



Agenzia nazionale per le nuove tecnologie,  
l'energia e lo sviluppo economico sostenibile

# Circular design and Business models

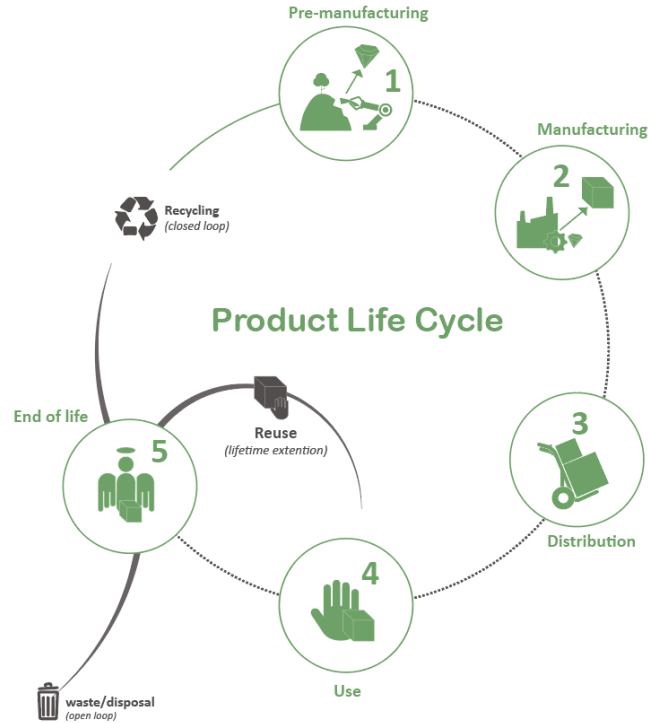
Paola Sposato, ENEA-SSPT - SEC



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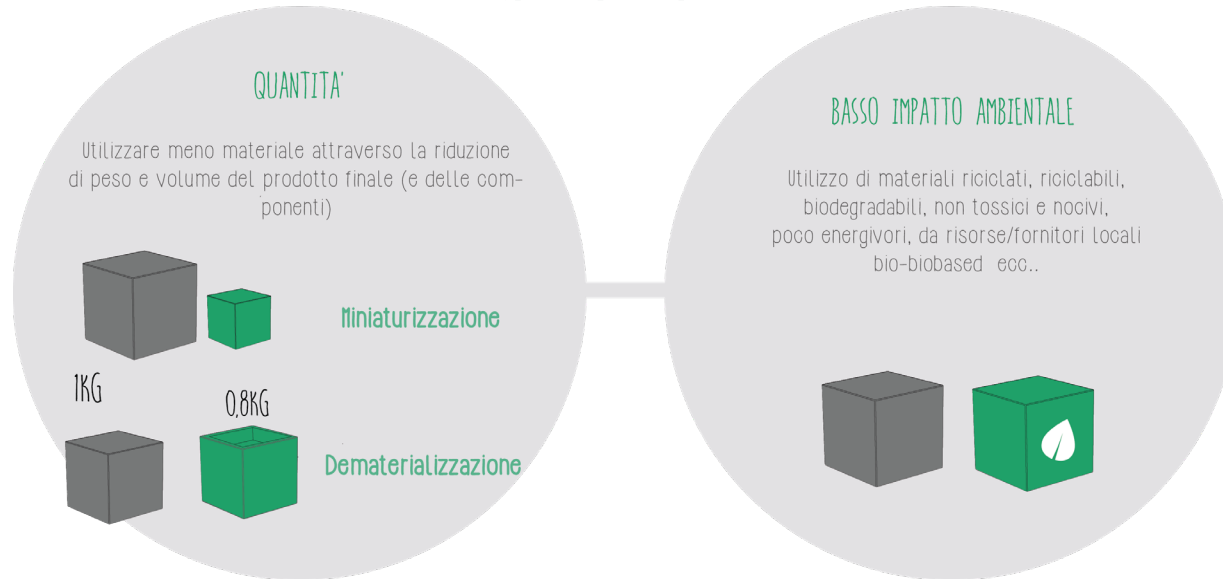


# Ecodesign strategies for Resource Efficiency



# Ecodesign strategies for Resource Efficiency

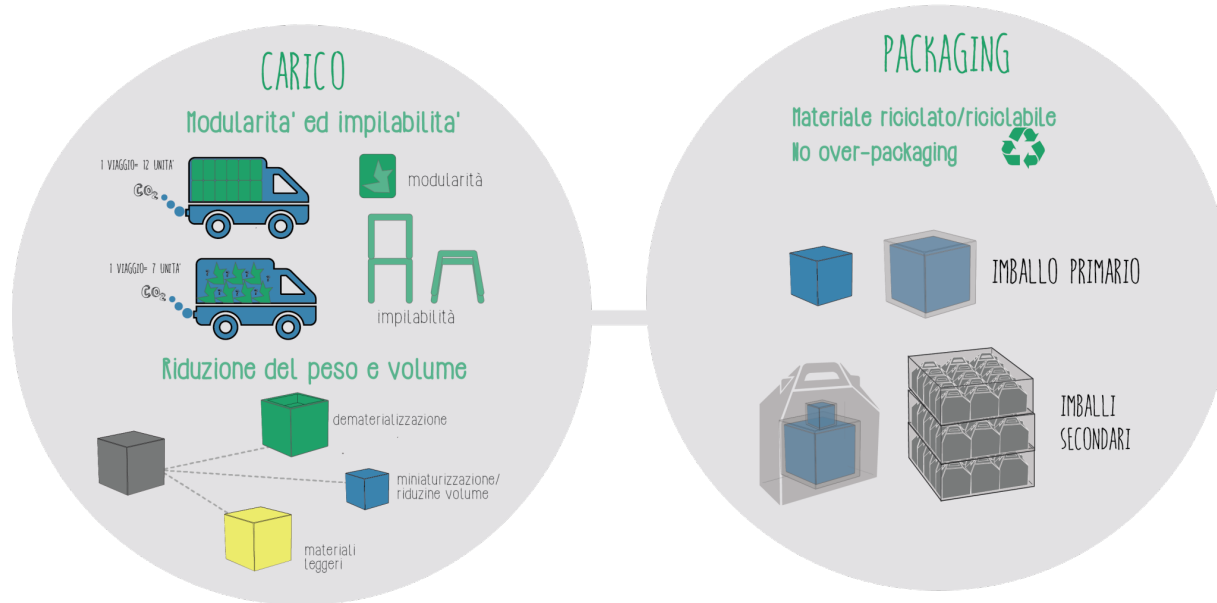
## SCELTA DEI MATERIALI



Dematerialization is delivering the same product or service using a percentage or none of the mass or material types.

