Circular Economy?

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It all started with …

1965 Adlai Stevenson II
(US ambassador at UN)
09/07 Geneva: speech to the economic and social council of the UN

spaceship

(focus on JUSTICE!)

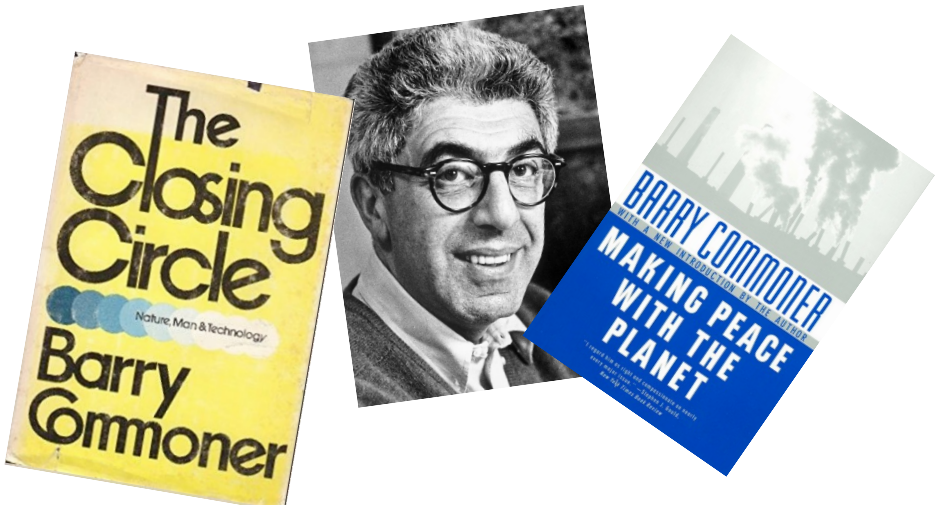
1966: The economics of coming Spaceship Earth

K. E. Boulding (1910-1993)

"The closed economy of the future might similarly be called the 'spaceman' economy,
in which the earth has become a single spaceship,
without unlimited reservoirs of anything,
either for *extraction* or for *pollution*,
and in which, therefore,
man must find his place in a cyclical ecological system»

***See also* Barbara Ward Spaceship Earth (1966)**

The Closing Circle



Barry Commoner (May 28, 1917 – September 30, 2012)
American biologist, professor, and politician.
leading ecologist and among the founders of the modern environmental movement.

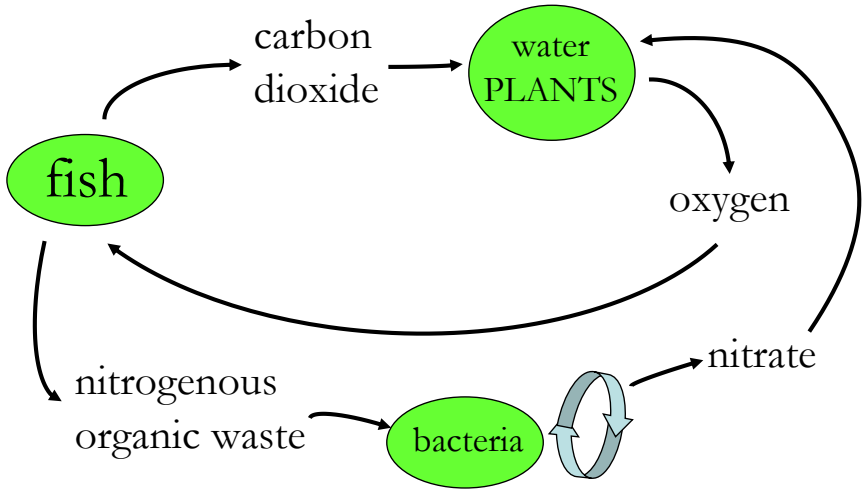
1971

2° law of ecology:

"**Everything must go somewhere**".

«In nature, there is no final waste, matter and energy are preserved, and the waste produced in one ecological process is recycled in another.»

