

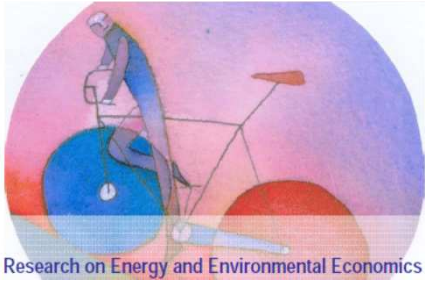
Economia circolare: il ruolo delle istituzioni e delle imprese

Prof. Fabio Iraldo

geo - THE **g**REEN **e**CONOMY **O**BSERVATORY

IEFE – Università Bocconi, Milano





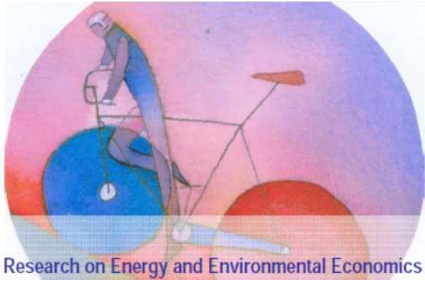
L'Osservatorio Bocconi si focalizza sulle strategie delle imprese di fronte alle sfide della Green Economy



Cominciamo quindi dalla visione di uno studioso di management:

“Pollution is a manifestation of economic waste and involves unnecessary, inefficient or incomplete utilization of resources. In many cases, emissions are a sign of inefficiency and force a firm to perform non-value-creating activities such as handling, storage and disposal. Efforts to reduce waste and maximize profits share the same basic principles, including the efficient use of inputs, substitution of less expensive materials and the minimization of unneeded activities”.

Michael Porter, 1995



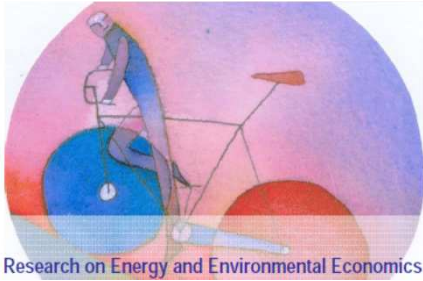
E' interessante notare come questa visione legata alla "efficienza" sia molto coerente con le più recenti definizioni della "economia circolare" adottate dalle istituzioni:

- «an economy that is **regenerative by design**: biological materials are designed to reenter the biosphere, and technical materials are designed to circulate with minimal loss of quality».



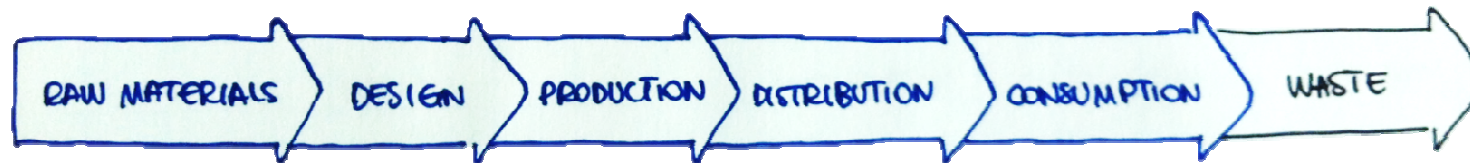
- «an economy that is **restorative by intention**; aims to rely on renewable energy and resources; minimize, tracks and eliminates the use of toxic chemicals; and eradicates waste through careful design».

