

AGRI-FOOD WASTE DAY CONFERENCE

Circular economy, a way to tackle societal challenges

Anne Verniquet, SOFIES Switzerland

17th October 2017
Brussels, Belgium



Sofies is an international **sustainability consulting** and private management firm.

We aim at creating a positive impact by delivering professional services based on **industrial ecology and circular economy** for a better use of natural resources



Why should we reach a circular economy ?



Manned mission to Mars: departure in 2025 (?)



Minimum requirement for the mission: 9 tons!

But the most powerful rocket can only send 5 tons to the moon...

Just transporting the water would cost 11 billion EUR!

→ so what is the solution?

Recycling is the solution!

30 kg of daily requirements:

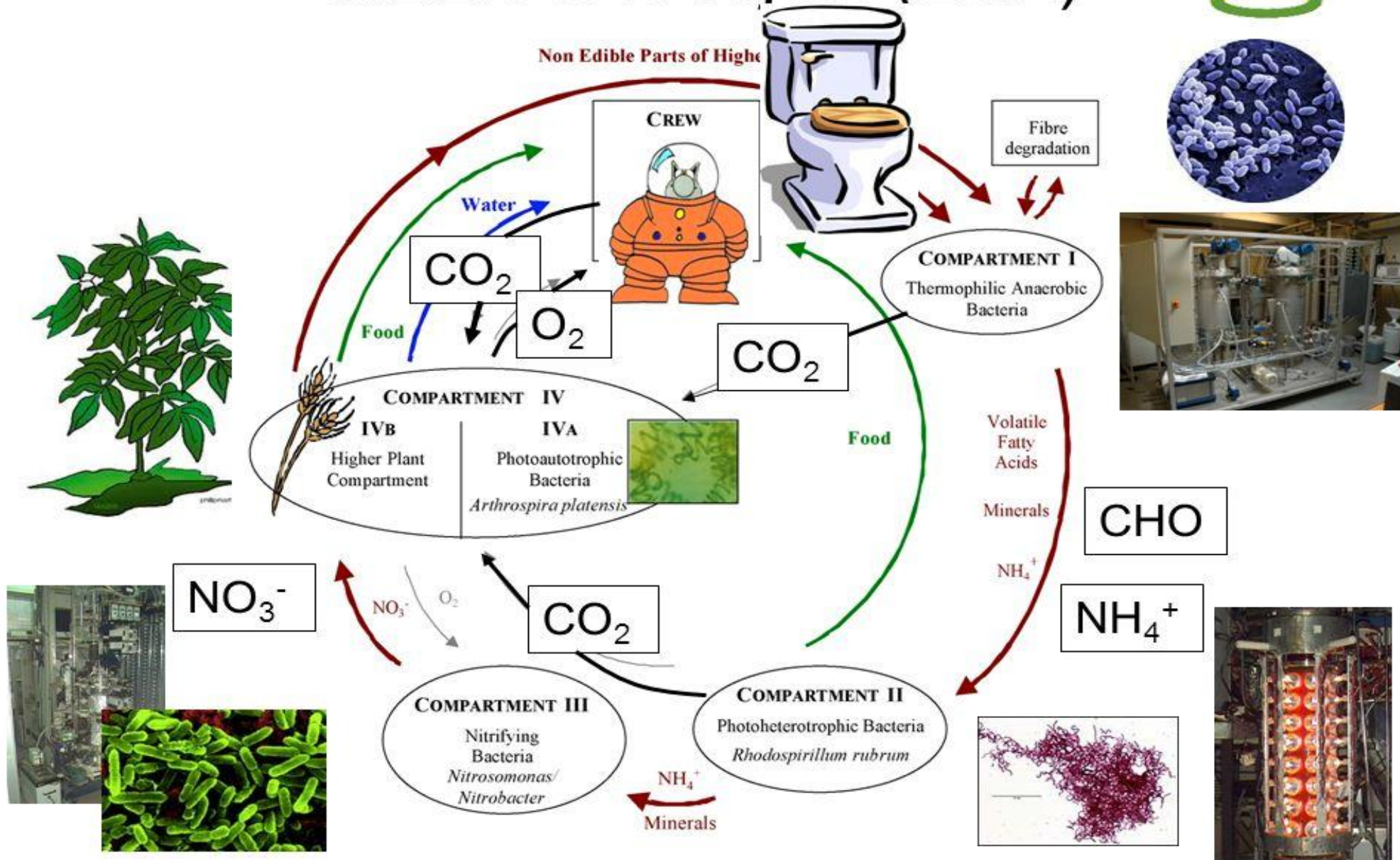
- Oxygen (1kg/day): 3%
- Hygiene water 78%
- Drinking water 9%
- Food 9%



Waste

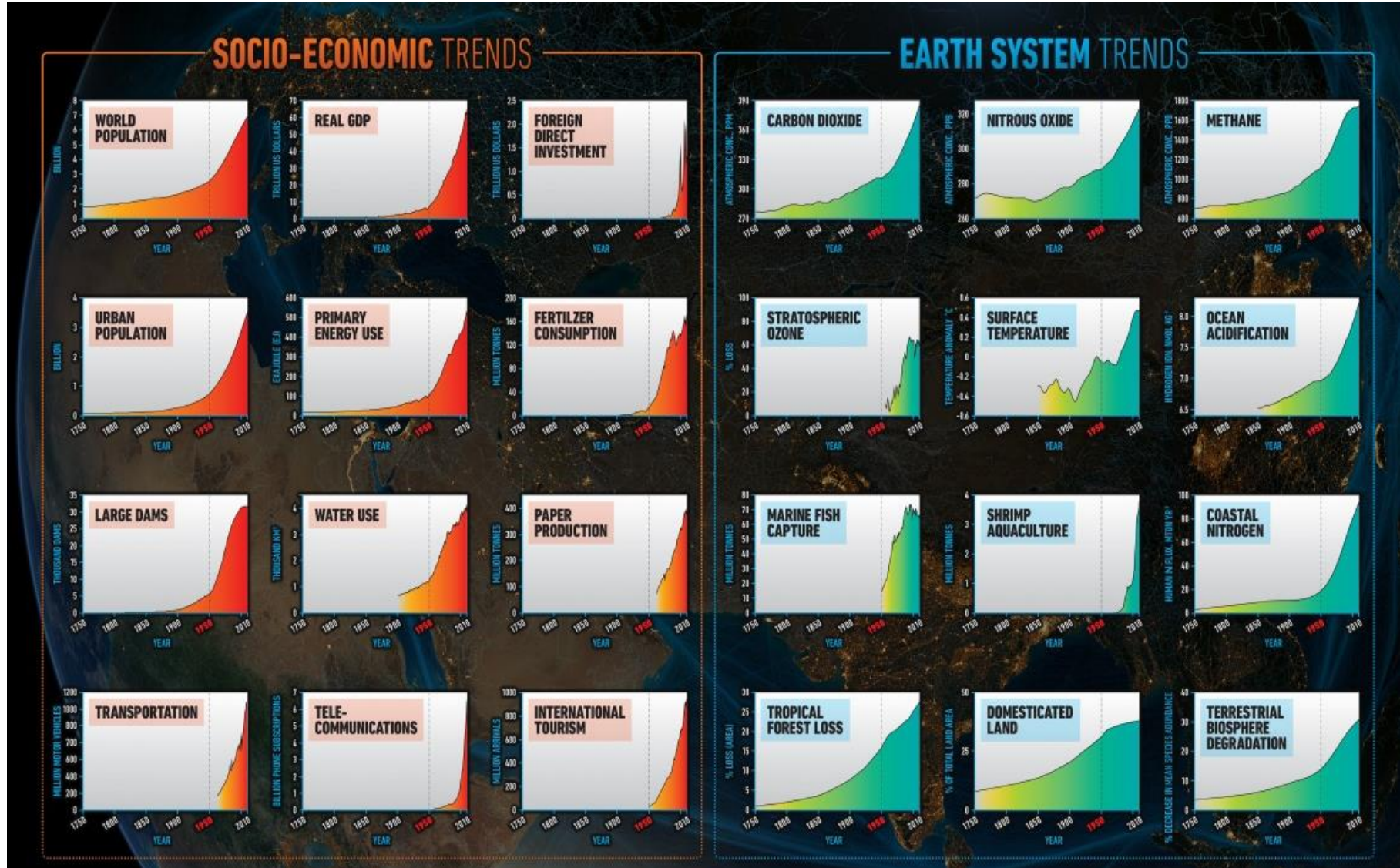
- CO2 (1,2 kg/day): 3%
- Solid waste 5%
- Liquid waste 81%
- Perspiration 10%

MELiSSA Project (ESA)





Back to Earth... its dimensions...its challenges ...