# Ecodesign strategies for Resource Efficiency

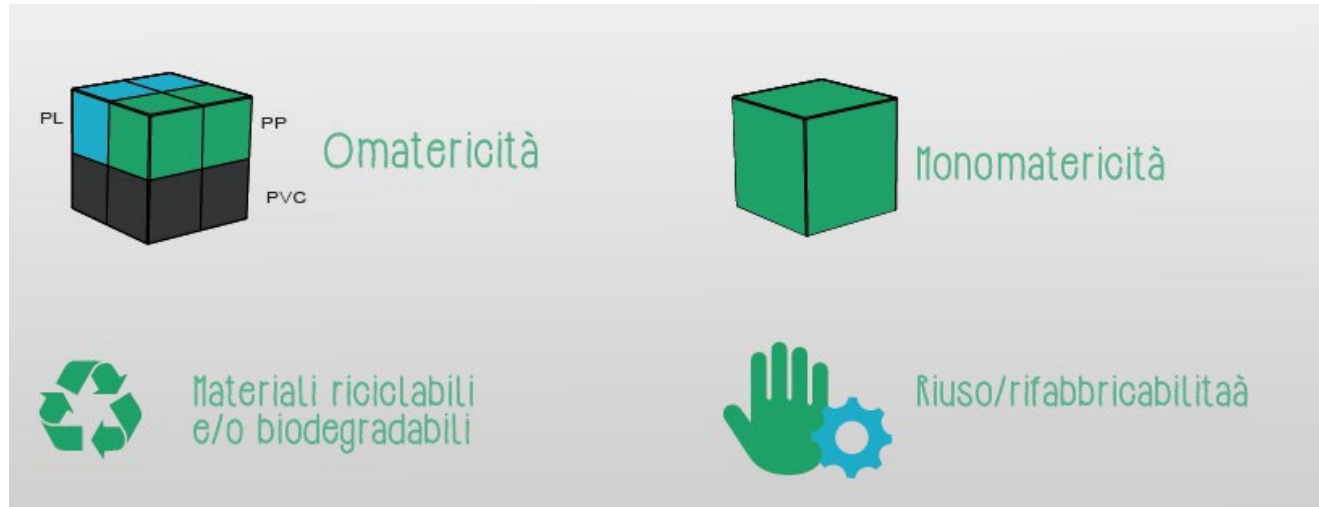
## OTTIMIZZAZIONE DISTRIBUZIONE



**Reduce and minimize resource and environmental impact**

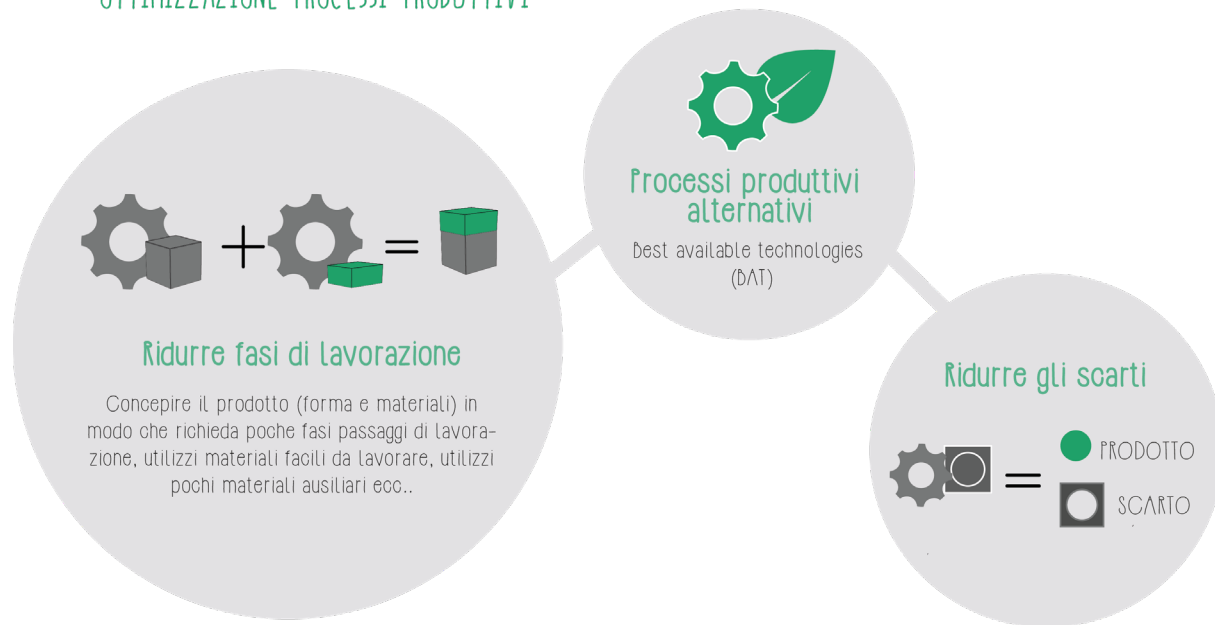
# Ecodesign strategies for Materials end of life

## Circular Materials



# Process Level

## OTTIMIZZAZIONE PROCESSI PRODUTTIVI



# Ecodesign\_closing loop strategies

## Circular design: closing loop strategies

Product-life phase	Ecodesign criteria e.g.
before point of sale	
Production phase (including extraction and distribution)	Renewable resources
	Non toxic resources
	Secondary raw material
	Clean production, zero emission
	Short transport distances
	Compressability
End of life phase	Recyclability
	Compostability