Ellen Mac Arthur Foundation, 2014

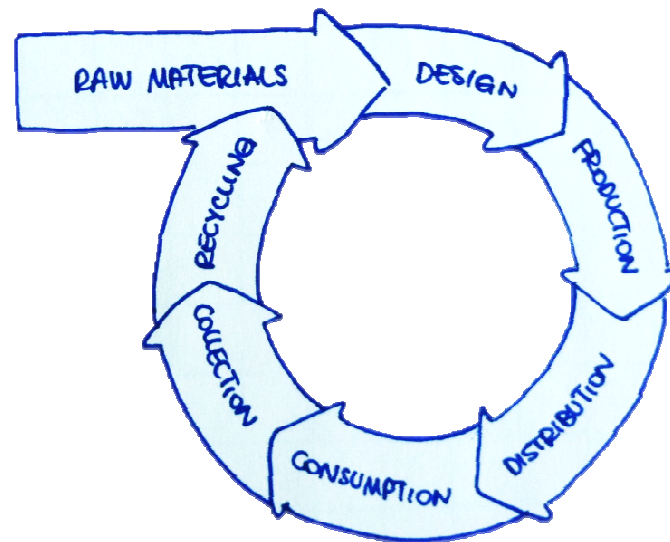


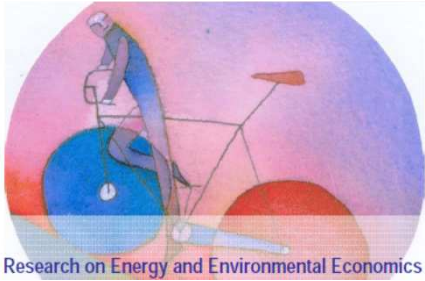
Dobbiamo quindi attenderci che la circolarità sia una tendenza spontanea nel nostro sistema economico?

- No, l'abbondanza e il basso costo delle risorse naturali ci ha portato ad un modello lineare:



- Le politiche ambientali mirano invece ad un "cerchio perfetto":



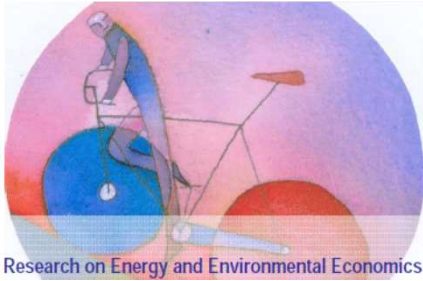


Ma questo è come il sistema in realtà sta funzionando:

Si stima che nel 2020 circa 82 miliardi di tonnellate di materie prime saranno utilizzate dall'economia mondiale (il 30% in più del livello attuale)

Solo un terzo dei 60 metalli più comuni ha un tasso di riciclo più alto del 25%



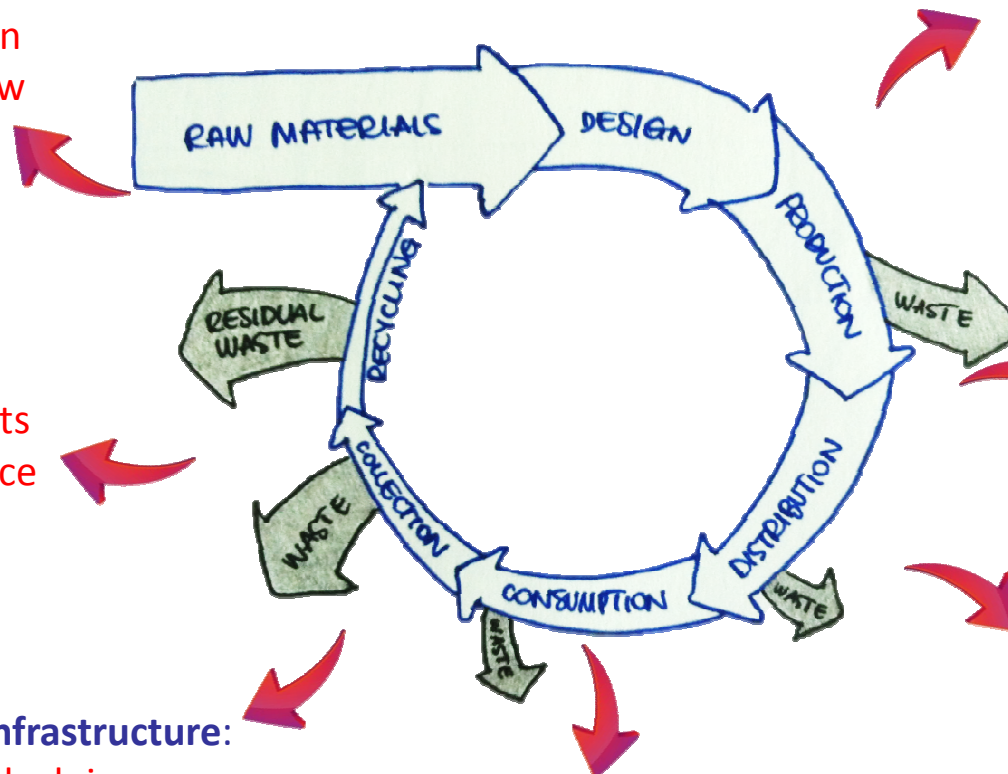


La ricerca condotta dal nostro Osservatorio è partita con l'identificare le cause che generano le "perdite" che assottigliano il flusso (ovvero le "forze centrifughe"):