Example:



Walter R. Stahel

Swiss architect (1946-)

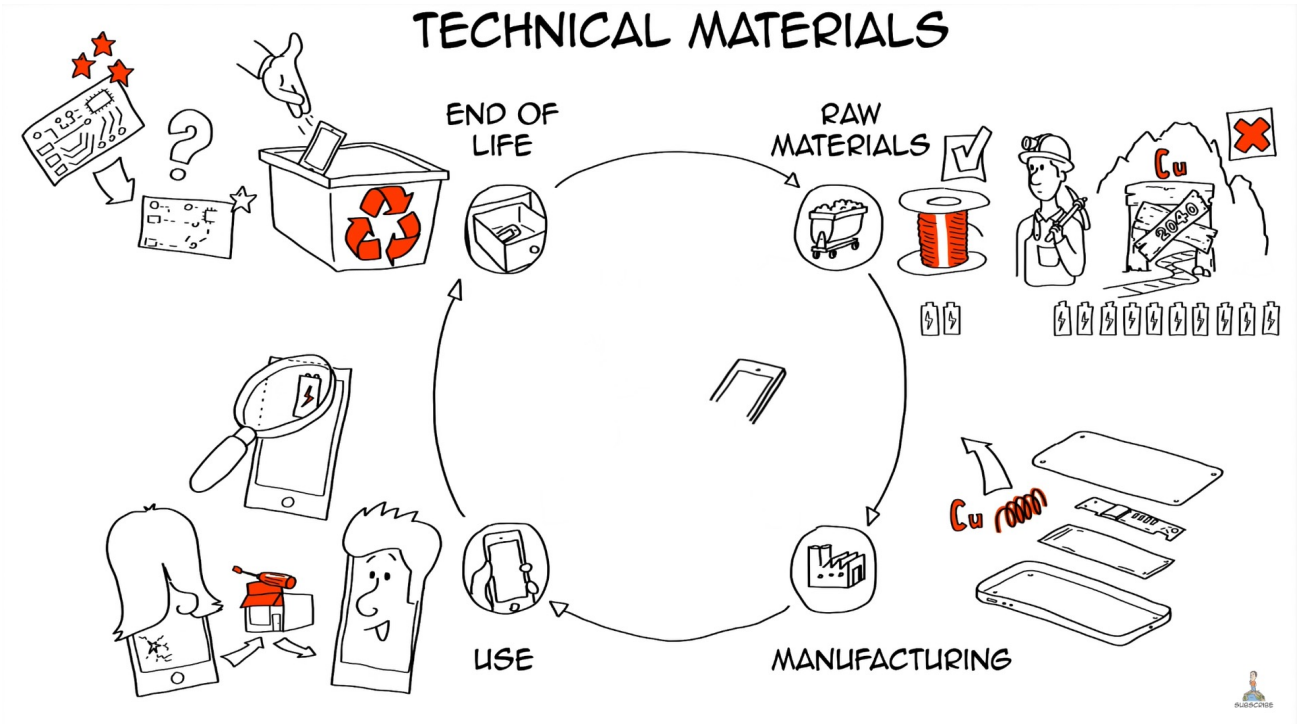
Product life extension

Read

Stahel, W. R. (2016). The circular economy. *Nature*, *531*(7595), 435-438.

Linear Economy

What is Circular Economy about?



Ellen MacArthur Foundation

Explaining the Circular Economy and How Society Can Re-think Progress | Animated Video Essay (3:48)
https://www.youtube.com/watch?v=zCRKvDyyHml

Circular Economy: definition & examples | Sustainability Environment (6:07)
https://www.youtube.com/watch?v=X6HDcubgxRk