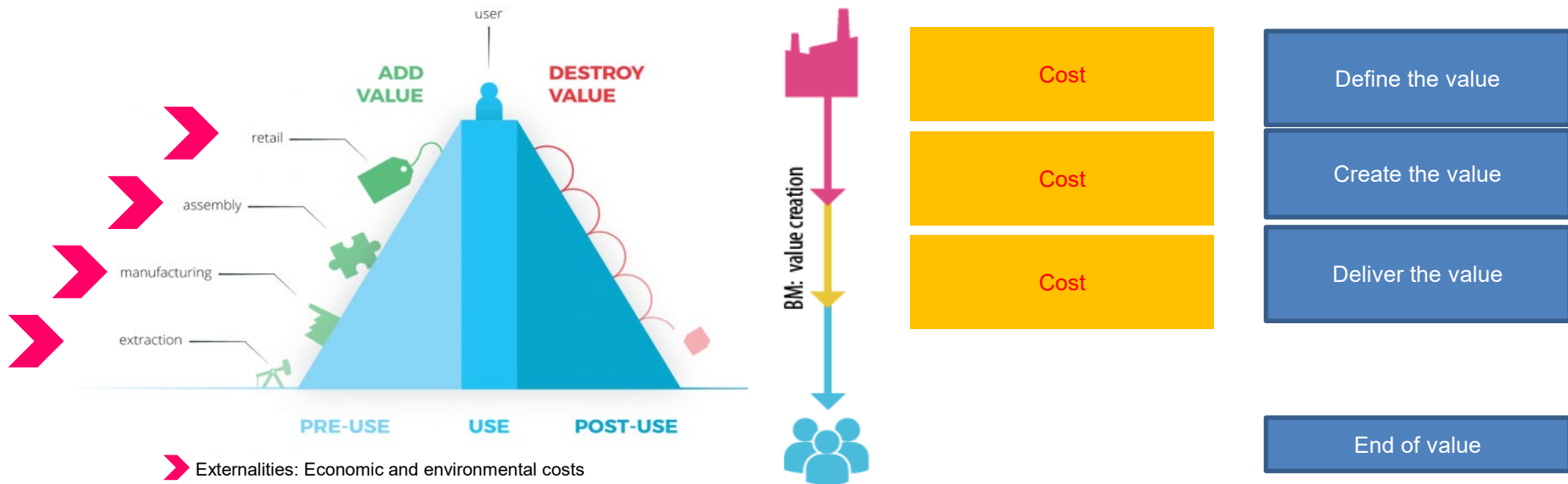
## From Materials to products: the importance of circular design

- Today we are designing technologies considering the actual production and consumption paradigm.
- Are we sure they'll be good also for future business model of production and consumption system?
- What change in resource efficiency and valorization if products conception and the way we use them deeply change? Which innovation are required?



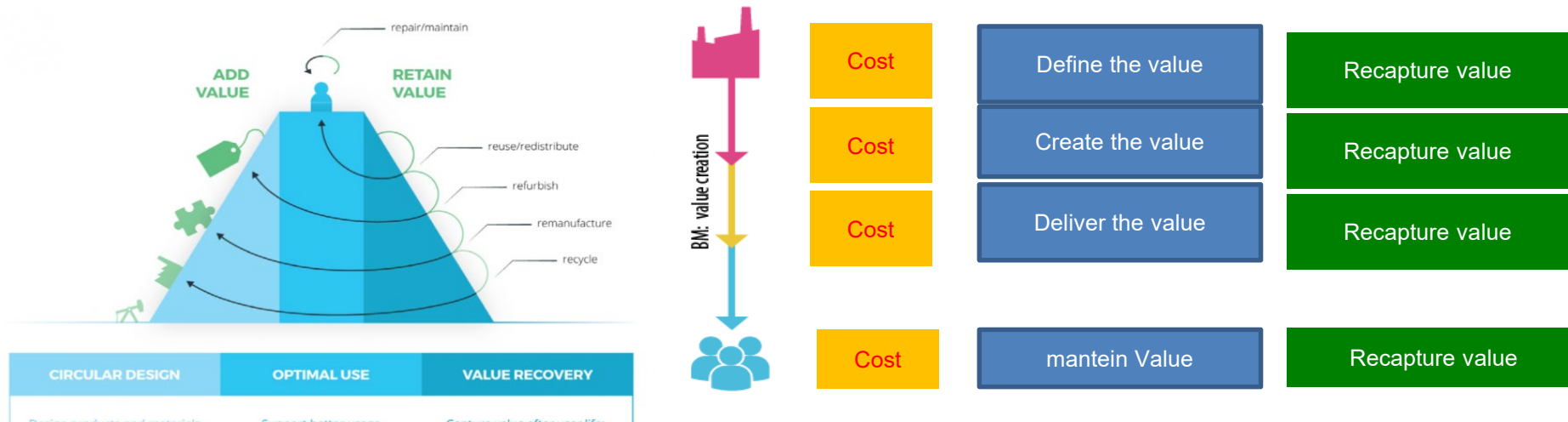
# Linear business models

The term *Business Model* refers to the conceptual logic of how the firm creates and appropriates economic value by **charging the customer (user) a price** for the solution to a problem (Teece, D. J. 2010).

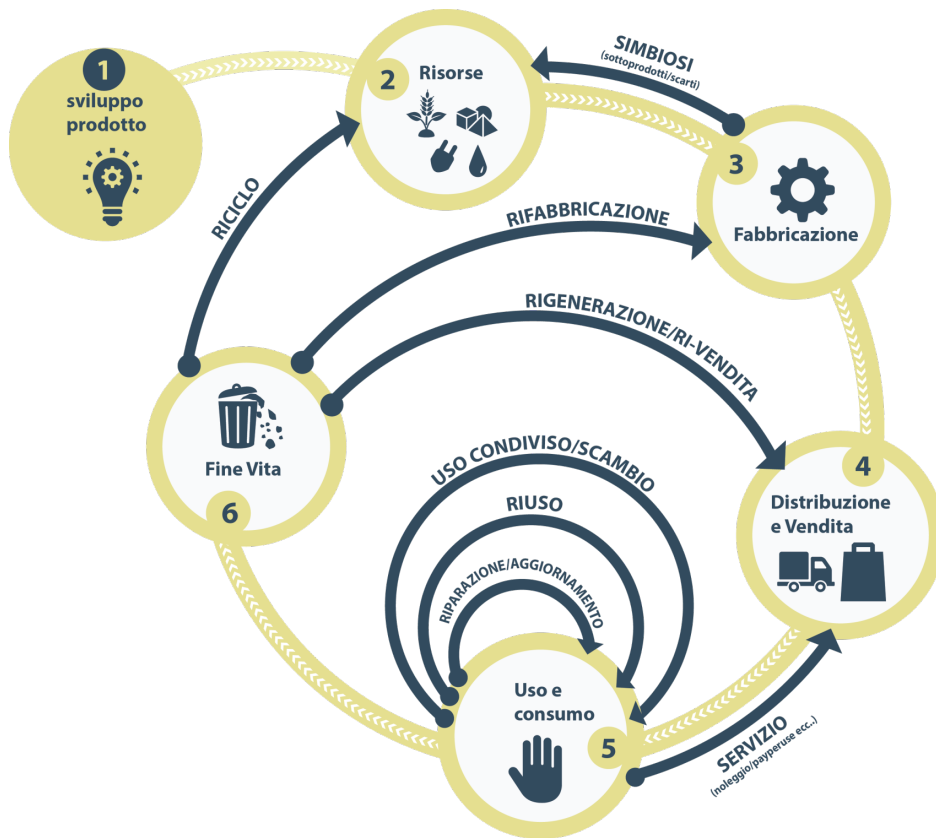


# Circular business models

A **Circular Business Model (CBM)** as conceptual logic for value creation is based on the production of new offerings **utilizing economic value retained in products after its use** for (Carbon Trust. 2017). It therefore integrates principles of circular economy such as resource efficiency and waste preventions.