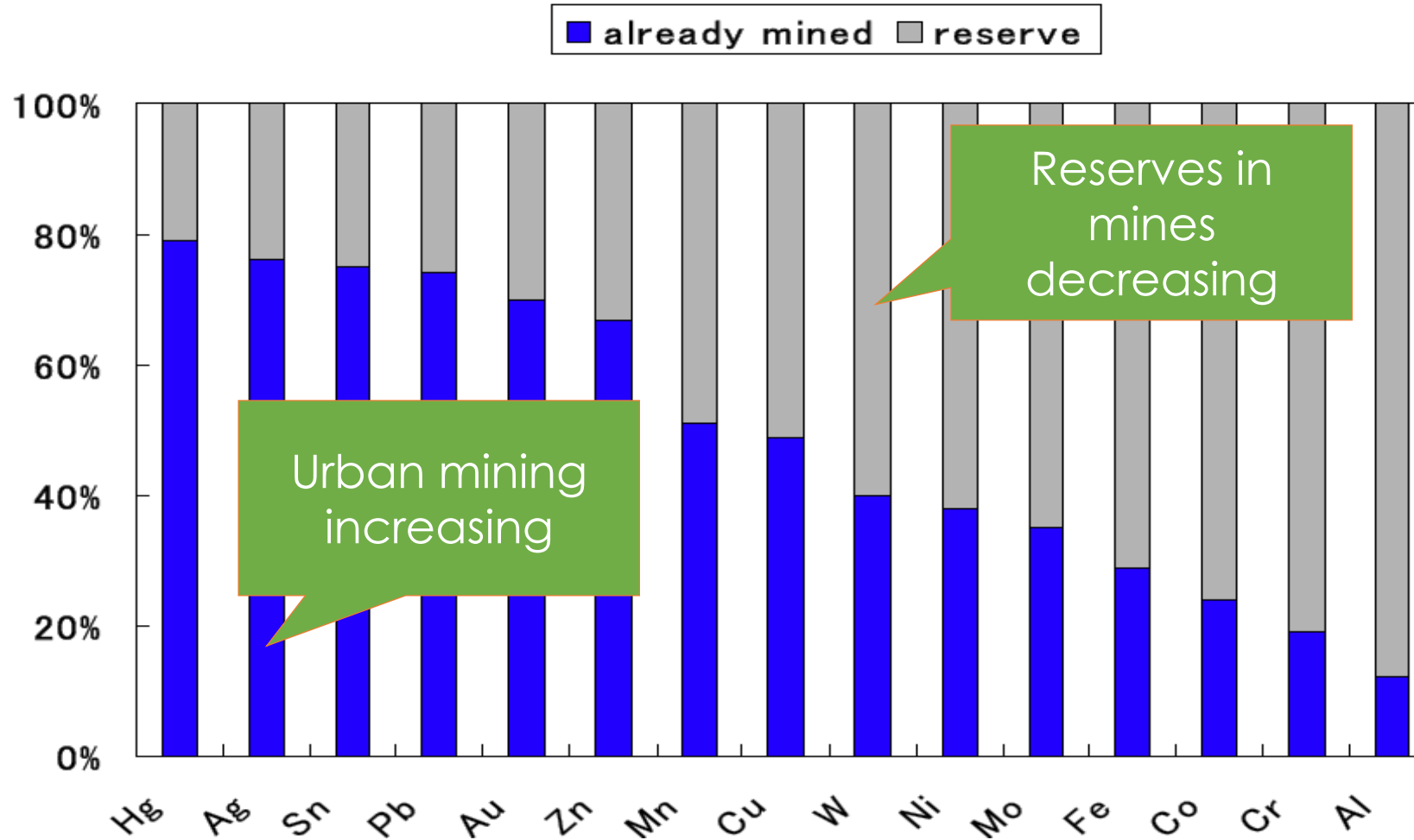


Source: Reference: W. Steffen, W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig (2015), The Trajectory of the Anthropocene: the Great Acceleration, The Anthropocene Review. Map & Design: Félix Pharand-Deschênes/Globaïa



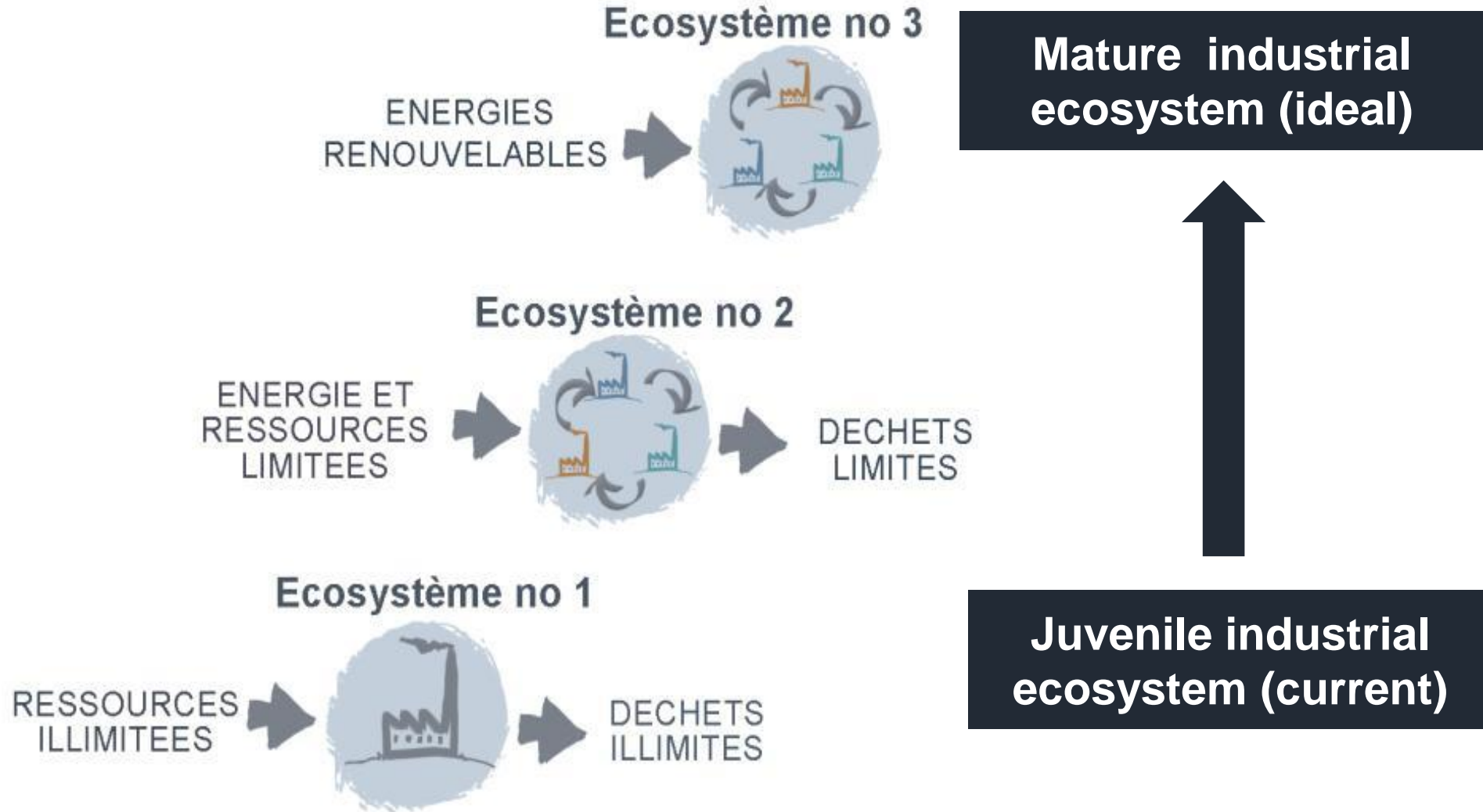
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688338