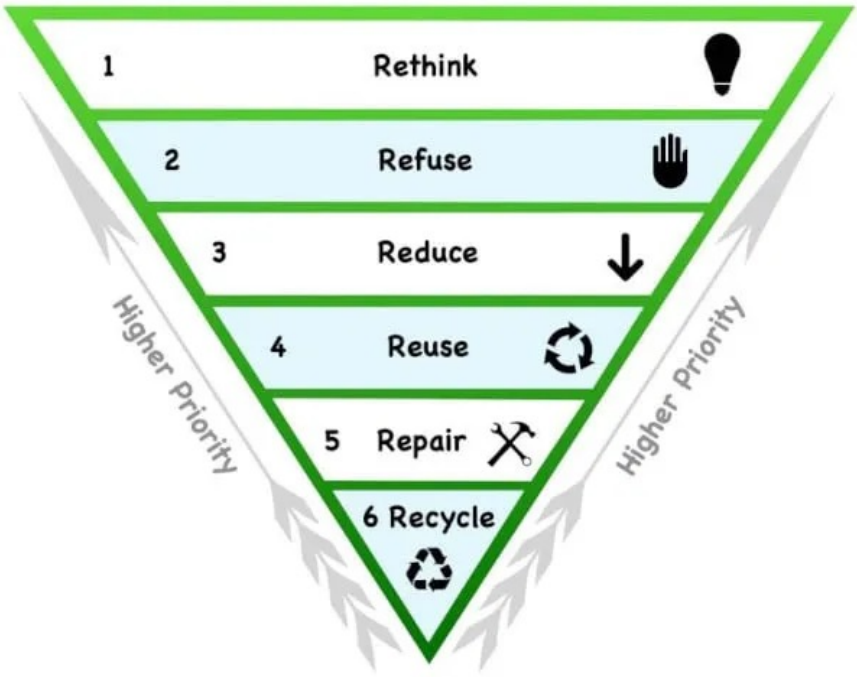
Circular Economy Explained: What Is It & Why Is It Important? (7:04) https://www.youtube.com/watch?v=N-cWaRRLh3k

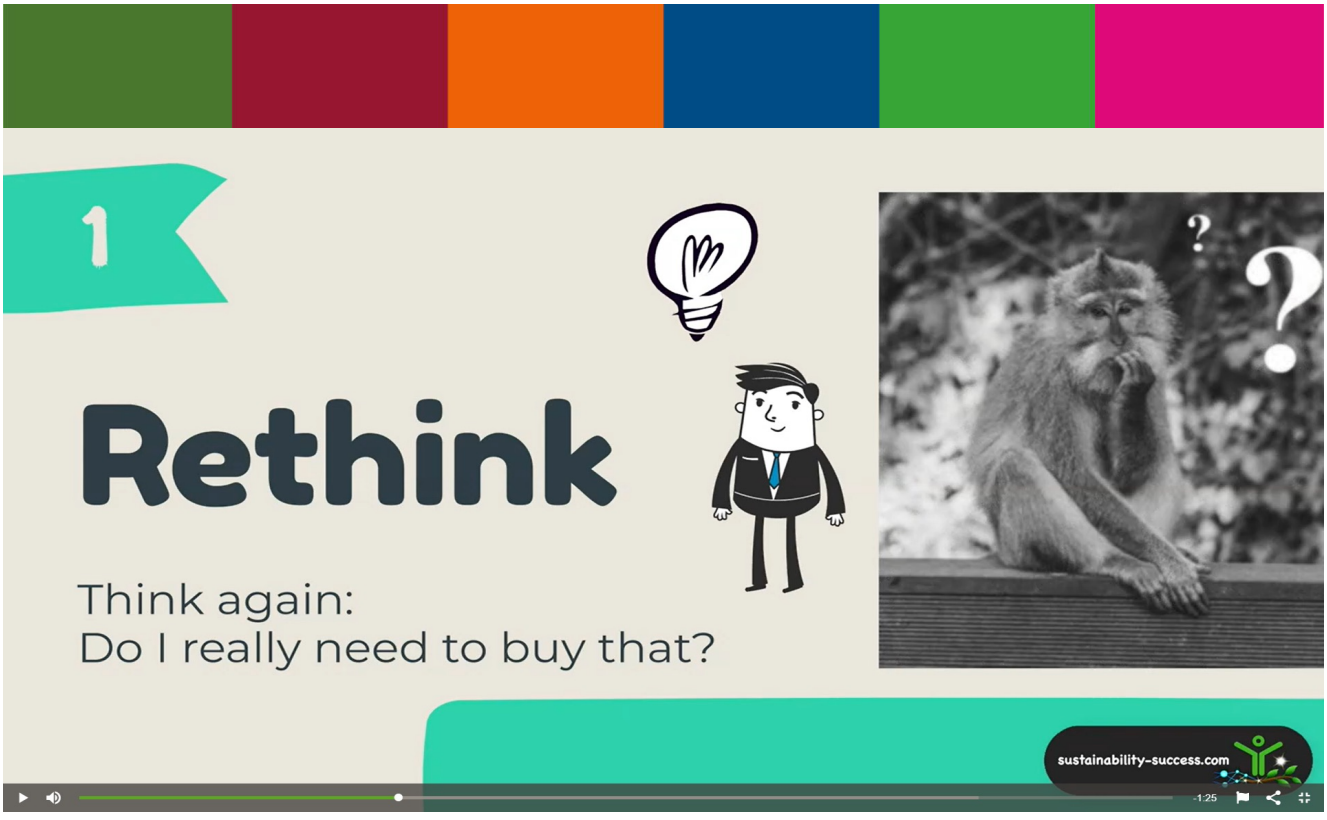
What If We Don't Buy Products and We Buy Service? Circular Economy Explained | Animated Video Essay (3:11)
https://www.youtube.com/watch?v=Cd_isKtGaf8