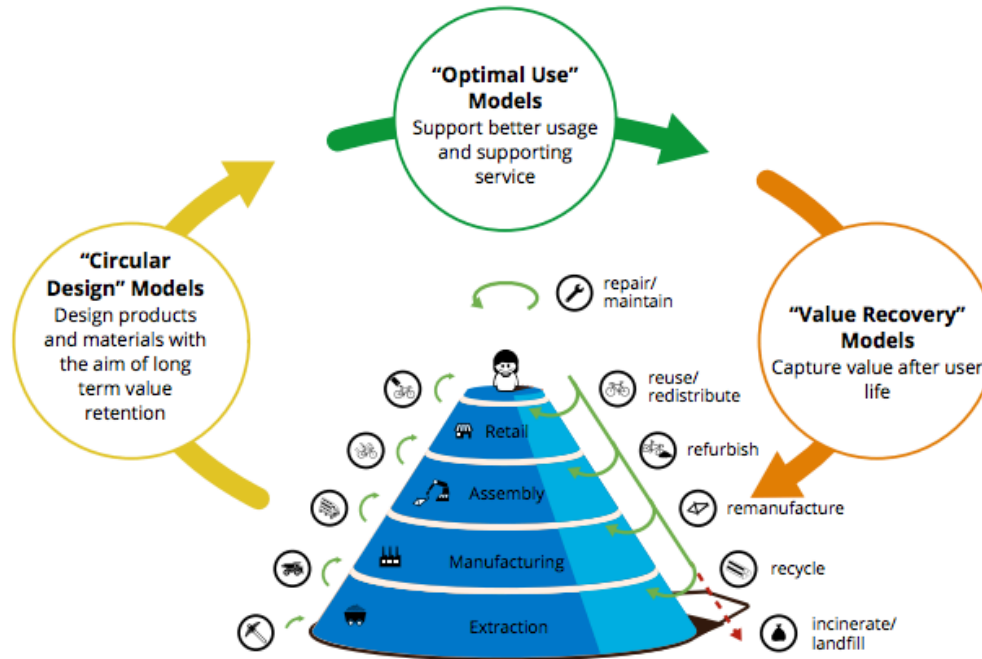


# Circular economy: resource closing loop strategies

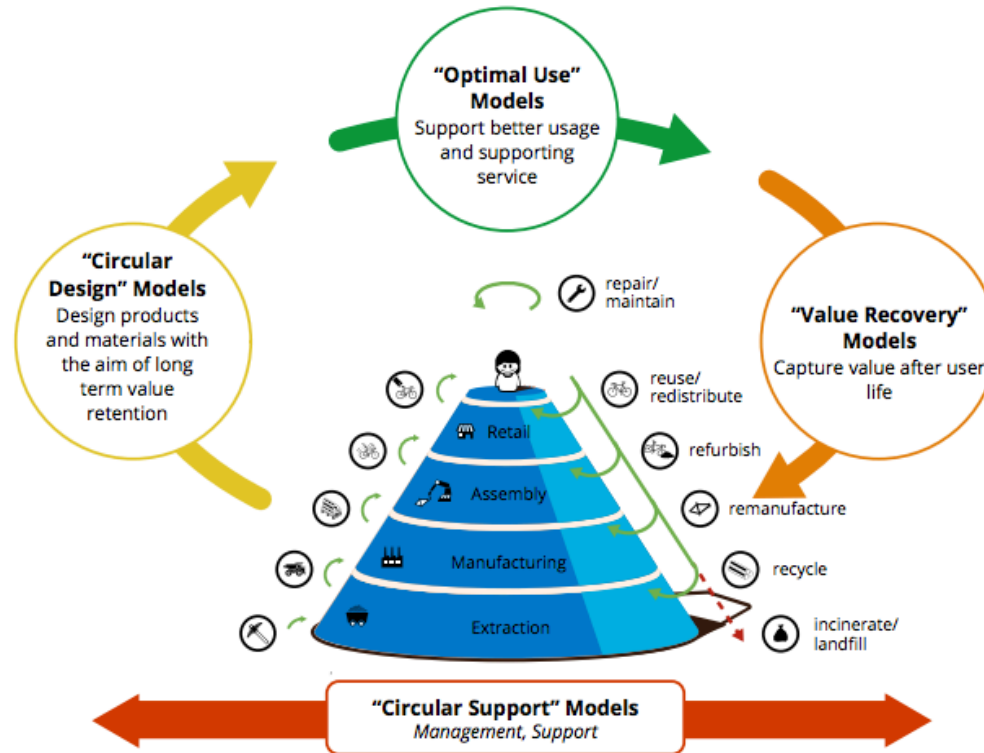


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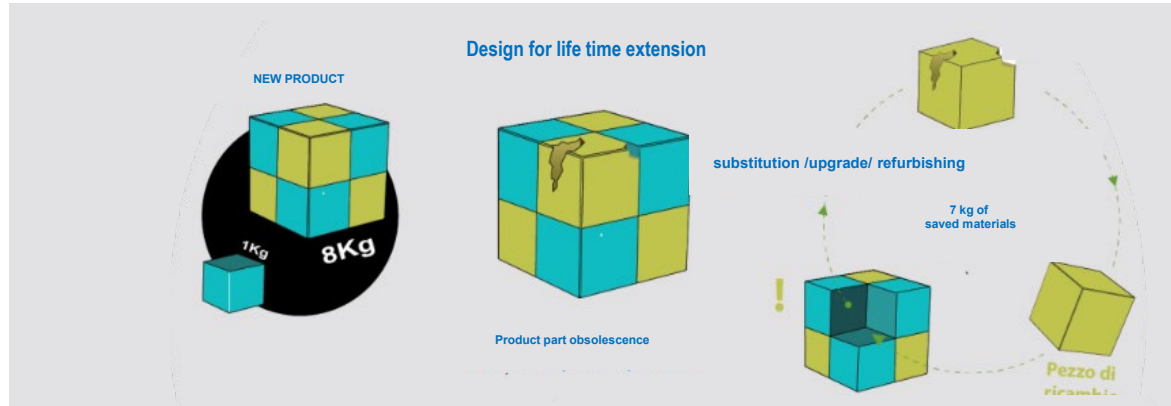
# Circular business models