Growing resource consumption



Source : T. Nishiyama

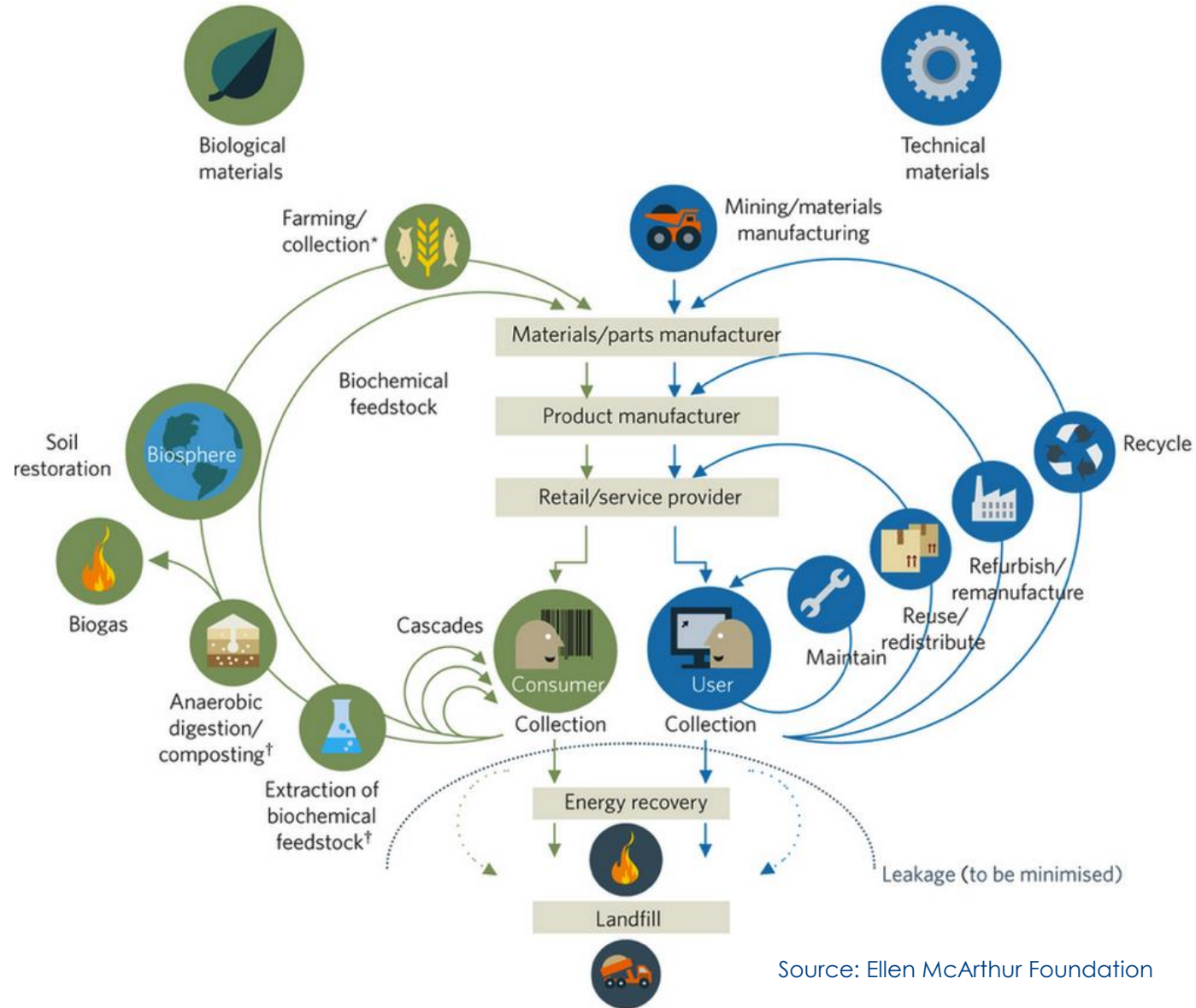




Circular economy: What is it ?



Circular Economy: an economy based on closed material cycles



Source: Ellen McArthur Foundation



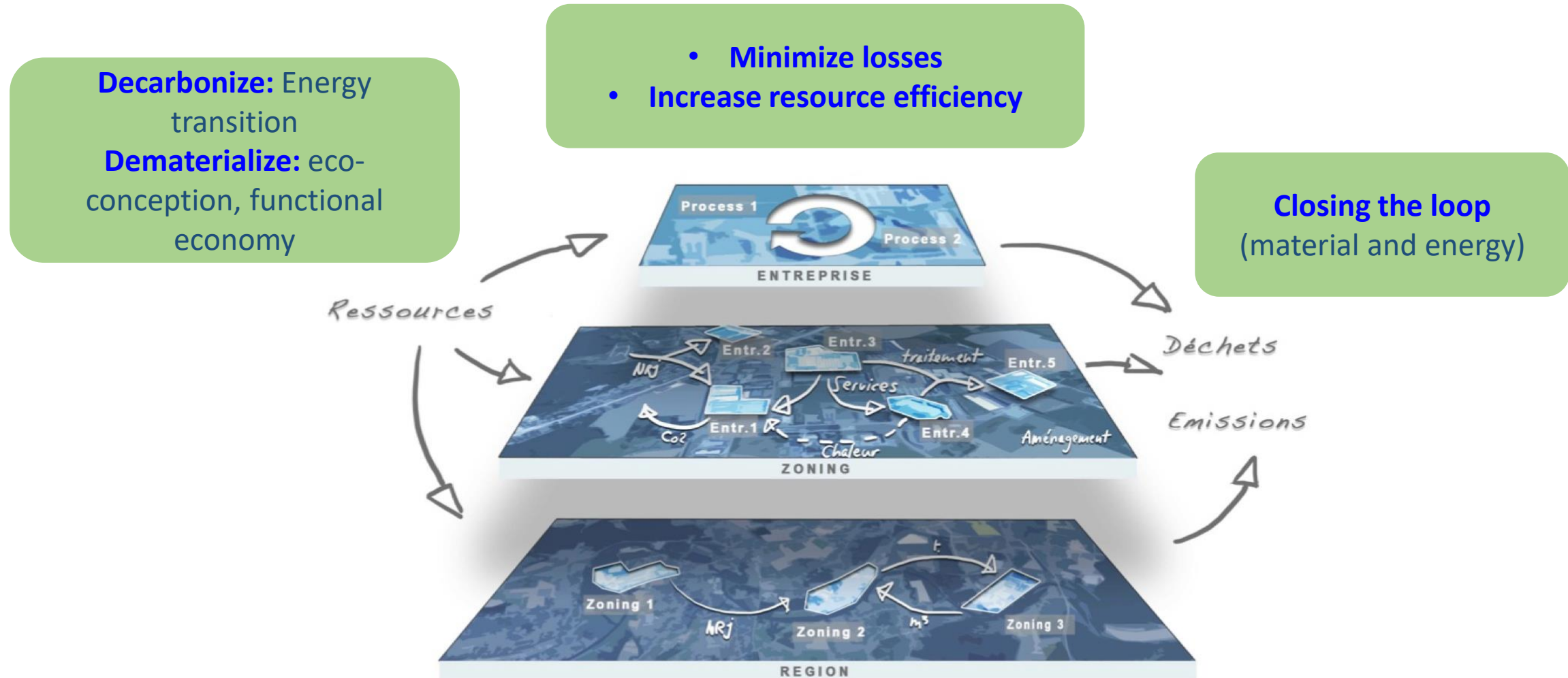




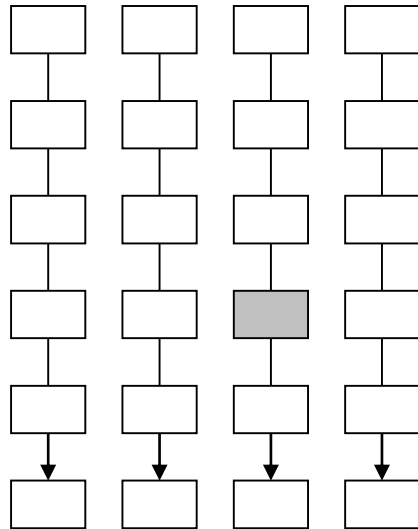
Circular economy: How to implement?



Industrial ecology: 4 strategies for implementing circular economy inspired by the functioning of natural ecosystems

