Norms and standards for a circular economy

Centre for Sustainability

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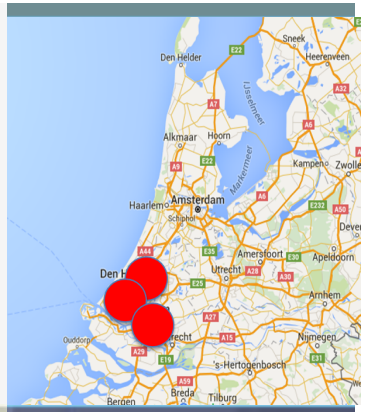

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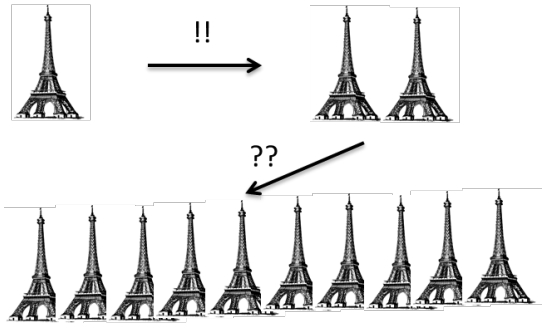
Circularity: needs & inconvenient truths

- 7% growth/yr doubles the economy in 10 years, 10 times in 35 years, 1000 times in 105 years.
  - 100 years: all solar energy
  - 200 years: all water
  - 300 years: Earth crust

- Circularity required! But:
  - Growing economies need new infrastructure and hence new materials
  - Compensating eternal growth by decoupling is impossible - Can we fulfil the transport service of a 1000 kg car today with 1 kg in future?

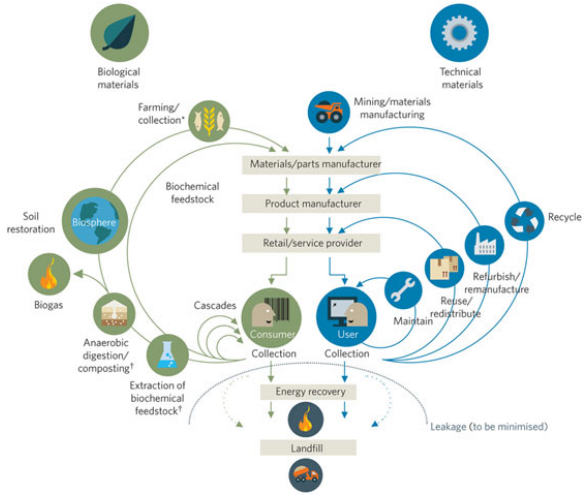


- We need to start now!
  - Avoid lock in's
  - We may not have eternal growth, but will be 20 times as prosperous
    - Say 5 times improved material efficiency
    - Say 4 times higher prosperity with same economic output

Norms and standards are essential

Typical resource-efficiency/circularity strategies

a) Design with minimal (life cycle) material use
b) Prolong product life, grade up, repair
c) Take back / refurbish or re-use product parts
d) Recycle secondary materials



Norms and standards? Essential!

- Ad a-d): Environmental Life cycle assessment essential for quantifying environmental benefits and avoiding unexpected trade offs
  - Supports environmental labelling of products
  - Supports sustainable public procurement
- Ad b, c, d): in many cases norms/standards are essential to prove in the market the quality of secondary products/materials
  - Quality of refurbished products and secondary product parts
  - Quality of secondary raw materials (e.g. leaching of building/demolition waste, slags…