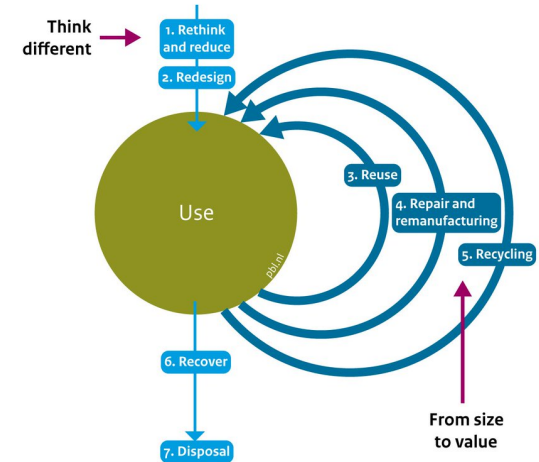
# Circular business models



# Circular design: closing loop strategies



Circular economy is more than recycling



Source: PBL

after point of sale	
Use phase	Durability
	Repairability, Upgradeability
	Water or energy efficiency
	Shared use possible
	Remanufacturability
	Services (guarantee, maintenance)

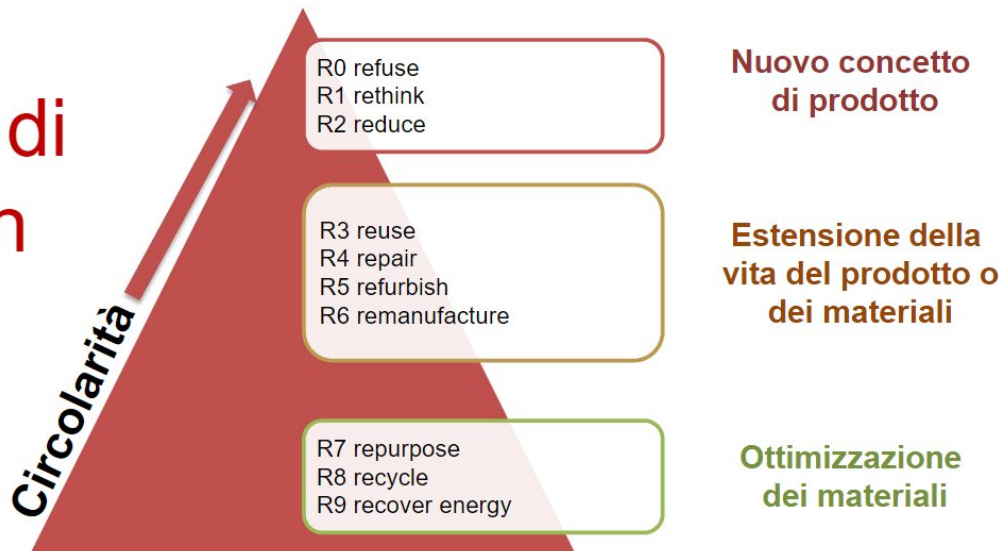
## LIFE TIME EXTENSION STRATEGIES

Circular design strategies. Image Source: Paola Sposato ENEA

# Ecodesign strategies



## Strategie di ecodesign le 9 «R»



# Durability and «HOT TOPIC»

**Flexibility: a key word for upgrade,  
maintenance and repair.**

**In other words**

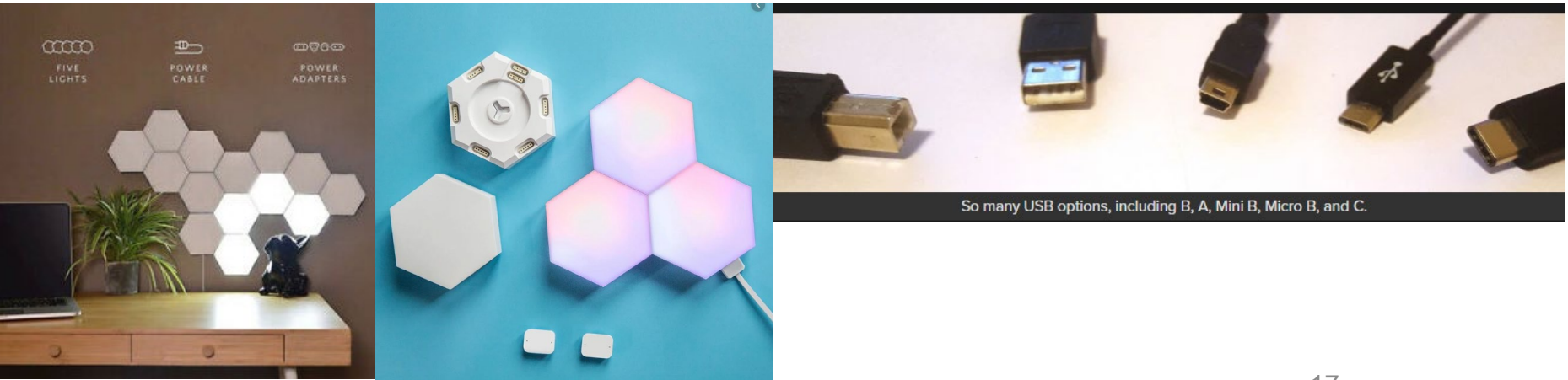
**MODULARITY and standardization**

While some niche companies are explicitly exploring modularity in terms of sustainability, other players are adopting a business perspective in which modularity is used to offer **mass-customised products**