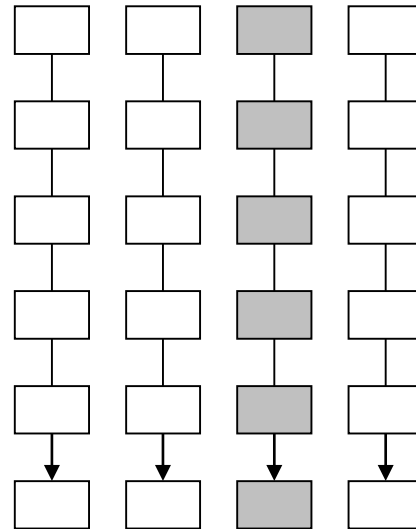


Cleaner production



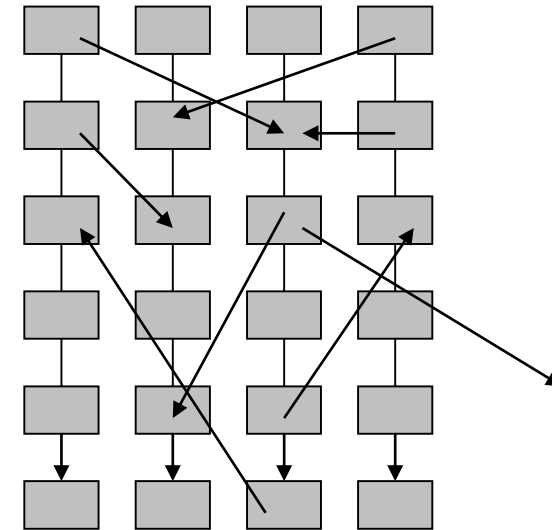
Process

Eco-conception

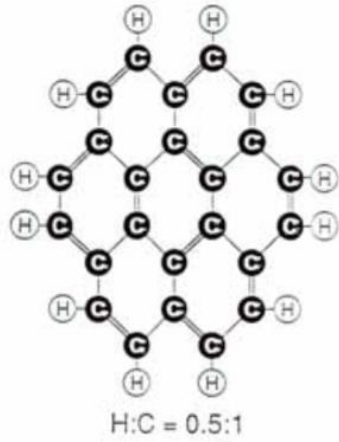


Product

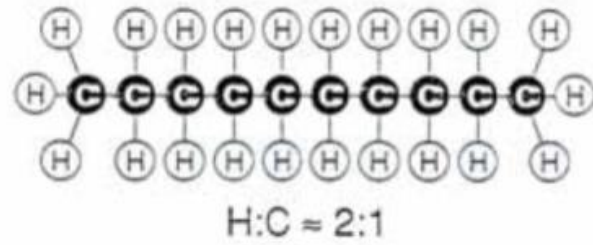
Industrial ecology



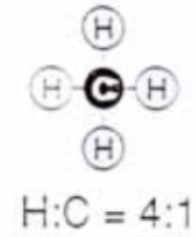
System



Charbon



pétrole



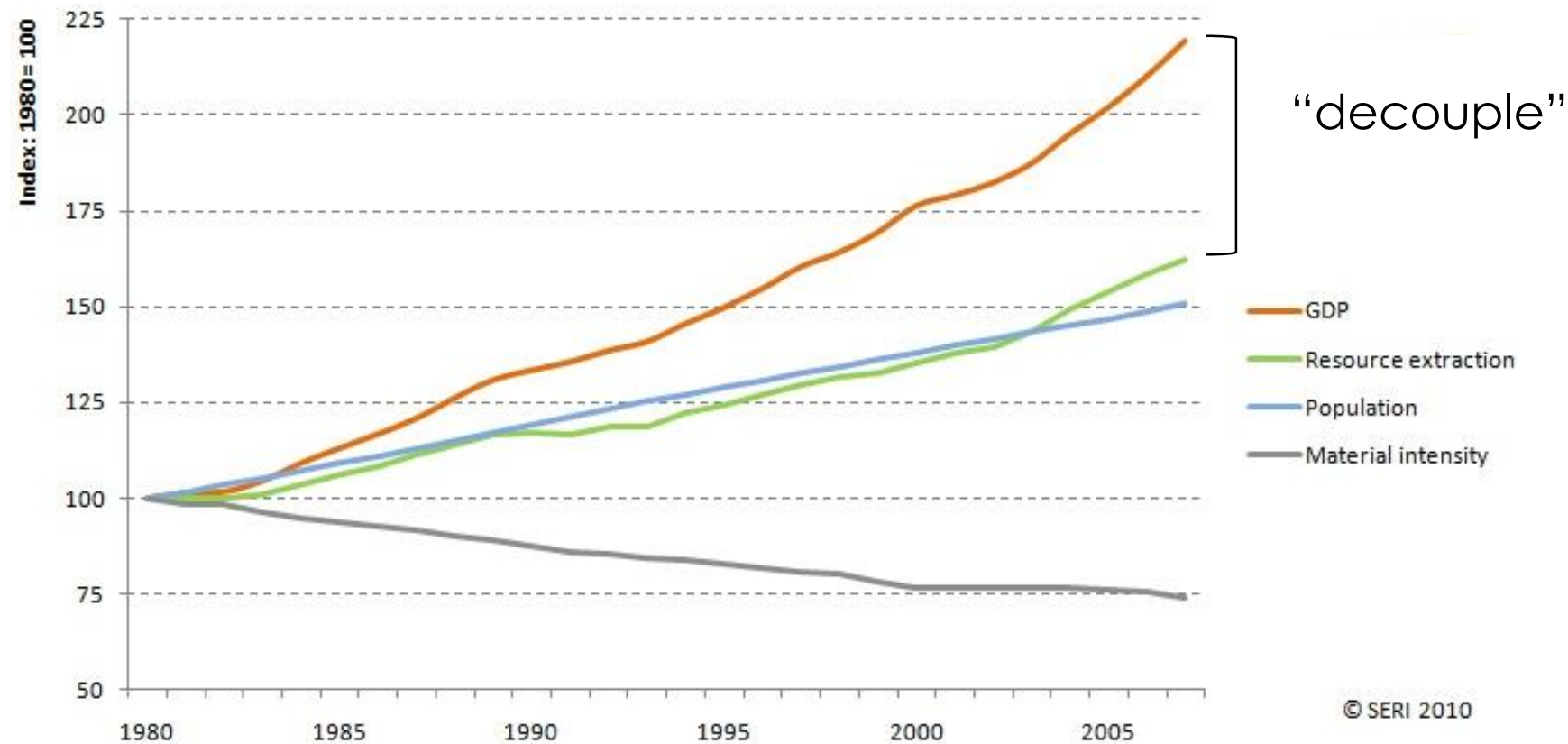
gaz naturel



Dematerialize, why?

Objective: dematerialization, decouple well-being from increasing natural resource consumption

World tendency: relative dematerialization, but growth of global resource extraction



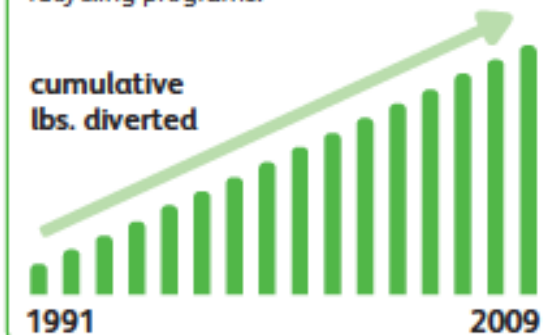
PSS Successful examples - Xerox

| | |
|----------|--|
| IDEA | B2B Leasing of printers & copy machines |
| HOW | <p>Focus on</p> <ul style="list-style-type: none"> • Selling the « quality copy » service vs selling « copy machines » • « remanufacturing » strategy. |
| BENEFITS | Increased machine lifespan & management |
| | Less resources use and E-waste. |
| | Over 100 millions \$ saved each year on raw material, logistics & inventory expenses |



Xerox remanufacturing and recycling programs

Since 1991, we have diverted over 2.3 billion pounds (cumulative) of waste from landfills through our equipment and supplies return, reuse and recycling programs.



Sources: xerox.com/gwa / Suren Erkman « Vers une écologie industrielle », 2004



Dematerialize, illustration

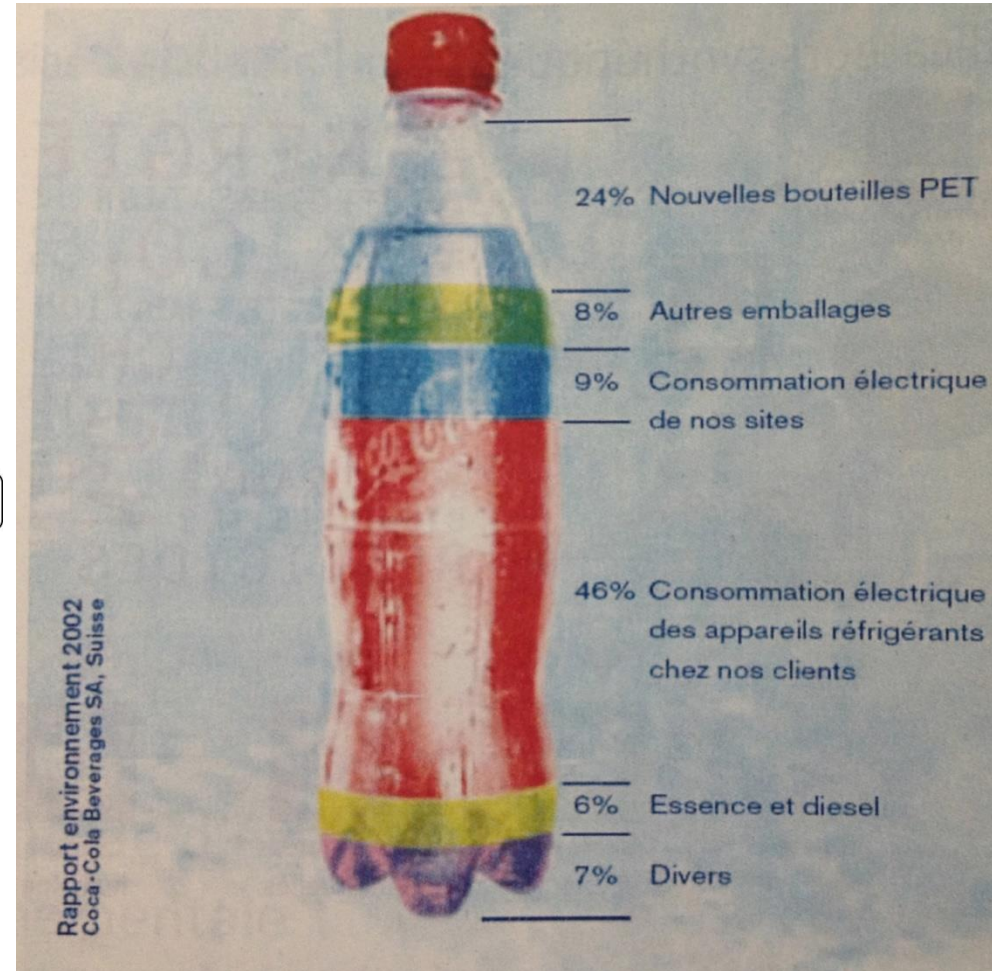
GE-Network, the network for shared workplaces