Rules: constraints in using secondary raw materials

Technology: limits to innovation pace

Geography and infrastructure: globalization and lock-ins, e.g. preventing reverse logistic

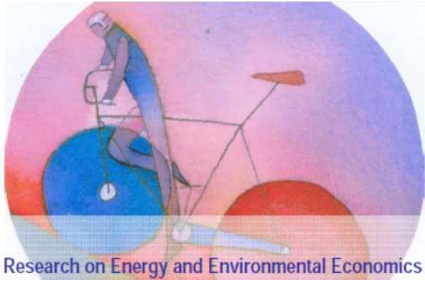


Information: asymmetries relating to environmental impact

Business priorities: emphasis on short run performance

Market barriers: price bias, lack of demand

Culture and habits: consumer behavior



Proprio come accade nella meccanica Newtoniana, anche nei sistemi economici le forze centrifughe sono causate da inerzie

Dobbiamo quindi aspettarci che le inerzie sui mercati, nello sviluppo tecnologico, nelle infrastrutture... rendano sempre difficile o siano perfino in grado di impedire la circolarità?

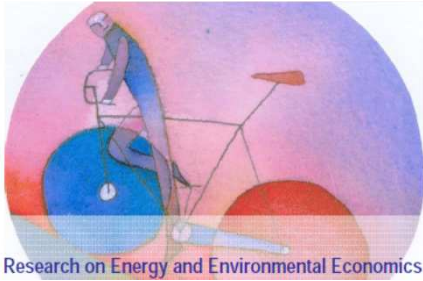
No, la nostra ricerca ha identificato alcuni “fattori interni” alle aziende che possono in alcuni casi superare le inerzie e fungere da forze centripete a favore della circolarità (chiudendo i cicli), ad esempio :

- Rischi da scarsità di risorse o volatilità incremento dei loro prezzi
- Nuove opportunità di mercato legate allo sviluppo di prodotti e servizi verdi
- Sinergie e risparmi derivanti dalla cooperazione (anche a livello territoriale)
- Etc.

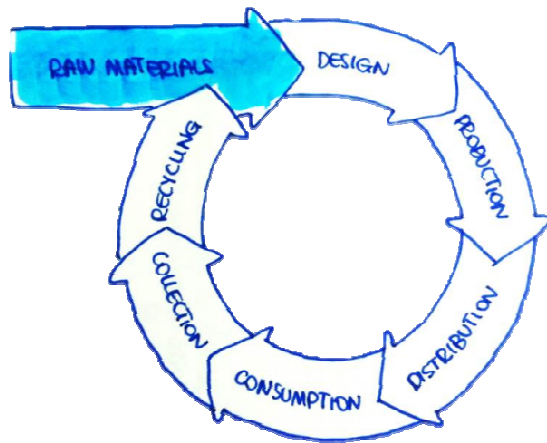


Questi fattori hanno giocato un ruolo cruciale nel promuovere la circolarità in molte best practice aziendali.

Ne abbiamo mappate molte, fuori e dentro l'Osservatorio



RAW MATERIALS



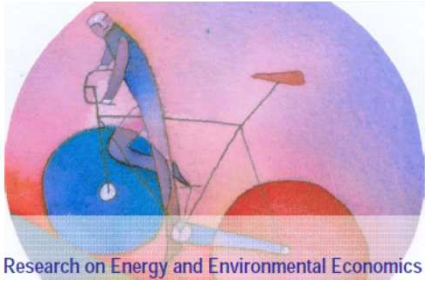
- Mapei: **RE-CONzero** project

- Every year, worldwide, 10 billions of cubic meters of concrete are produced
- The main waste is “**returned concrete**”, i.e. wet cement not used that turns back to production plant and goes to landfill. It is worth 5% of USA total production, 2% of total production in Japan and Europe.
- RE-CONzero project uses an additive to transform returned concrete in a **new granular raw material**, which is **entirely used as aggregate for concrete production**, saving up to 265 Kg of CO₂ per m³ of returned concrete.

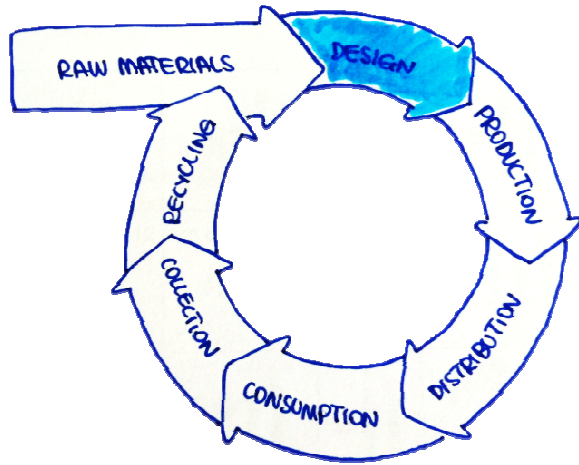
-  2015 S.p.A.

