Industrial symbiosis and innovation

Abolish industrial symbiosis' barriers with the implementation of innovation

Envimpact training day
Budapest, 2013. március 7.

Where is the link between industrial symbiosis and innovation?

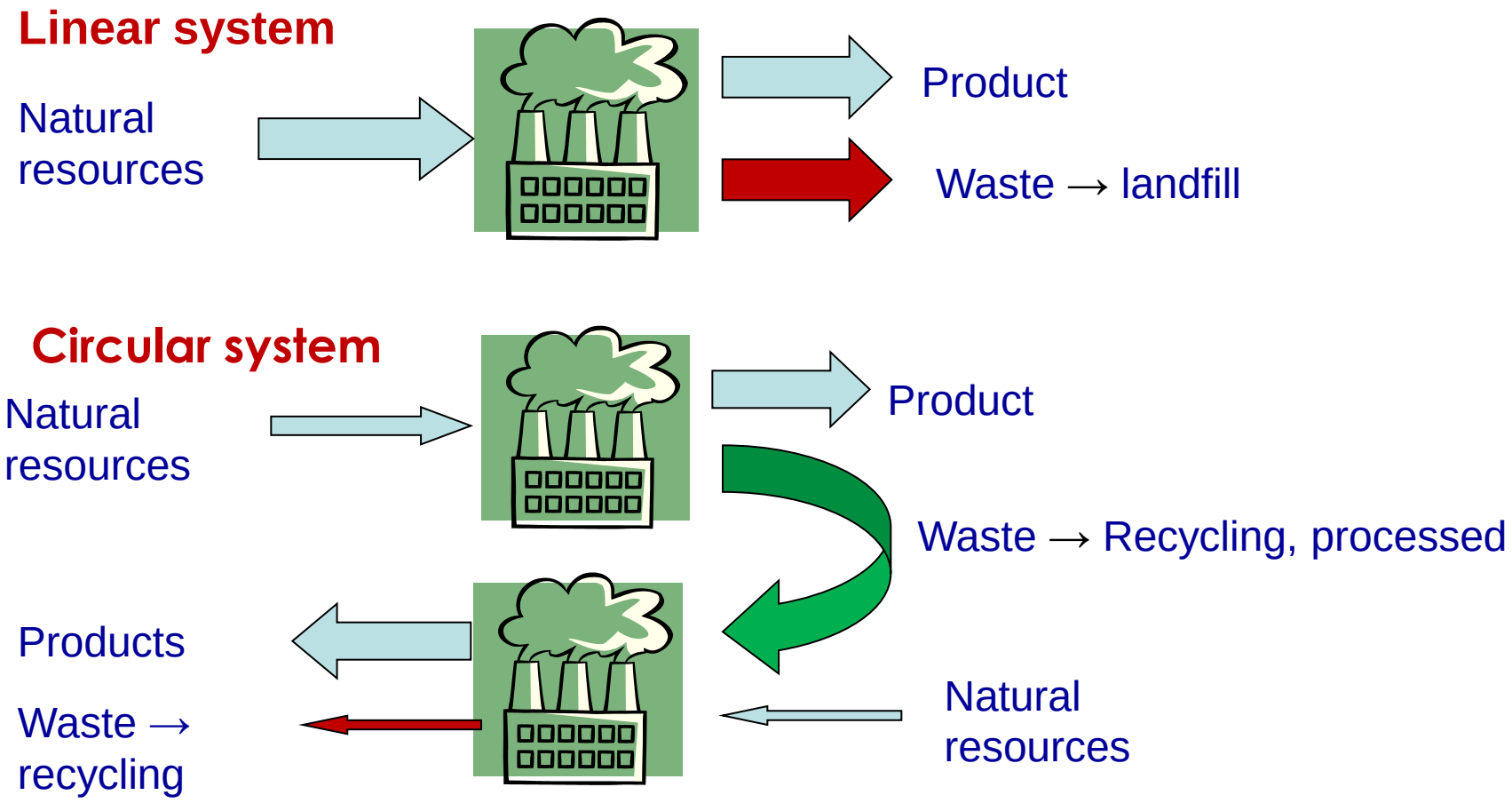
How is the environmental impact of this link?

How can we measure these impacts?

Industrial symbiosis

- Create link between different industrial sectors
- Use waste to produce (substitute raw materials)
- Less demand for raw materials, natural resources
- Reduction of industrial water and CO_2 emission