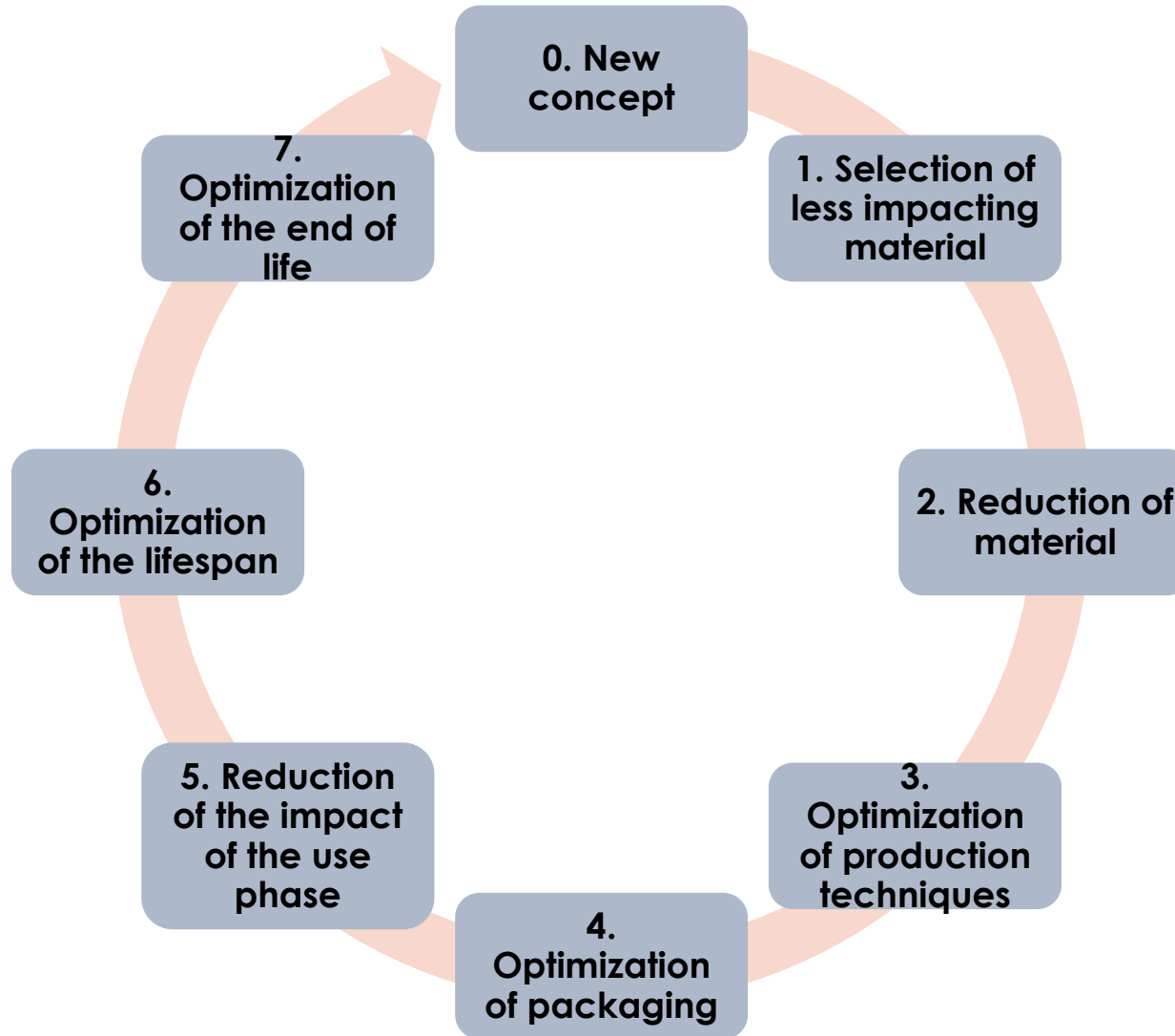
<http://www.teletravail-geneve.com/>



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Eco-conception, how ?



Eco-conception, a way to go beyond traditional competitive factors - Illustration

« Blue Ocean Strategy »

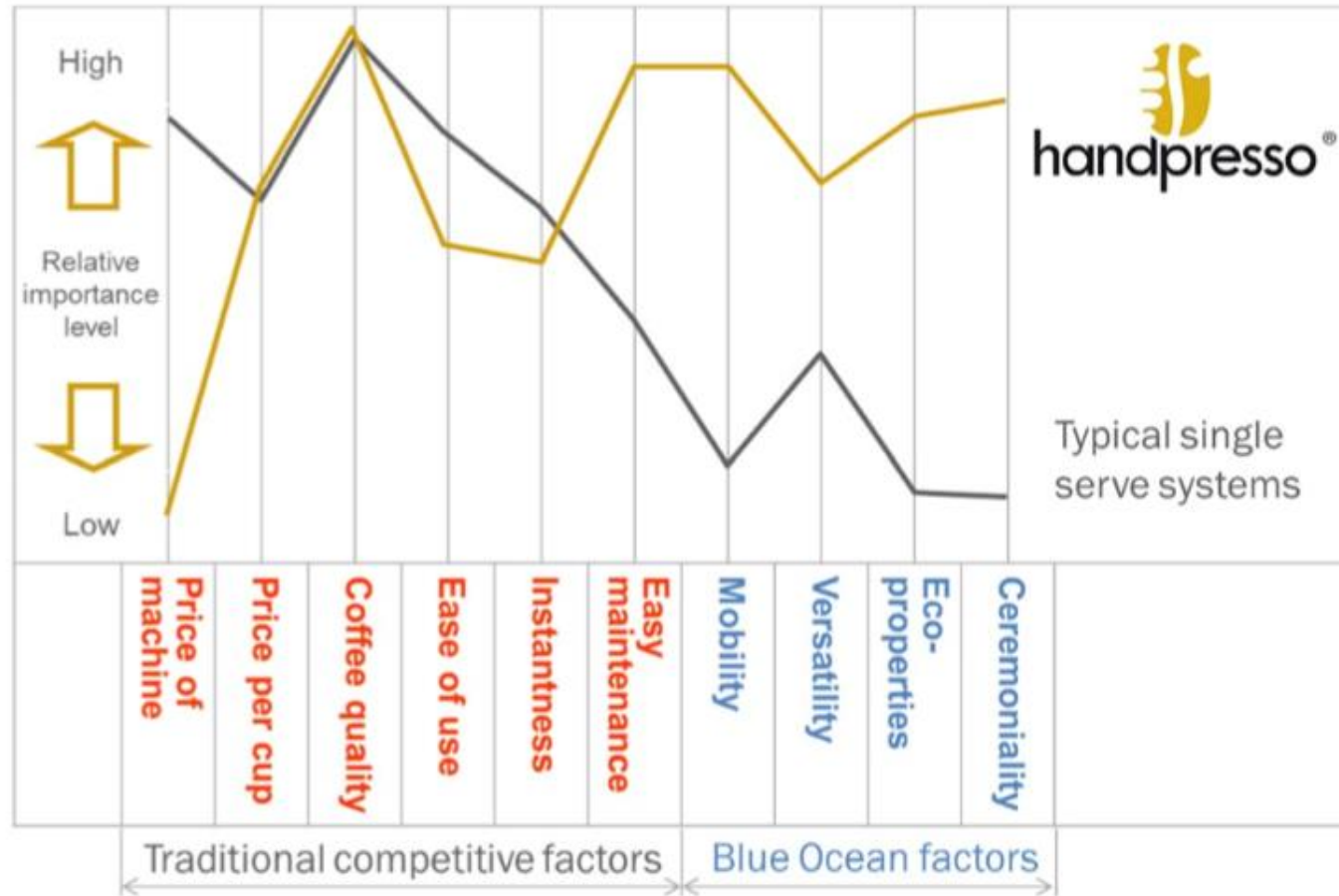


Figure 2-8. Example of a Blue Ocean canvas for Handpresso (Nielsen, 2007).

Source: UNEP eco-innovation manual



Minimize losses

Transport

Metals
...



Construction materials

Metals
Biocides (pesticides)
Anti-UV
...



Cosmetics

Surfactants
Biocides
Colorants
Anti-UV
...



Pharmaceutical products

Medicaments
Antibiotiques
Hormones
...



Cleaning products

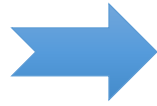
Surfactants
Biocides
Colorants
...



Autres

Pesticides (gardens)
...