- Materials, products and services for the Universal Exposition in Milan purchased by the Organiser and by the Participant Countries are subject to **Green Procurement guidelines and criteria** that are prioritizing recycle content, reusability, recoverability and recyclability.



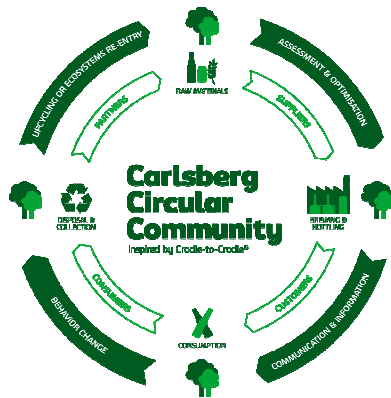


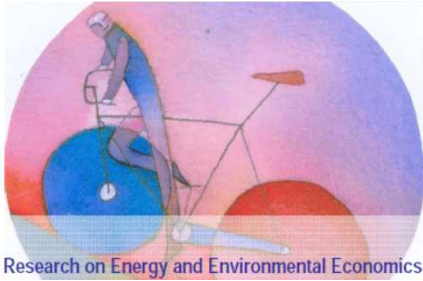
DESIGN



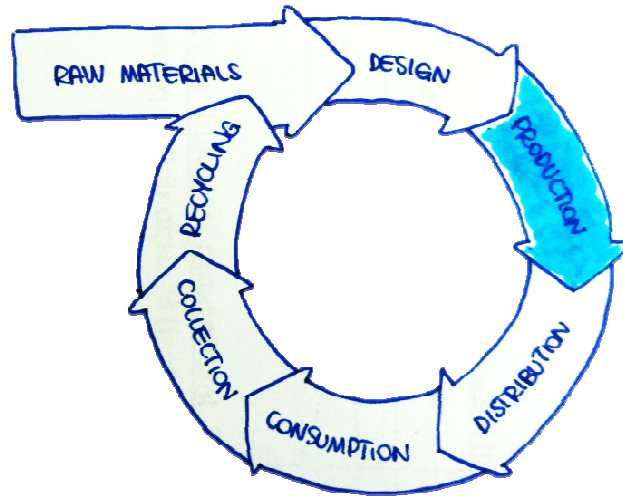
• Carlsberg Circular Community

- Based on **EC Product Environmental Footprint** study, lighter packaging with a lower environmental impact (e.g.: not using CO₂) are preferred. In Italy this has yield a reduction in CO₂ emissions by 28% per beer hectoliter.
- A **Cradle to Cradle** approach is adopted to improve «circularity», e.g.: by improving purity of packaging to favor recyclability.



