its whole LCA.”

<https://aluminiuminsider.com/steel-cannot-compete-with-aluminium-in-vehicle-lightweighting/>
[accessed 09-Apr-2019]

- Product category rules (PCRs) define how an LCA should be performed for a particular product group
- An environmental production declaration (EPD) is a public report on how a product performs against a given PCR
- EPDs *should* enable customers to compare products and select the more environmentally friendly option
- In contrast, comparing LCAs is *not* appropriate

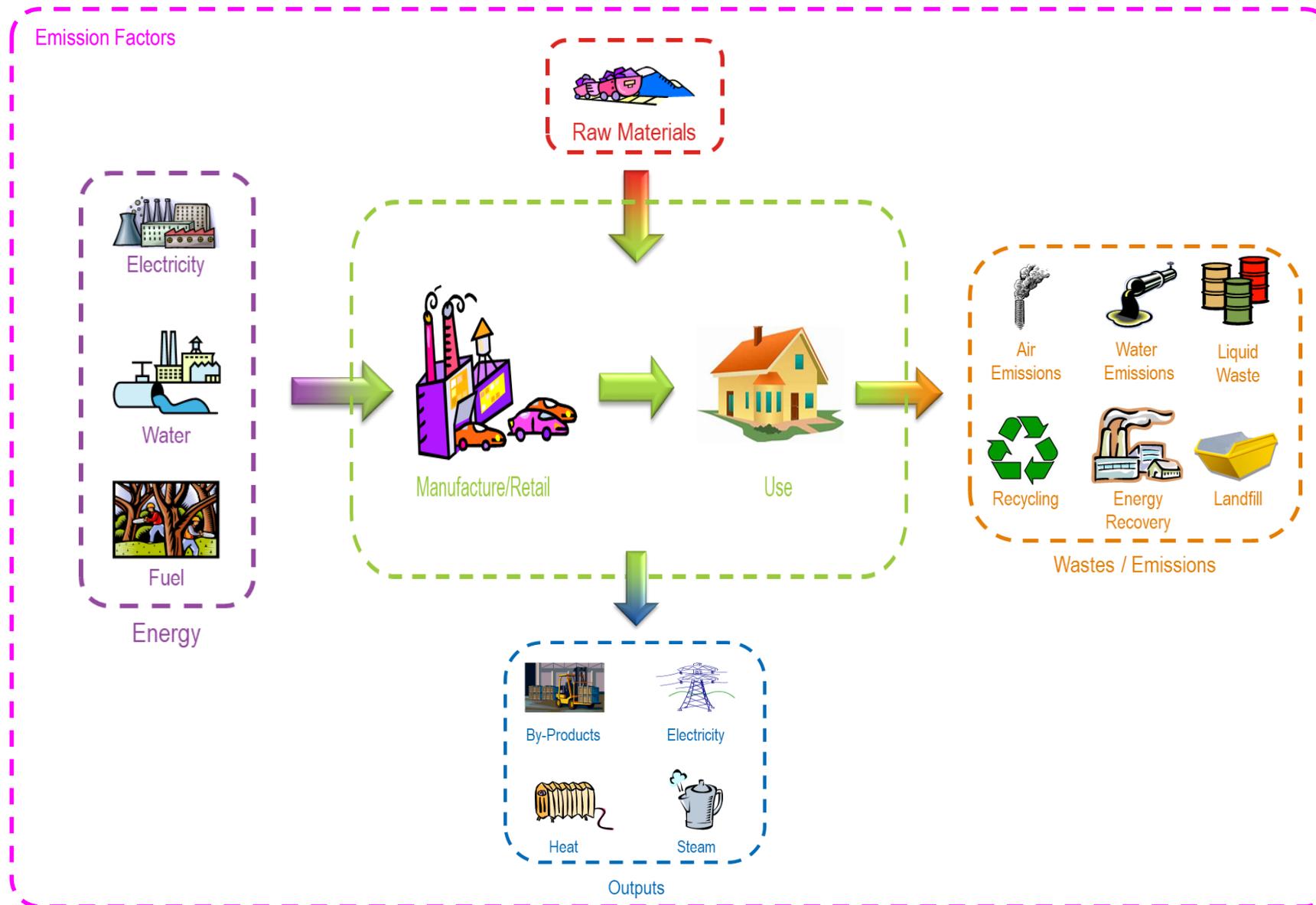


“This EPD prepared by Ricardo will now enable our clients to receive recognition for using our I-joist within environmental certification schemes.”