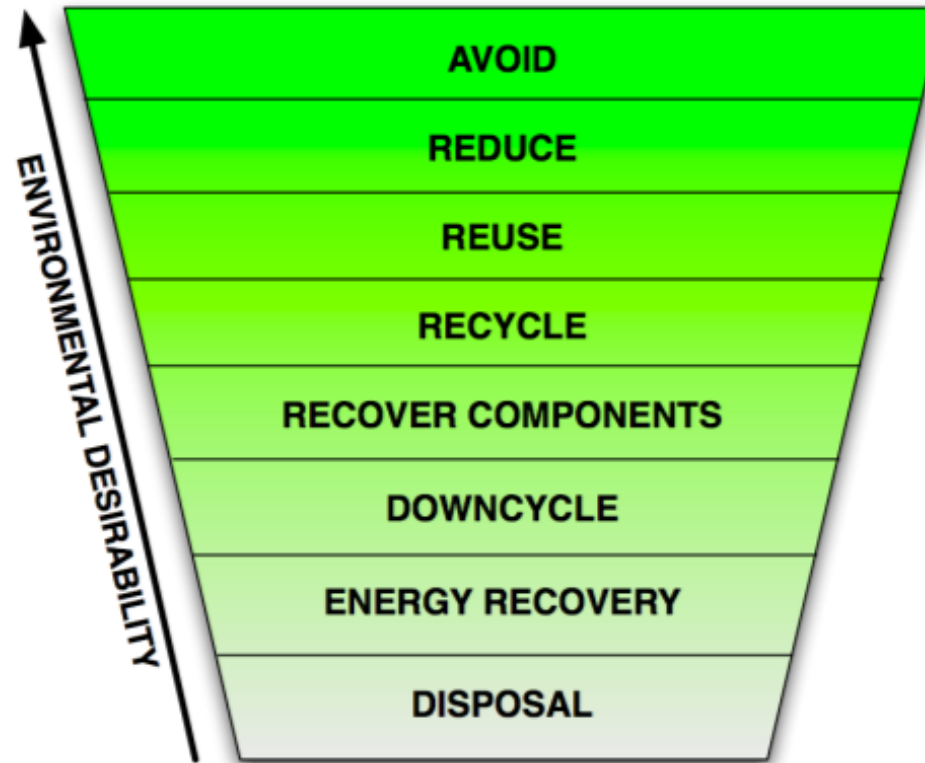




From bed dryers to drying towers



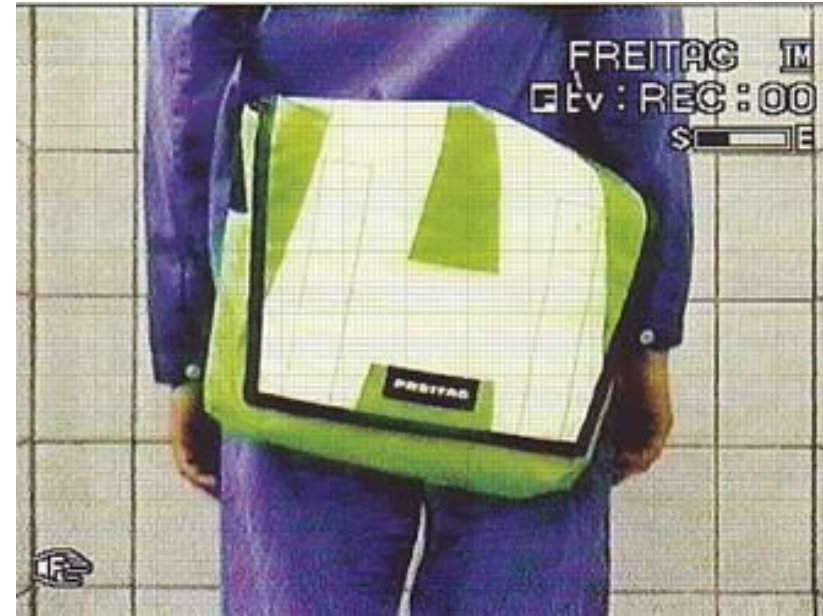
3 R
Reduce
Reuse
Recycle



Sources: Sofies



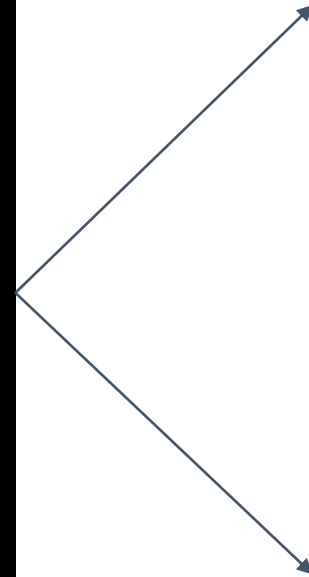
Exemple: « up-cycling »



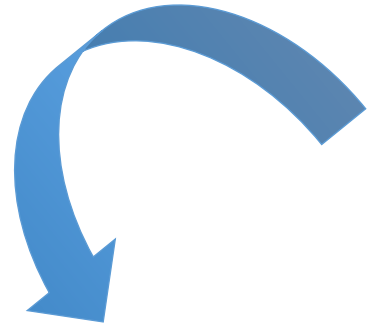
Exemple: « up-cycling »



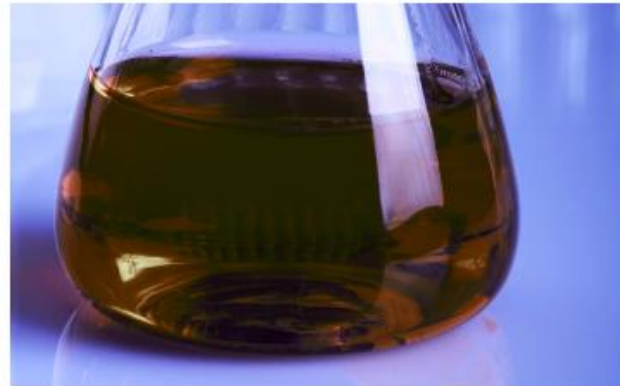
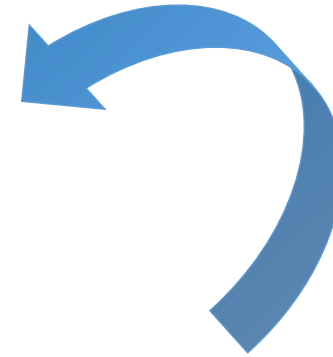
Second life, Nespresso



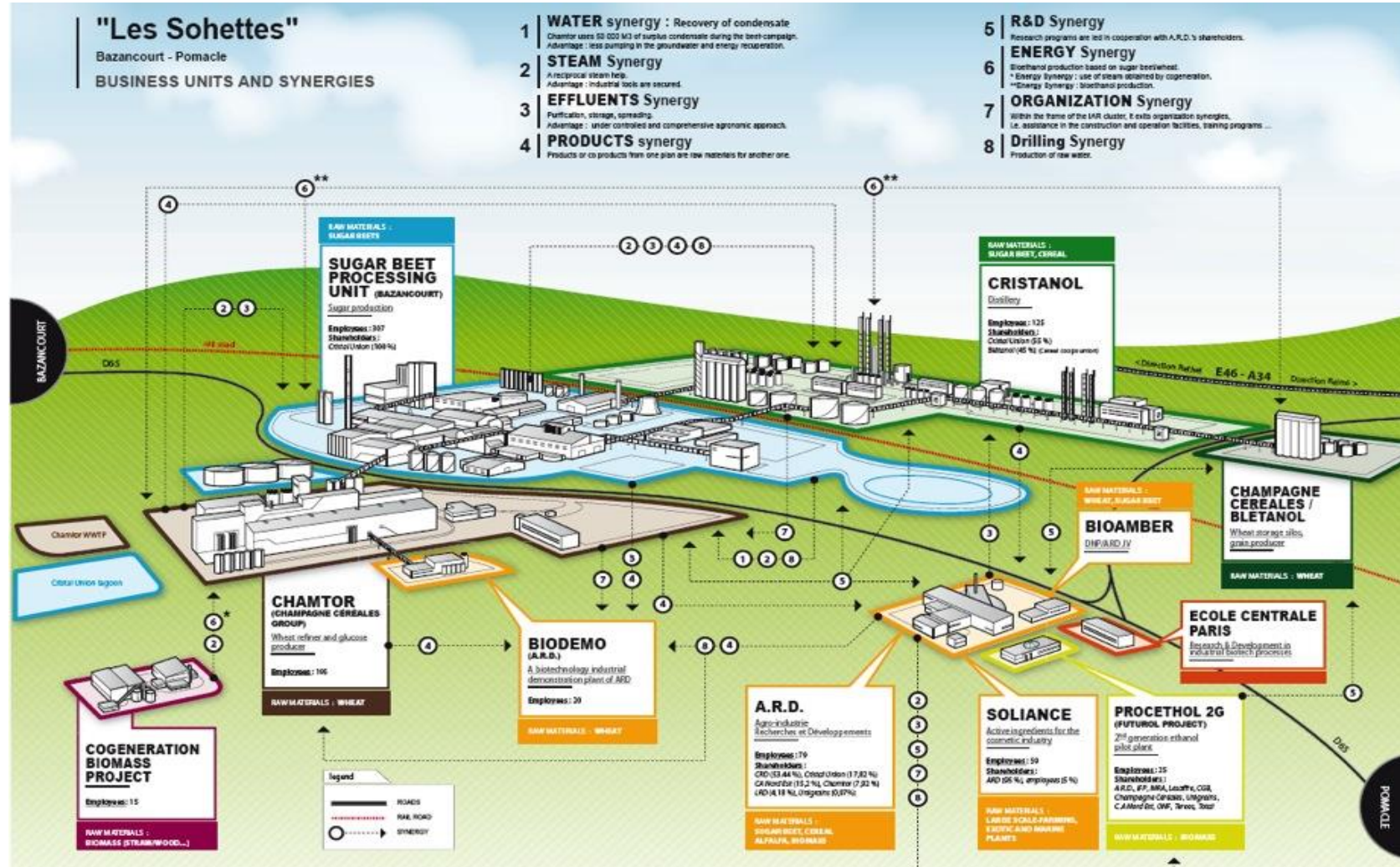
Exemple:
« Cascade of valorization »