# Concetti e strategie chiave del design circolare

## Flessibilità: Modularità, standardizzazione e compatibilità



# Hot topic

## Flessibilità: Modularità, standardizzazione e compatibilità

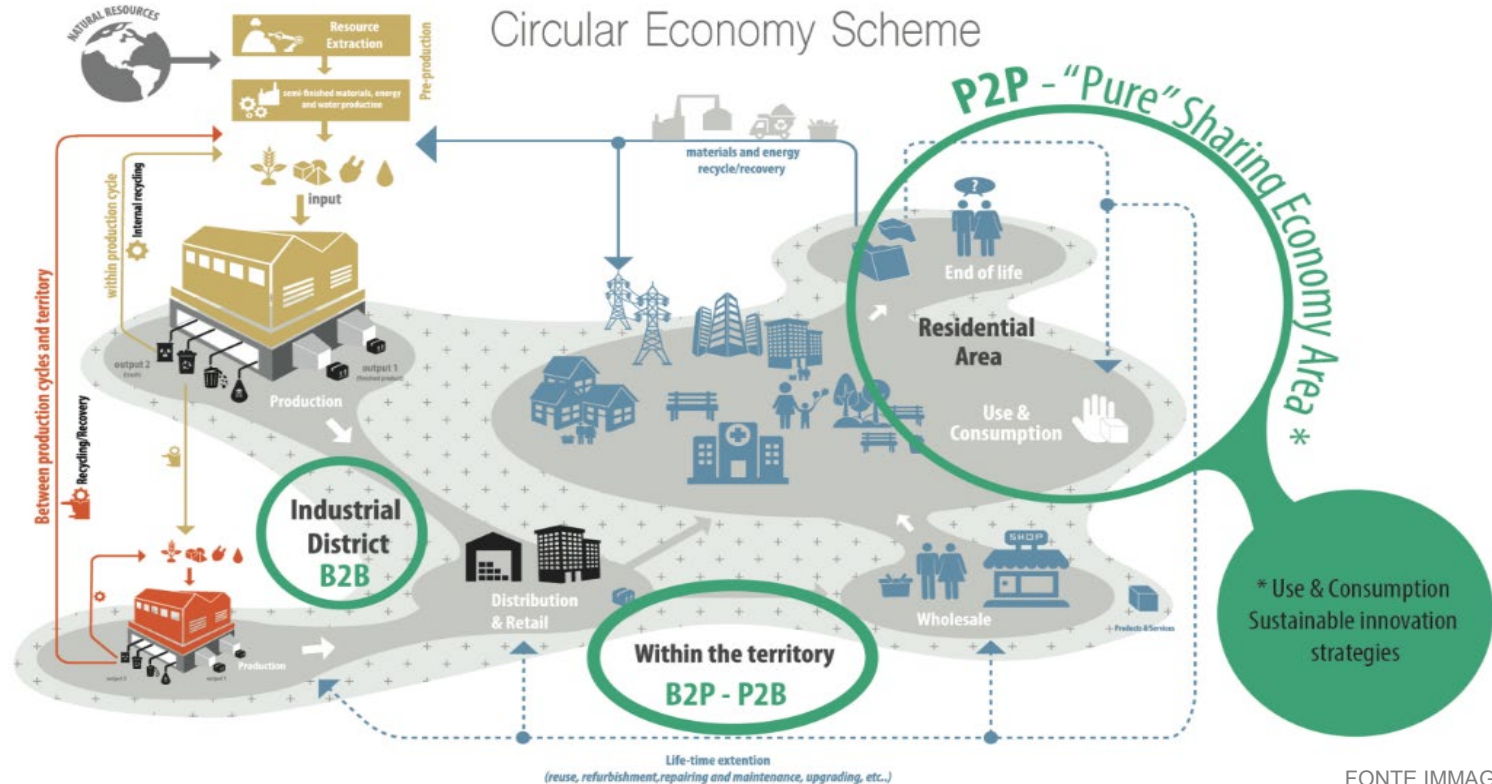


# Concetti e strategie chiave del design circolare



**Obsolescenza  
programmata**

# From sharing economy to Collaborative and Circular business models (CCBM's)



# Dalla sharing economy ai Collaborative and Circular business models (CCBM's)

## **Definizione di Economia Collaborativa**

*L'economia collaborativa si riferisce ai modelli imprenditoriali in cui le attività sono facilitate da piattaforme di collaborazione che creano un mercato aperto per l'uso temporaneo di beni o servizi spesso forniti da privati*

**“un valore inutilizzato è un valore sprecato”**

**Forme di condivisione:** Riuso, redistribuzione, scambio, utilizzo simultaneo, affitto

# Why to share?

## Critical environmental issues



40%

(\*)

total world's CO2 emissions

world natural resources consumption

waste production (Italy 37%\*)

Data Source: Jacques Lair; ISO 21931-1:2010

"Sustainability in building construction –  
Framework for methods of assessment of the  
environmental performance of construction work

(\*) ISPRA\_ - "Report 2015 on italian waste"

Data source: Ellen-Mc Arthur -  
"Growth Within: a circular economy  
vision for a competitive Europe"



12%  
EU CO2  
emission

50% of  
urban land

90% of emission is  
produced in urban center  
(human exposure)



17%

total EU's  
CO2 emissions

28%

natural resources  
consumption

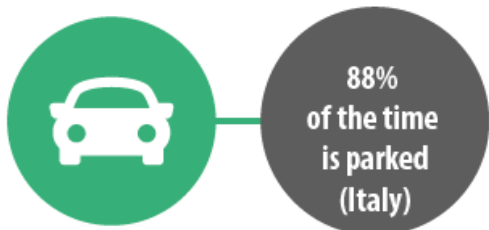
Agriculture is one of the main causes of changes in land use, loss of habitats and biodiversity, climate change, water pollution and impoverishment of the soil.

Data Source: FAO- Food and Agriculture Organization of the United Nations

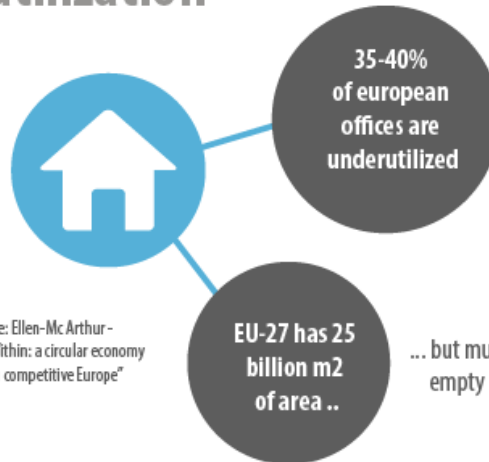
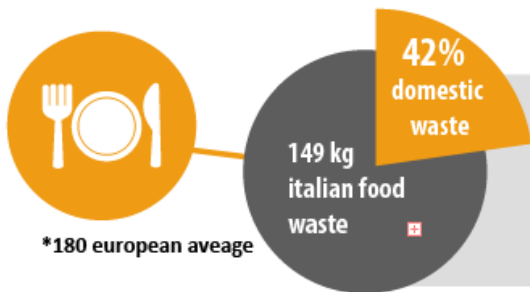
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# Why to share?

## Underutilization



Data source: Marta Manieri. «La mappatura delle piattaforme italiane 2015». Adaptation ENEA



Data source: Ellen-Mc Arthur -  
"Growth Within: a circular economy  
vision for a competitive Europe"

... but much of it remains  
empty or underused!

In developing countries 40% of the waste takes place  
in the phase of post-harvest and processing,  
while in industrialized countries the same percentage  
It is wasted in the distribution and consumption phases.