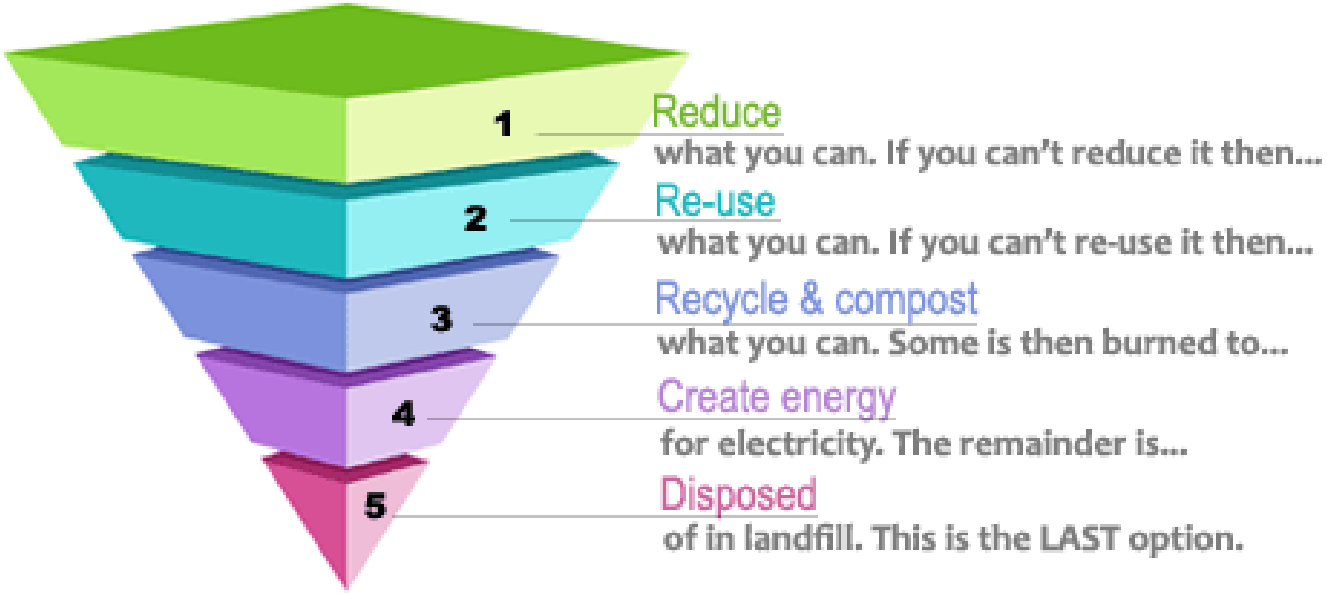
Transform linear systems into circular ones



Envimpact

When applying industrial symbiosis methodology we try to keep waste/resources on the first ranks of the waste hierarchy (reuse, recycle or create energy).

“Higher we get on the hierarchy, **more savings** can be realised”



NISP

- Industrial dating – intermediator role
- Practitioners role, business opportunity workshops

Have

Unnecessary materials

+

Want

Materials to be processed

=

Identify Synergies

NISP

- Assess resources in the production (input & output) – to identify synergies
- Progress synergies
- Identifiy synergy barriers → EUR-IS

Barrier types

- Legal
- Financial:
  - landfill cost (cheaper)
  - transport cost
  - processing cost
- Technology

Solution

- New (innovative) machine
- New (innovative) technology
- Experiences, experiments
- Science of materials – characteristics
- New (innovative) product design, implementation

Results

- Waste recycling technology creation
- Moderate demand for raw materials and for extraction of natural resources into industrial use
- Resource-efficiency

Stakeholders

- Manufacturing companies – issuing
- Recycling companies
- Universities, researchers, PhD students, innovators, R & D companies
- Funders?

Environmental impacts

- More resource being recycled

  ⟹ less resource on landfill

- Less raw materials into industry

  ⟹ more natural resources left

Environmental impacts

- Transform raw materials extracted from nature needs more energy and causes more emissions (energy, water, CO_2)
- Secondary materials are cheaper

  (quality requirements, standards, safety regulations, qualification)

Monitoring

- ISL – Synergie software
- Methodology DEFRA (Department for Environment, Food & Rural Affairs, UK)

  - Reduction in input quantity
  - Savings through the process steps
  - Reduction in landfilled quantity

(savings/carbon impacts)

Material	Embodied fossil energy (tonnes CO_2e saved per tonne of waste prevented)
Paper and card	2.556
Kitchen/food waste	2.428
Garden/plant waste	0.089
Wood	0.256
Textiles	19.294
Plastic (dense)	12.778
Plastic (film)	10.222
Ferrous metal	1.917
Non-ferrous metal (incl. Aluminium)	16.1
Silt/soil	0.004
Aggregate materials	0.102
Misc. combustibles	0.102
Glass	1.406
Estimated impact of materials not covered in ERM study (municipal and C&I)	2.86

Table 1: Embodied fossil energy by material (Defra, see [2])

Material	CO_2e saved per tonne of waste not landfilled (tonnes)
Paper and card	0.687
Kitchen/food waste	0.258
Garden/plant waste	0.135
Wood	0.298
Textiles	0.233
Plastic (dense)	0.01
Plastic (film)	0.01
Ferrous metal	0.01
Non-ferrous metal	0.01
Silt/soil	0.01
Aggregate materials	0.01
Misc. combustibles	0.305
Glass	0.01
Estimated impact of materials not covered in ERM study (municipal and C&I)	0.081

Table 4: Savings for landfill avoided (Defra, see [2])

EUR-IS workshop

Meeting and networking opportunity for businesses, scientific professionals, innovators, universities

20. March 2013. at 9:30

1063 Budapest, Munkácsy M. u. 16. IFKA

Pioneers into Practice program

Thank you for your attention!

Annamária Virág Dr.

virag@ifka.hu