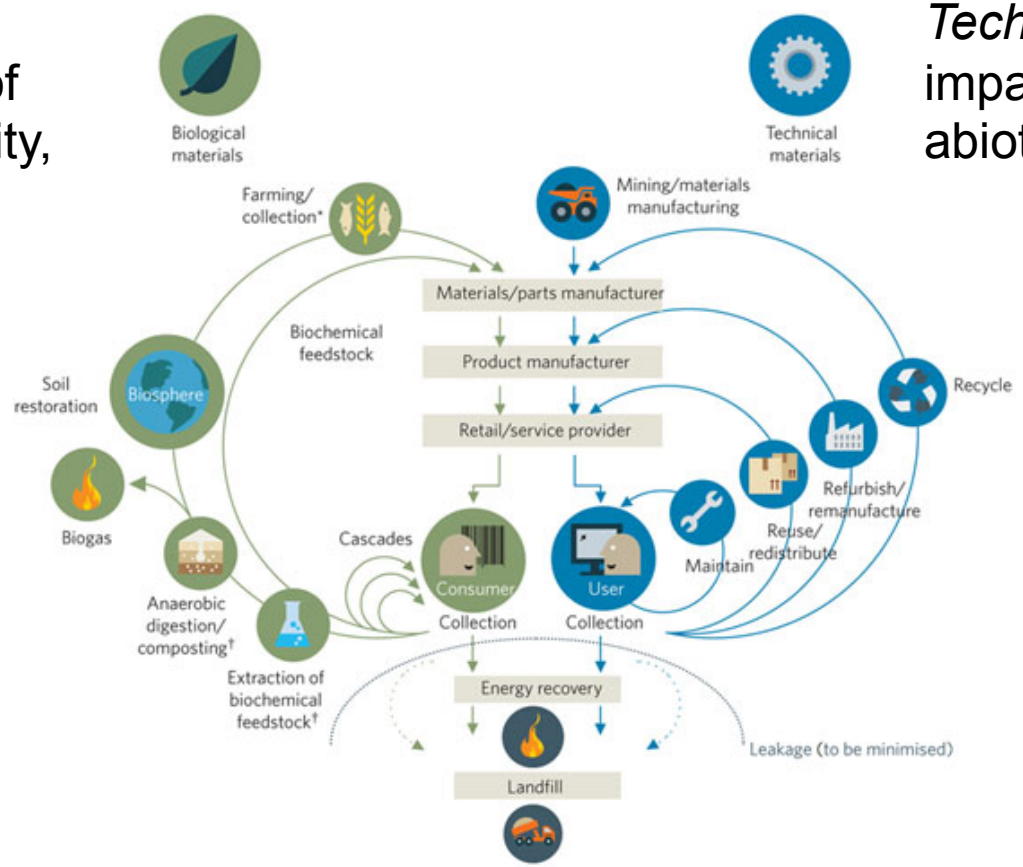
Some practical examples

- Life cycle assessment: essential for quantifying environmental benefits and avoiding unexpected trade offs
  - EU's Product Environmental Footprint
  - Criteria for EU and other ecolabels
  - Discussions about packaging systems in many EU member states
  - Discussions about best waste management practices and circularity practices in many EU member states

- Norms/standards: essential to prove in the market the quality of secondary products/materials
  - Dutch Order on soil quality – requires certification of secondary building and construction minerals
  - Test methods to assess quality of secondary materials from end of life tyres
  - Quality standards for secondary plastics
  - Etc,

Some required improvements of LCA

Biological materials:
impact assessment of biodiversity, soil quality, ecosystem services



Technical materials:
impact assessment of abiotic depletion

Circular processes:
often are novel, and need new Life cycle inventory data

And: implement LCA and standards with care

Example 1: A too comprehensive LCA for a key packaging law

- Study of 3-4 years, Millions of Euro
- By the end of the process, the packaging systems had changed!

Example 2 'I use clean energy / recycled materials / compensate CO2' (etc.) – but does it really lead to changes at macro-level?

- The fact you use hydropower implies others cannot use it
- The fact you use secondary aluminum does not change the global primary / secondary production mix
- ….again, be careful with LCAs proving 'benefits' here

Example 3: Standards can be costly

- ISO 14001 does not pay off (de Francia and Ayerbe, Env. Res. Ec. (2009)
- Representative sampling & Leaching tests – you cannot do that for each batch

Example 4: But let us not despair

- Labelled coffee in Sweden could gain a 38% price premium (Schollenberg, 2013)

Implications can conclusions

Norms and standards can provide a price premium. Yet:

Design norms, standards and certification schemes smartly

- Avoid too complex testing methods – this can kill circularity initiatives
- LCA needs improvement – data on circularity options, and impact assessment of biodiversity and abiotic resource use

Use tools like Life cycle assessment wisely

- Screen first, go a bit more in depth later
- Understand the assumptions that can 'topple' the outcome
  - Focus on sensitivity analysis on these points
  - Be transparent on this
- Avoid by all means the following undesirable situations
  - Paralysis by analysis mode 1 – one tries to be so perfect that the LCA costs 100s of thousands of Euro's, lasts >2 years, and the product under study is innovated by the time the LCA is ready
  - Paralysis by analysis mode 2 – the LCA is in fact used as a tool to confuse the discussion, opposing parties all provide their own 'truth'

WORLD MATERIALS FORUM

Thanks for your attention!

A bit about myself

- **Ministry of Environment (1988-1990)**
- **TNO (1990-2013)**
  - Many different topics on innovation, policy, environment, indicators
  - PhD with prof. Jacqueline Cramer, ‘98
  - Part time professor at NTNU, Trondheim, 2010-2014
- **Leiden University, CML (2013-now) and the Leiden-Delft-Erasmus CfS on circularity**
  - Technology (TUD)
  - Value chains (TUD-IO, EUR-RSM)
  - Governance (All)
  - Systemic economic & environmental analyses (UL-CML, EUR-Ec.)
  - *Education: Industrial Ecology, Sustainable Design, Technology, Business, and in future : Governance of Sustainability*