Data Source: FAO- Food and Agriculture Organization of the United Nations

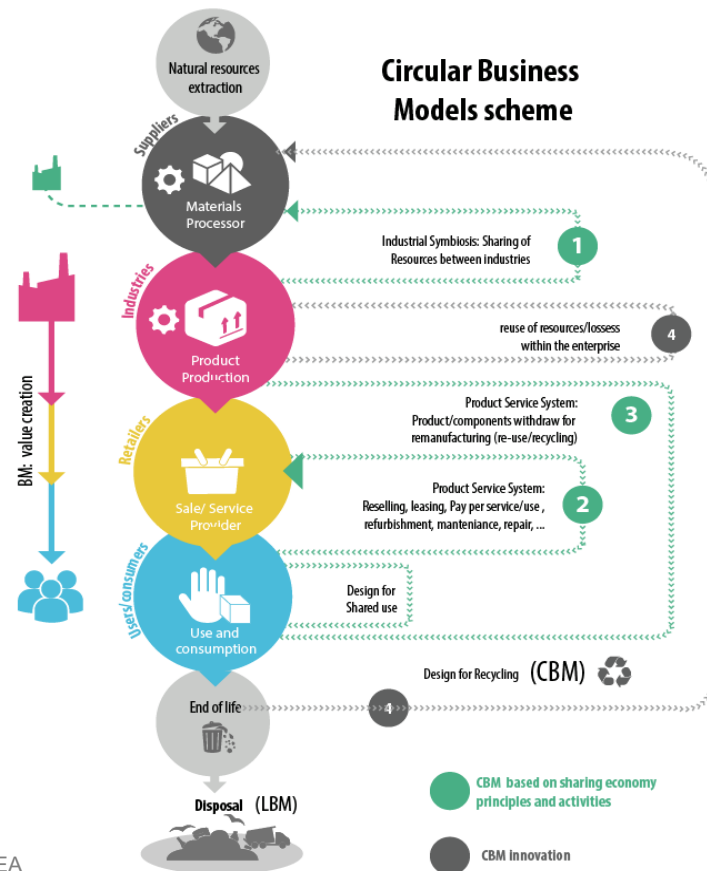


# Modelli di business circolari e collaborativi

**CCBM (Circular and collaborative business model)** sono quelli che si basano sui principi della condivisione e scambio di risorse (sharing economy)

1. Business-to-Business (B2B) CCBMs:  
**Simbiosi industriale**

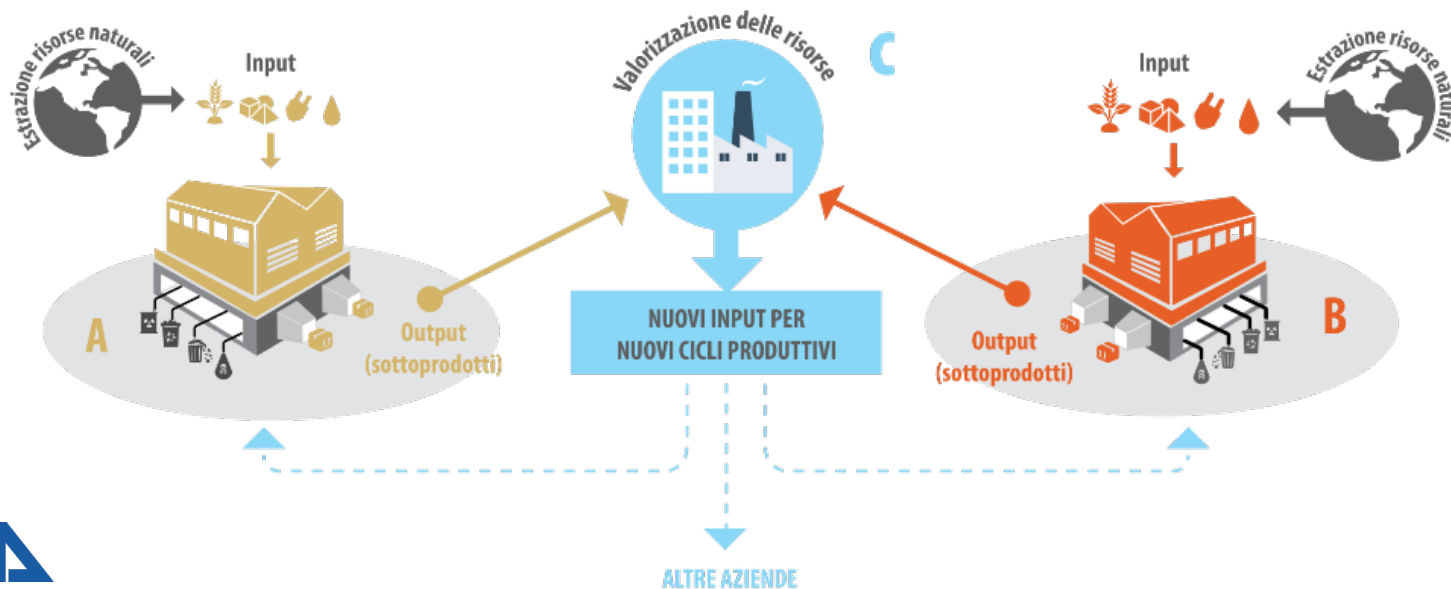
2-3 Business to Consumer (B2C) CCBMs:  
**Product Service System (PSS)**





# Circular Business Models B2C: Industrial simbyosis

Industrial symbiosis (IS) is an important collaborative circular economy business models (CCBM) which implements “closing the loop strategies” at the production stage through the **collaboration between two or more companies in order to exchange, share or jointly manage resources**, with both economic and environmental advantages for all parties and the possibility of creating new business opportunities.