<http://entomeal.ch/wordpress/>



Exemple: « Biorefinery in an Eco Industrial Park setting »

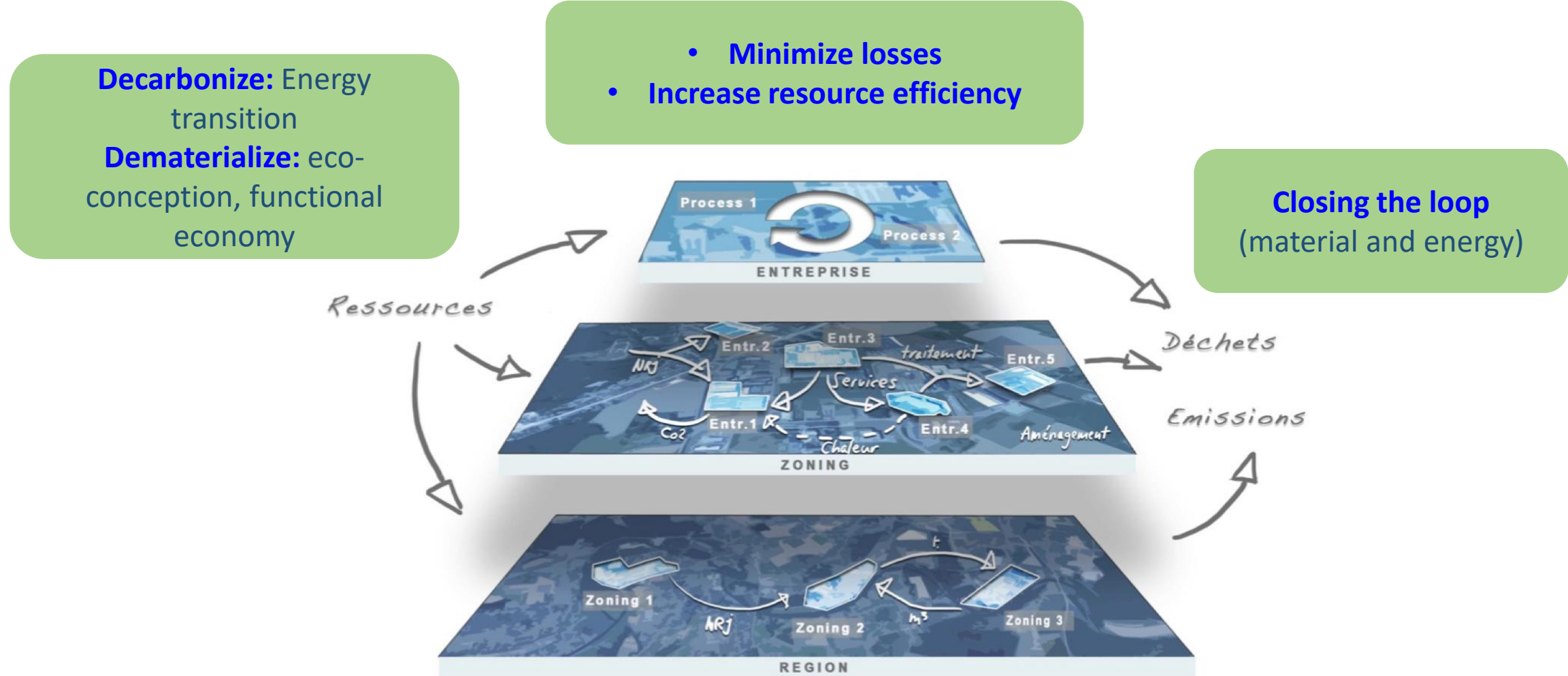


<http://www.a-r-d.fr/ARD-filiales-et-partenaires-Bio-raffinerie-Recherches-et-Innovations-BRI-68.html>

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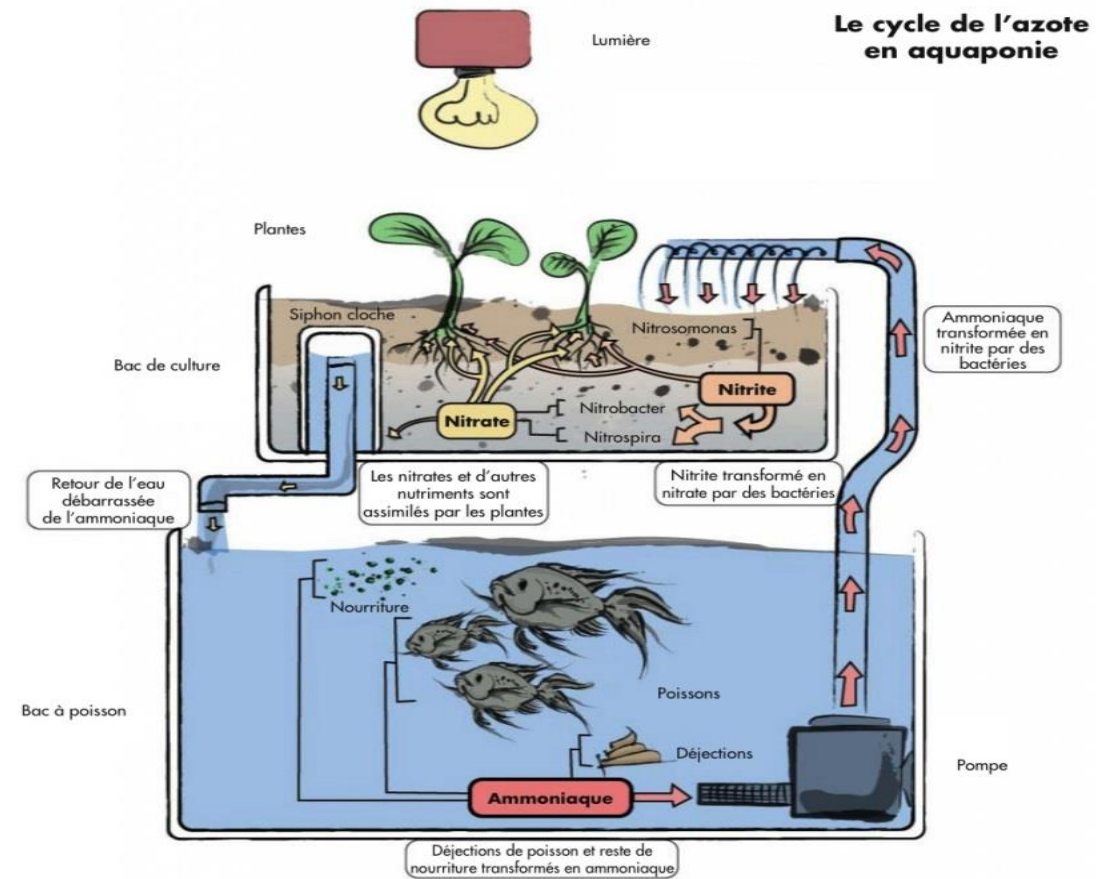
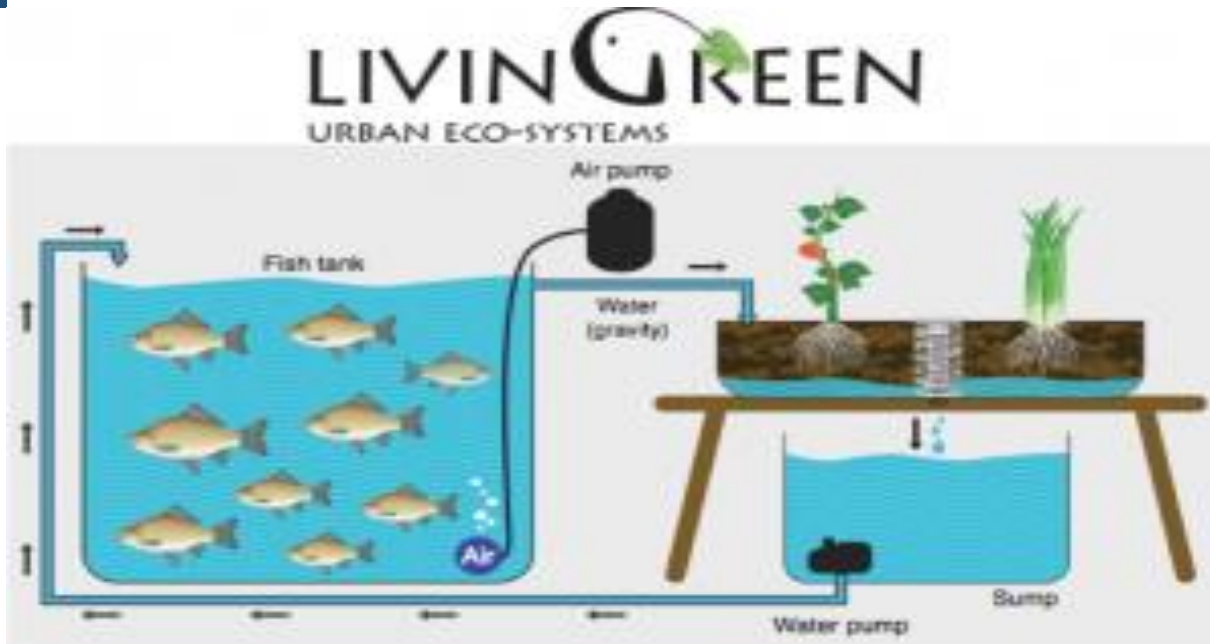
Industrial ecology: 4 strategies for implementing circular economy inspired by the functioning of natural ecosystems