6 R's OF SUSTAINABILITY

for a

Sustainable Lifestyle

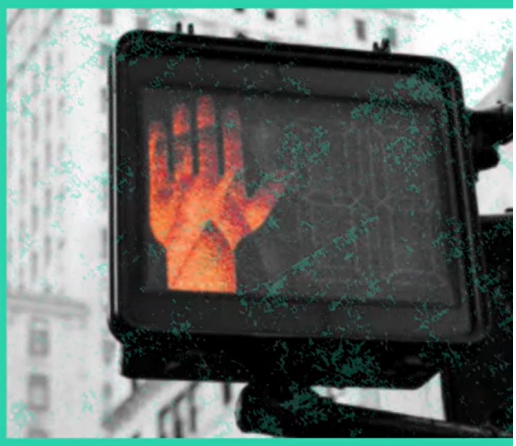




2

Refuse

Unnecessary items, for example:
Say no to that plastic straw



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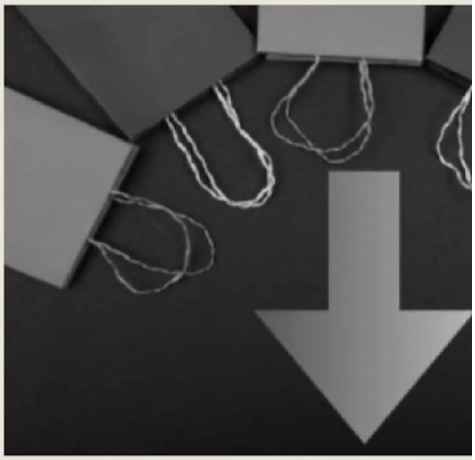
3

Reduce

Reduce your consumption.
For example:
Prefer energy efficient products.



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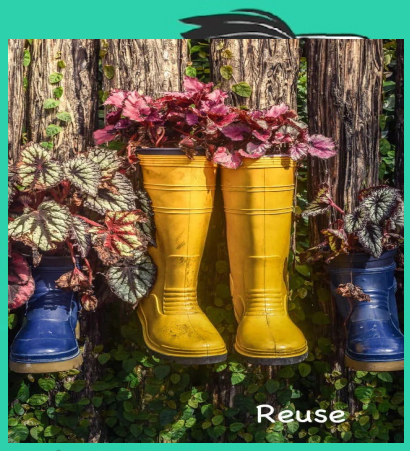
SOSTENIBILITÀ

4

Reuse



Reuse old items, for example:
- Don't get a new phone every other year.
- Find new uses for old items: art, charity etc.