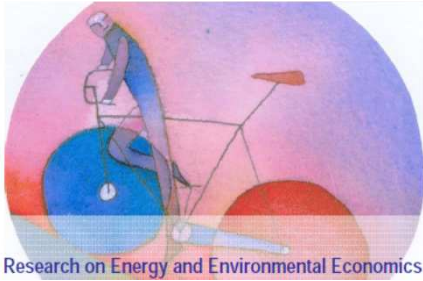


PRODUCTION

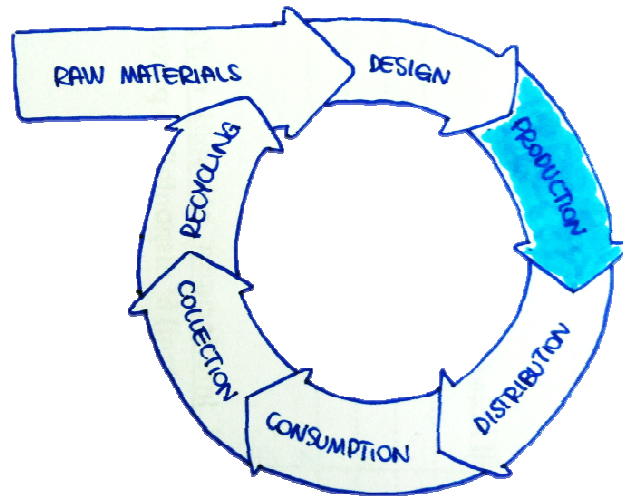




RENAULT

- Renault's remanufacturing plant in Choisy-le-Roi near Paris, France, employing 325 people, **reengineers** different mechanical subassemblies, from water pumps to engines.
- The company also **redesigns components** (such as gearboxes) to increase the reuse ratio and make sorting easier by standardizing components. While more labor is required for remanufacturing than making new parts, there is still a net profit because no capital expenses are required for machinery, and no cutting and machining of the products, resulting in **no waste and a better materials yield**.
- Renault has achieved reductions of 80% for energy, 88% for water and 77% for waste from remanufacturing rather than making new components.

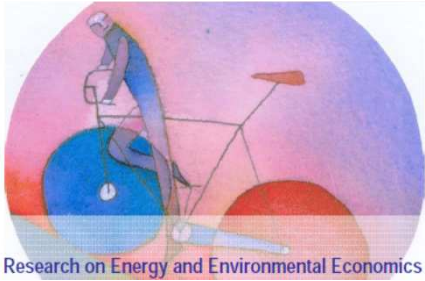


PRODUCTION



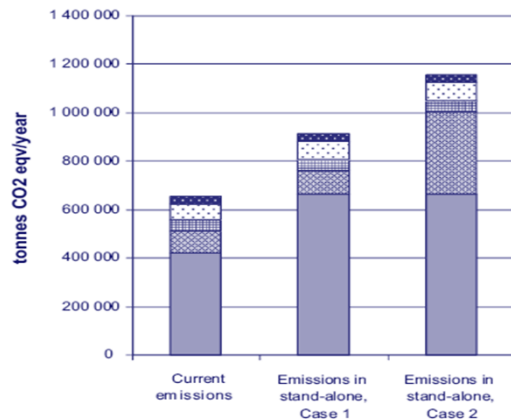
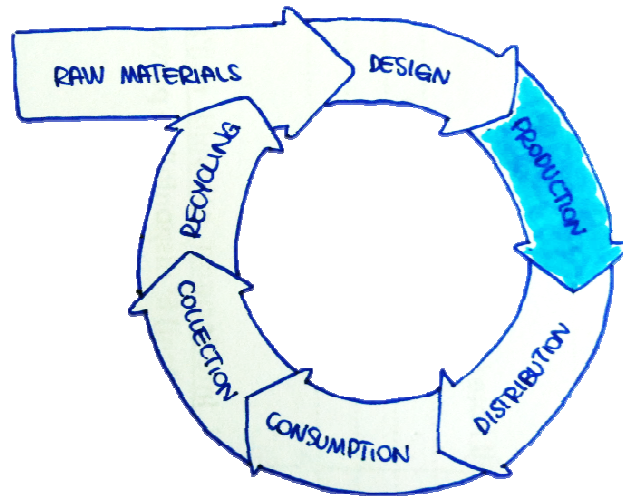
- 
Cartacrusca project

 - From 2013 Barilla collaborates with Favini to recover the bran part that can no longer be used for food: the focus is on **recovering the bran** obtained as a by-product from the grinding of wheat, barley, rye and other cereals to then process it, together with cellulose, and turn it into a raw material for paper production.
 - For the production of Cartacrusca, **20% of the cellulose derived from trees is replaced with bran**, and is mixed with virgin cellulose and FSC certified post-consumption recycled fibers.
- Cartacrusca emits **22% less CO2 eq. emission from the production phase** when compared to 1 ton of Favini standard paper, the plant being the same.





PRODUCTION

Industrial symbiosis



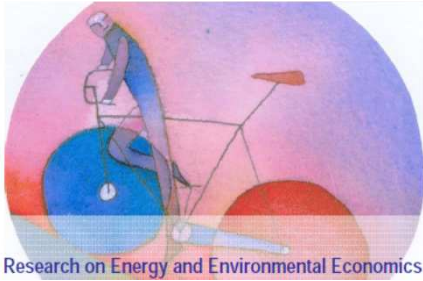
- **Kalundborg symbiosis (Denmark)**

- is an industrial ecosystem, where the residual product of one enterprise is used as a resource by another enterprise, in a closed cycle. Created in the 70s as a private initiative, now it involves the whole area of Kalundborg.
- 30.000 tons of straw converted to 5,4 million liters of ethanol.
- 150.000 tons of yeast replaces 70% of soy protein in traditional feed mix for more than 800.000 pigs.