Abel Munoz, James Jones & Sons Ltd Technical Manager

Practical approaches

Traditional data requirements

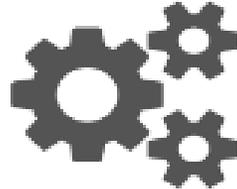




- Dutch LCA software platform, operating since 2011
- Clients include Philips, Dunlop, Saint Gobain ...and Ricardo



- **Map Company Emissions**



- **Allocate to Processes**



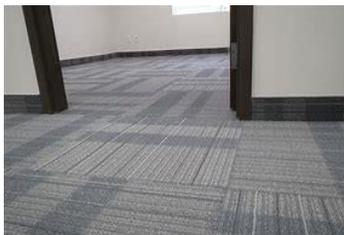
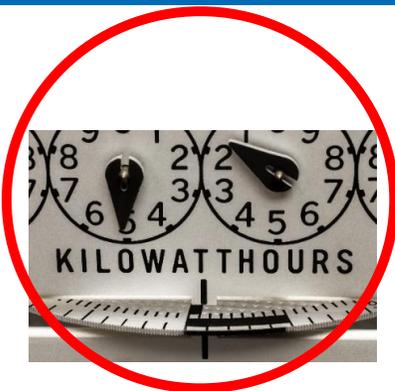
- **Allocate to Products**