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6

Repair

Repair old items instead of replacing them with new products

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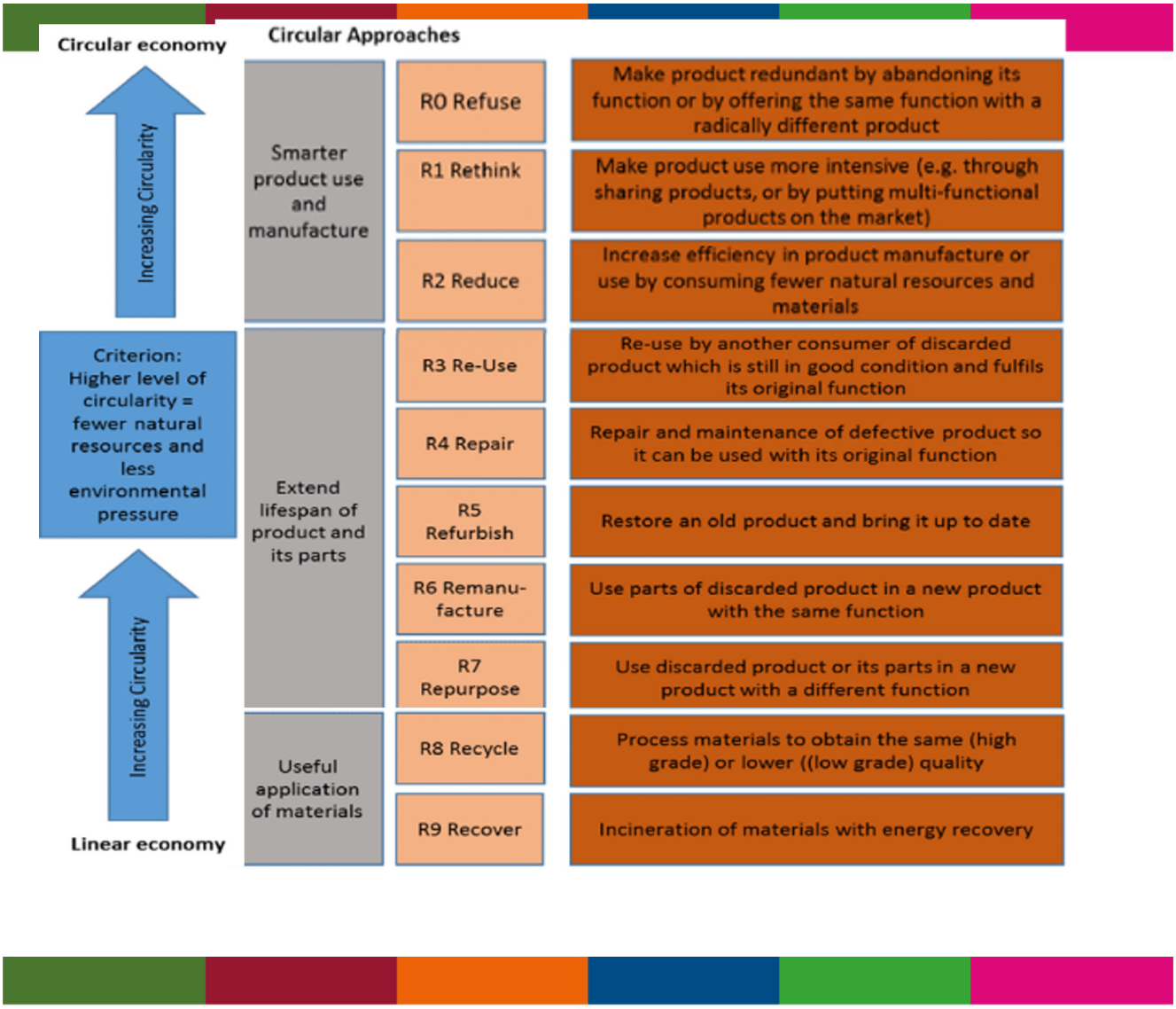
mess:
INDIVIDUAL vs SYSTEMIC



Smarter product use and manufacture

R0 Refuse	Make product redundant by abandoning its function or by offering the same function with a radically different product
R1 Rethink	Make product use more intensive (e.g. through sharing products, or by putting multi-functional products on the market)
R2 Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials

Extend lifespan of pruducts/parts

R3 Re-Use	Re-use by another consumer of discarded product which is still in good condition and fulfils its original function
R4 Repair	Repair and maintenance of defective product so it can be used with its original function
R5 Refurbish	Restore an old product and bring it up to date
R6 Remanu-facture	Use parts of discarded product in a new product with the same function
R7 Repurpose	Use discarded product or its parts in a new product with a different function

Useful application

R8 Recycle	Process materials to obtain the same (high grade) or lower ((low grade) quality
R9 Recover	Incineration of materials with energy recovery

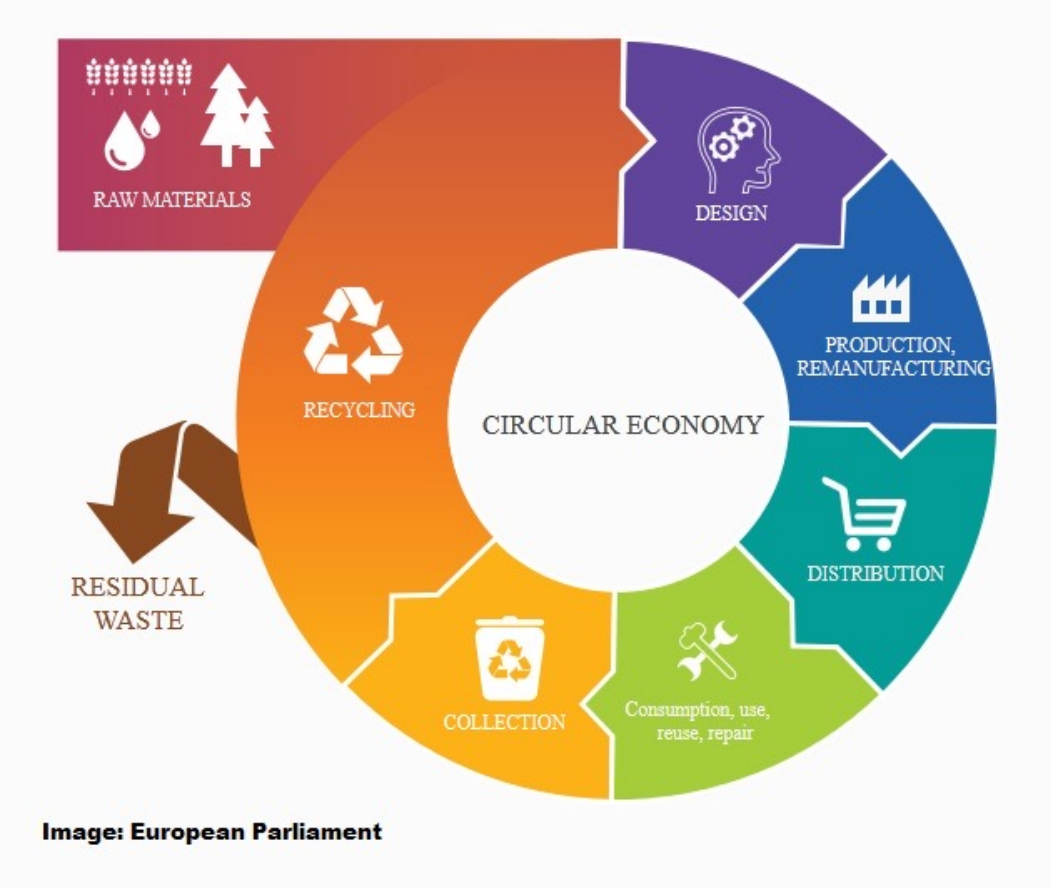
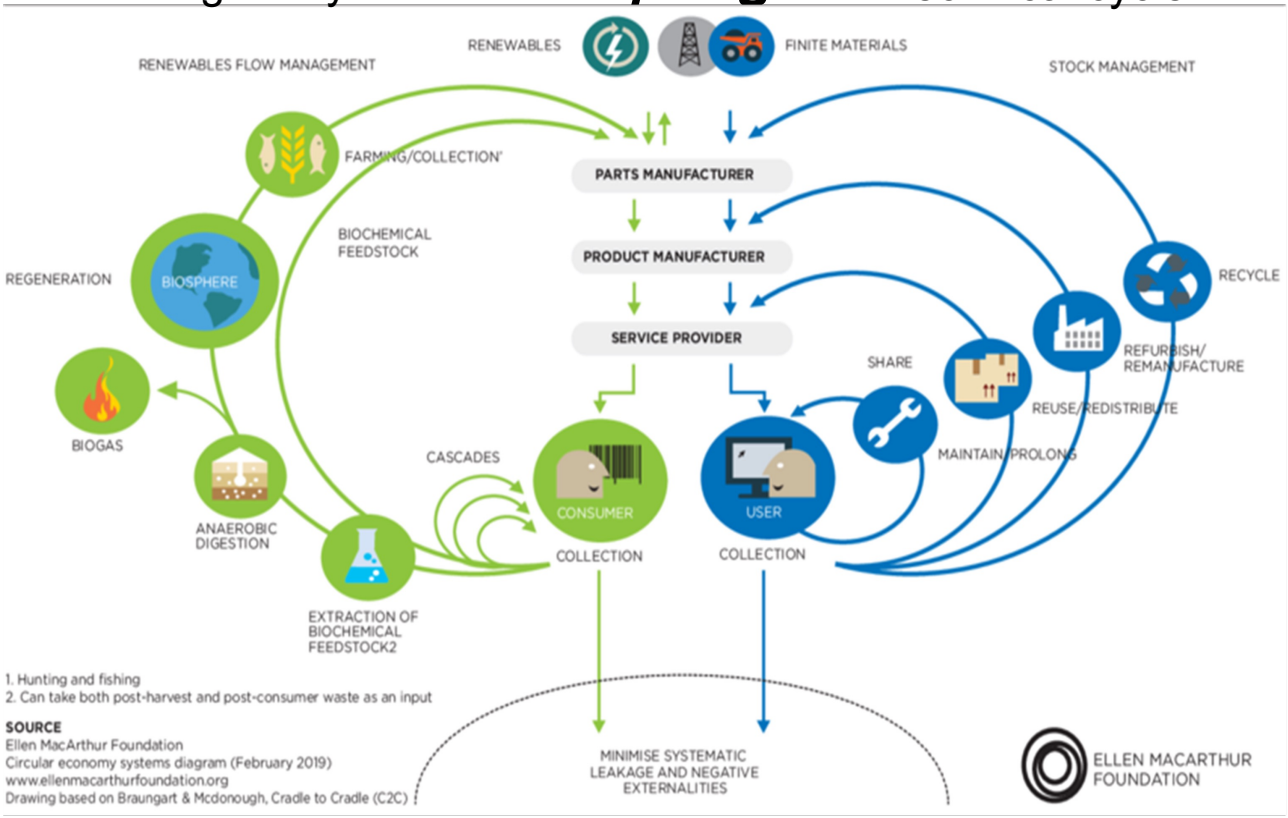