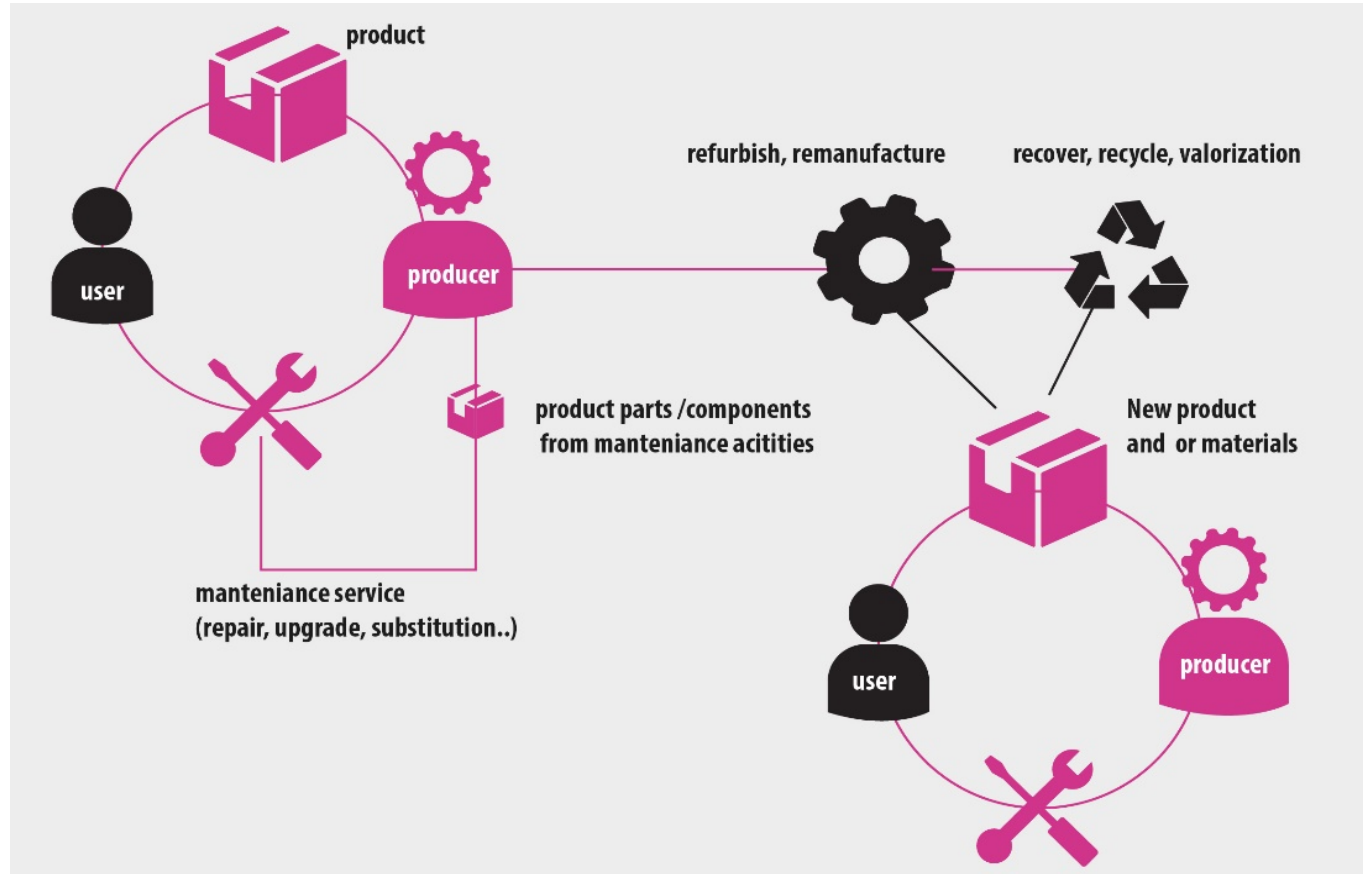


# Modelli B2C: i PSS (product service system)

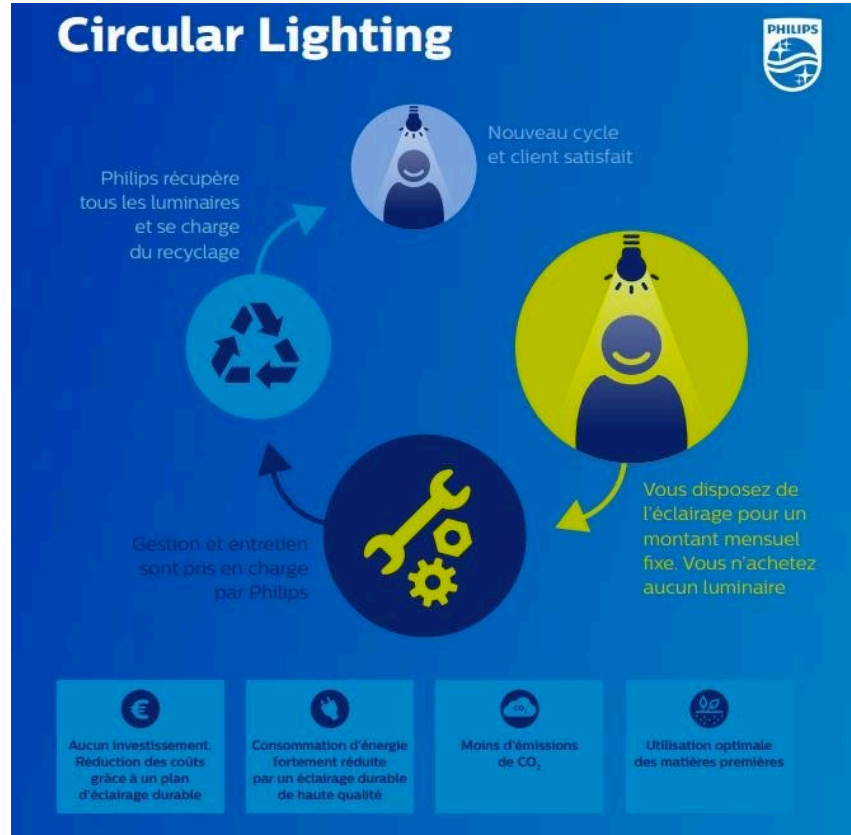
## Life time extension strategies within PSS

- Encourages the EPR (extended producer responsibility) and a better resource management (economic interest in material valorization by firms)
- Avoids planned obsolescence
- Prevents problems connected to complex products recycling
- Avoids raw materials extraction and production
- Internal plant processing ensure better second-hand materials quality

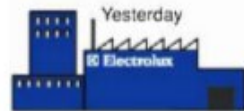
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# Product service system (PSS): esempi



# Product service system (PSS): esempi



Customer buys:  
A washing machine



Electrolux provides  
a laundry function with:

A machine at home  
Electricity  
Service  
Upgrading  
Product Recycling



Customer gets:  
Clean Clothes



1  
Red hat  
has arrived on

**PAY PER  
WASH**



<https://www.electroluxgroup.com/annualreports/2012/en/visionandstrategy/electroluxstrategy/innovation/innovatingforsustai/innovating-for-sust.html>

# Product service system (PSS): esempi



Interface®

[https://www.interface.com/EU/en-GB/campaign/reentry/reentry-en\\_GB](https://www.interface.com/EU/en-GB/campaign/reentry/reentry-en_GB)

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