- Greener product/process based models
- Waste regeneration systems
- Alternative energy-based systems
- Efficiency optimisation by ICT
- Functional sales and management services model
- New sustainable mobility systems
- Industrial symbiosis
- Green neighbourhoods and cities
- Innovative financing schemes

Source: Business Models for Systemic Eco-innovations, Feb. 2012, Technopolis Group

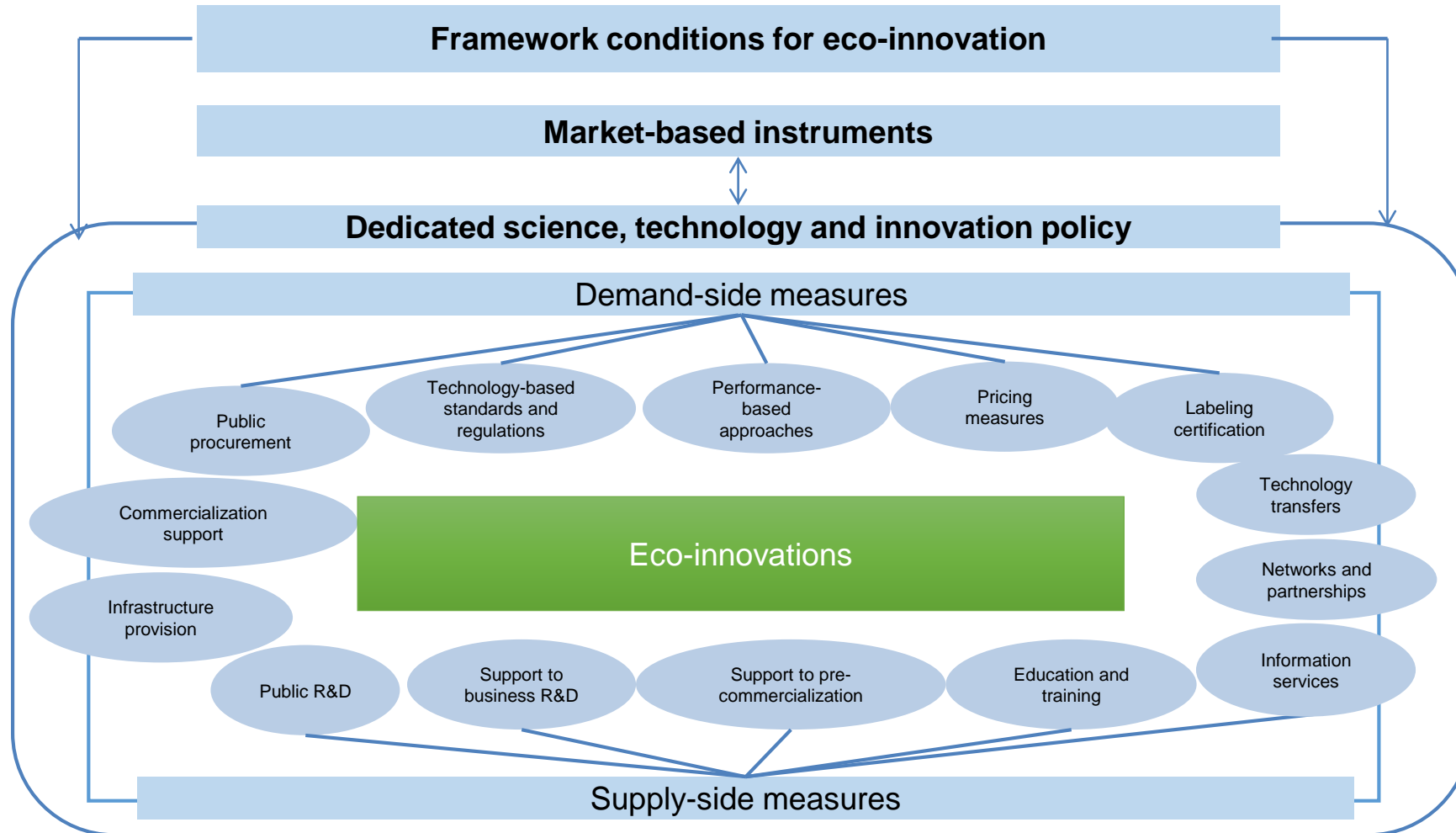




<http://livinggreen.co.il/en/>

Source: internet / LinvinGreen





Source: OECD, Policy Measures for Eco-Innovation



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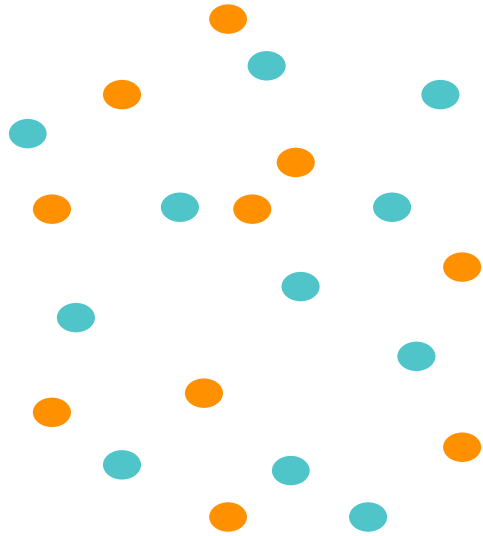
Still there are challenges to tackle ... When it comes to agro byproducts valorization

A few ones ...

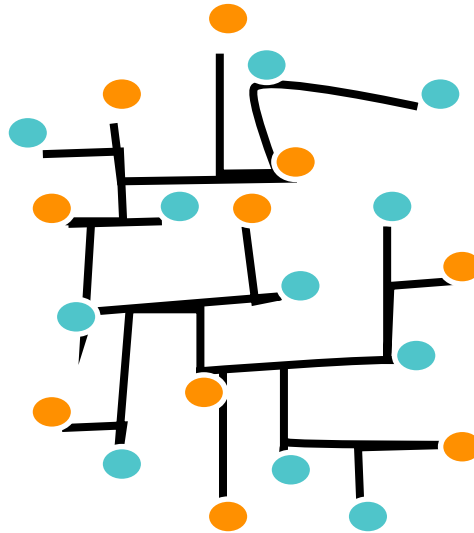
- Market acceptance
- Low fossil fuel price => business case at risk for the bio economy
- Nutrient cycle
- Water content and logistics
- ...

Mindset : collective intelligence

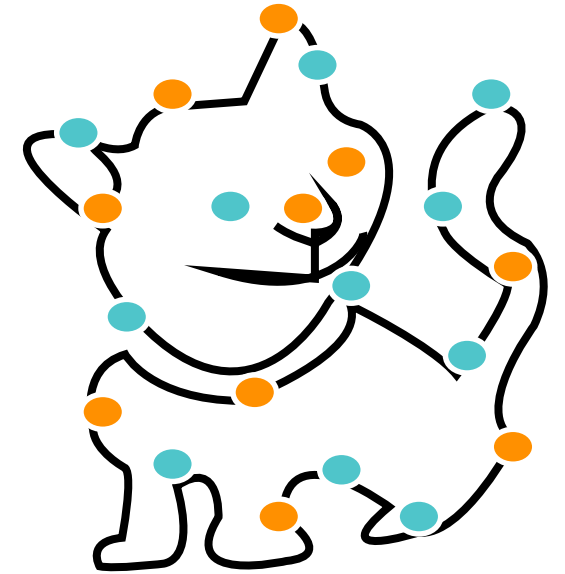
Knowledge



Experience



Creativity



Mindset : out of the box, no silo thinking 😊