Image: European Parliament

Biological cycle **Butterfly diagram** Technical cycle



DESIGN: Repairability

framework

https://frame.work/it/en

Does Circular Economy imply Sustainability?

Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all

Develop resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

1.Ensure sustainable consumption and production patterns.

2.Reduce waste generation through prevention, reduction, recycling, and reuse.

Many different and vague definitions

also going beyond circularity

politically attractive message

like motherhood and apple pie!

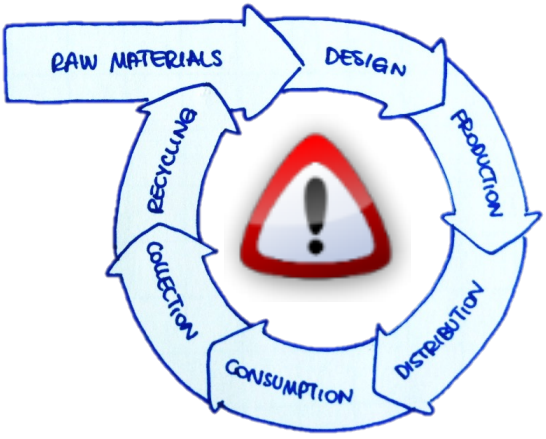
Business As Usual (BAU)

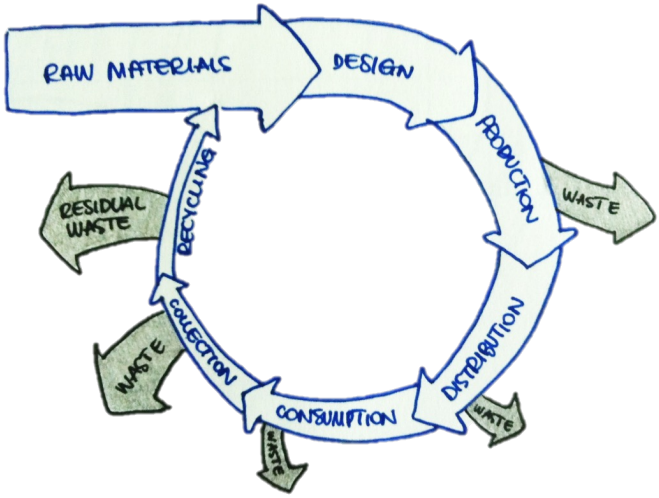
Take – make - dispose

F. Iraldo

Circular economy

Reduce, Reuse, Recycle, and Renew

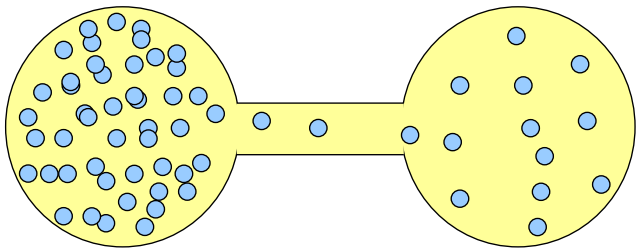




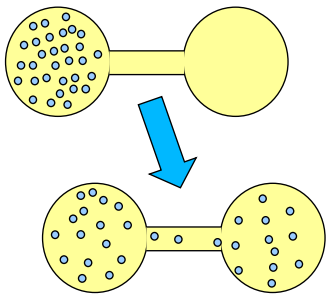
How it is supposed to be

How it is

Two communicating spheres with gas molecules inside



From ORDER - far from equilibrium



To DISORDER - thermodynamic equilibrium

What is it that allows circularity in ecosystems?

Energy is needed to close the loops!!!

Are perpetual motion machines possible?
https://www.youtube.com/watch?v=4b8ZsFszE8I

Circularity → sustainability ?

Not necessarily!!!!

CE can be worse than «linear» models

- ENERGY
- SCALE: problems even with natural nutrients
- NEW TOXICS:

Our knowledge about more or less harmful effects of substance flows on the environment is growing continuously

In the recent past and likely into the future as well, the production of beneficial consumer products almost always resulted in the generation of industrial wastes and used products or materials that turned out to be hazardous, necessitating treatment and disposal of unexpected waste flows (e.g. petroleum waste, nano-particles).

OTHER ISSUES

1) Optimization requires **rigidities** and dependencies→ industrial symbiosis

Dangerous rigidities in a highly changing world, based on decentralization (markets)

2) **Rebound effects!**

Which GOALs?

SUFFICIENCY vs CIRCULARITY: what about the speed of material throughput?

SUFFICIENCY vs EFFICIENCY

READ this editorial

de Man, R., Friege, H., 2016. Circular economy: European policy on shaky ground. Waste Management & Research, 34 (2), 93–95.

CONCLUSION

✓CE much more than RECYCLYNG

✓CE VS MARKET ECONOMY

✓DISSIPATIVE material LOSSES in every round

✓MIMICKING NATURE?

ENERGY needed to recycle – Solar vs Fossil

Nothing last for long in Nature

The logical consequence:

HOW? new glasses …