- **View and share results**

Case Studies

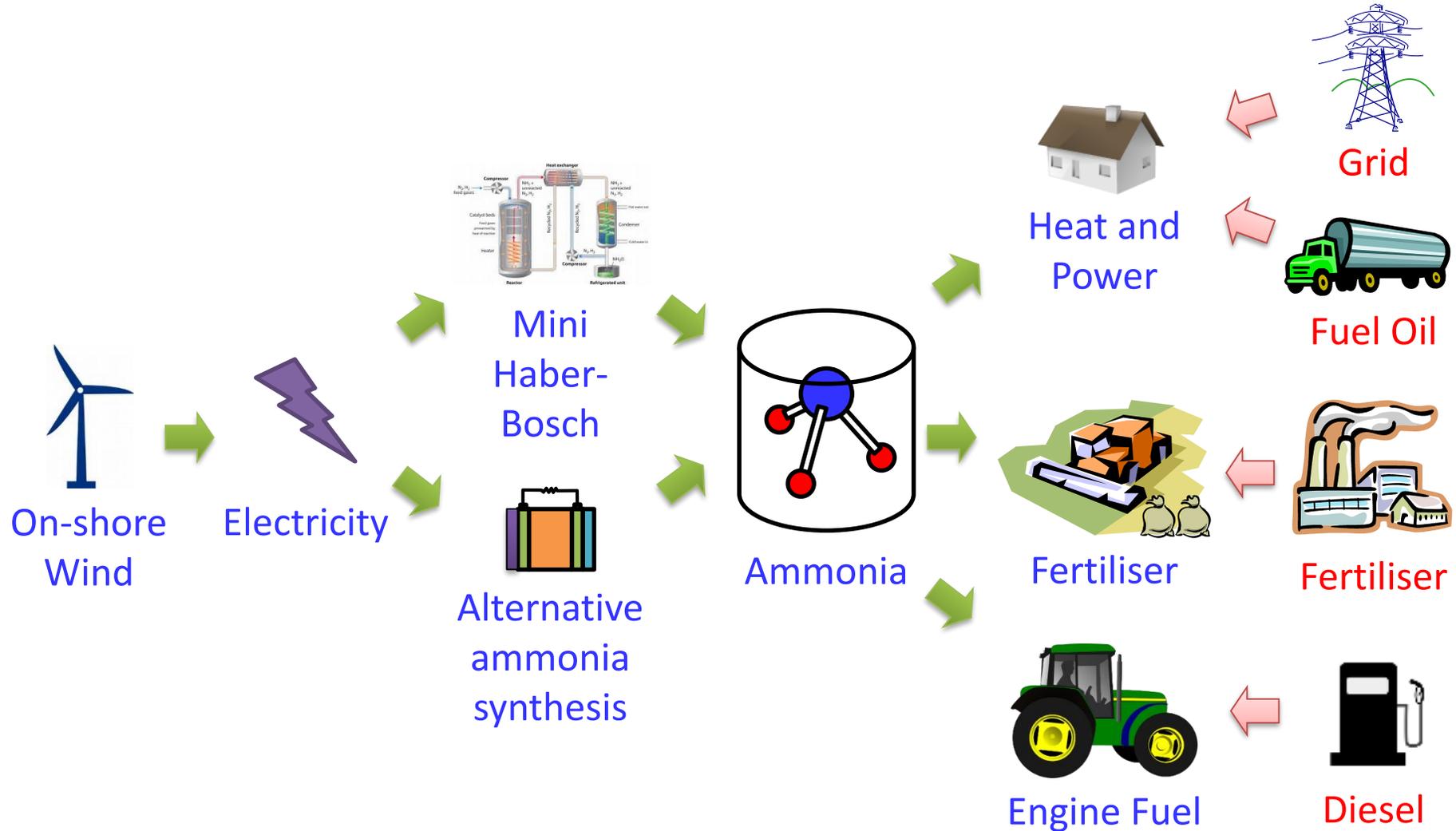
Selection of Ricardo LCA projects



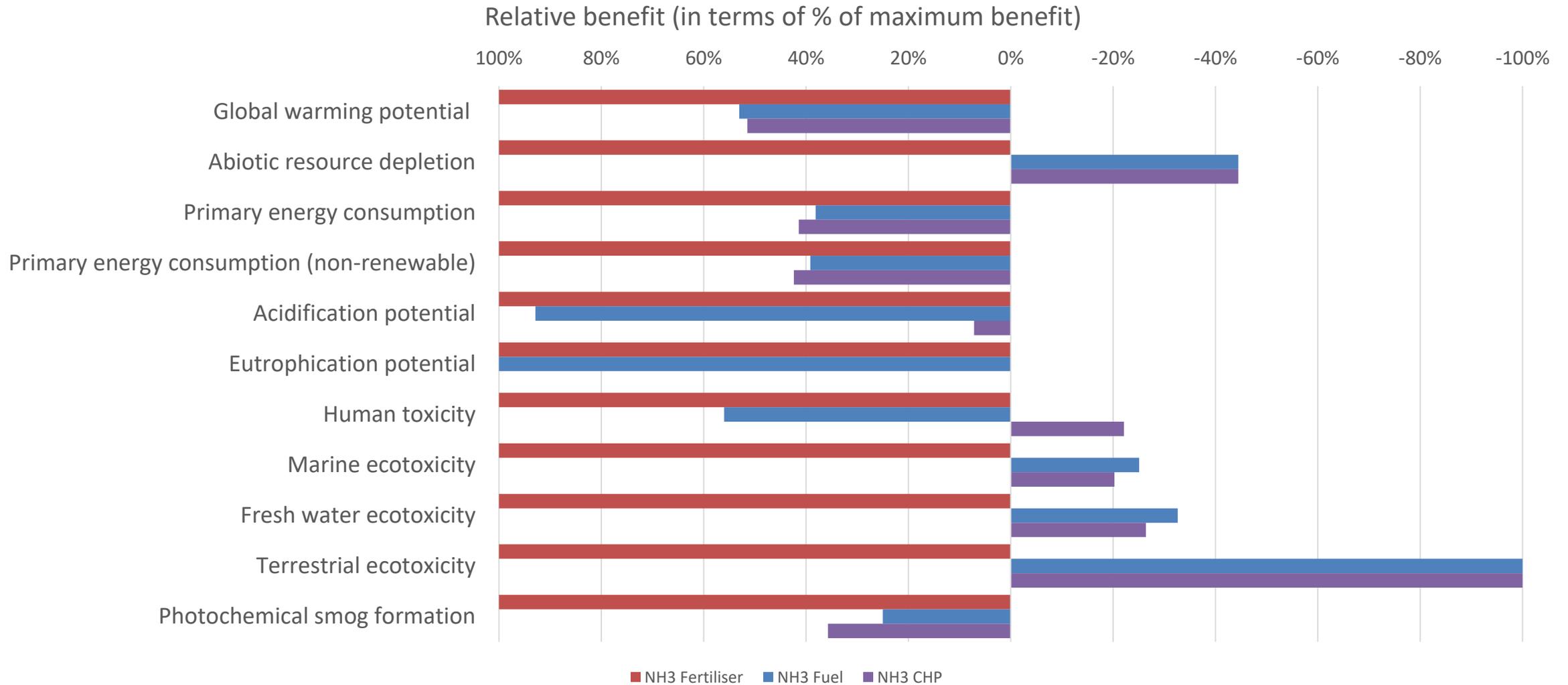
- Major international chemicals company
- Novel process for making kerosene from gas or waste
- Better or worse than traditional kerosene?
- What social issues exist along supply chain?
- Results confidential, but, at high level:
 - technologies much closer than expected
 - certain sensitivities swing results
 - potential social vulnerabilities in certain material can be addressed with stewardship



Ammonia as energy vector



Ammonia results



- Major UK provider of in-line printing
- Desire to optimise service offering:
 - Choice of ink solvent
 - Design of printer to handle that ink
 - More fundamental material choices
- Interested in many criteria beyond just carbon
- Ricardo commissioned to develop a “design for the environment” tool able to explore all these avenues



Summary

- 
- A hand is shown placing a wooden block on a staircase made of wooden blocks. The staircase is built on a wooden surface and consists of several steps of varying heights, each made of multiple wooden blocks. The background is a blurred green and blue gradient.
- ✓ How can an Life Cycling thinking help your business? Cost? Environment? Social?
 - ✓ Do you know where do your products' biggest impacts are?
 - ✓ Social considerations are fast gaining traction
 - ✓ No one solution; every study is tailored
 - Careful planning required
 - Data sources?
 - Tools & comparability? Product or Factory?
 - External verification
 - ✓ LCA + SLCA + LCC = UN SDGs

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