- **Santa Croce tannery industrial cluster in Italy**

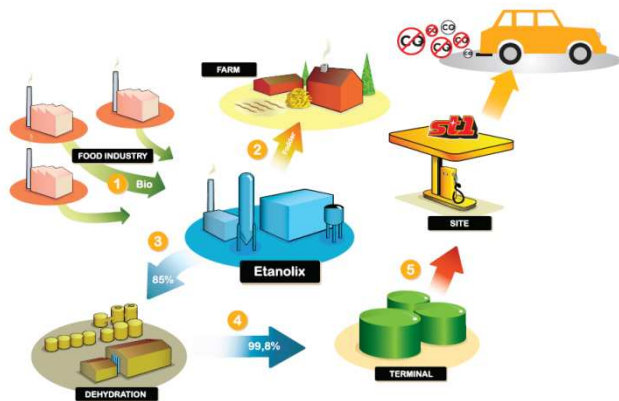
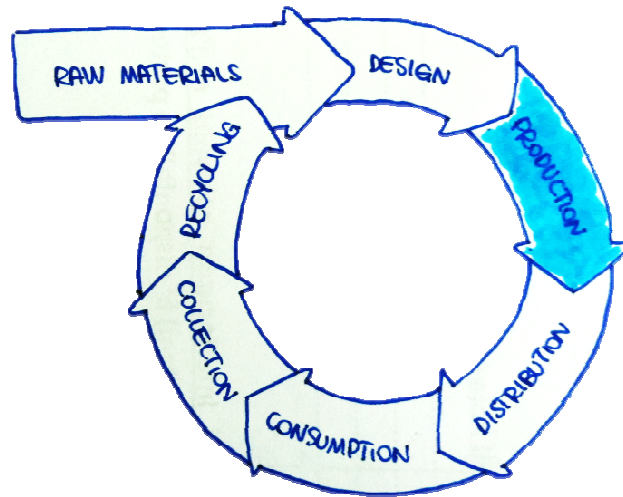
- 120.000 tons per year of sludges from more than 400 tanneries to a local company, Ecoespanso, as an input to produce building material.

- **SITRA** (Finland) has mapped 200 projects for industrial symbiosis in Finland, among which Kymenlaakso, where industrial symbiosis reduces e.g. CO2 emissions by 40%

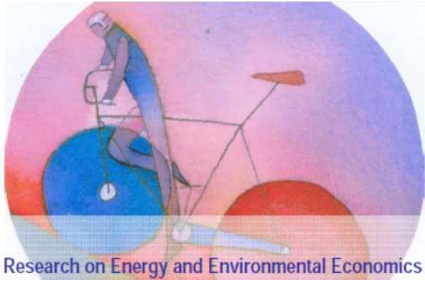


PRODUCTION

Industrial symbiosis

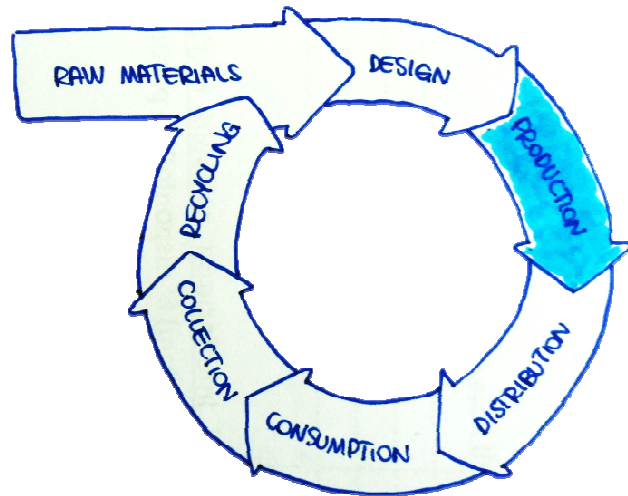


- **STI (Finland): Waste to Bioethanol: ETANOLIX**
 - Biowaste and residues of food industry as feedstock;
 - Able to utilize also packaged products: "Out of date –bread" collections from supermarkets and small bakeries in Greater Helsinki area and Lahti
 - packed and unpacked bakery products
 - raw dough not suitable
 - Enables:
 - production of bioethanol + animal feed as by-product
 - sustainable recycling
 - no added costs for customers
 - 100 tons of waste bread:
 - Produce about 25,800 liters of high-blend ethanol for transportation use;
 - Drive about 318,000 km;
 - Reduces fossil CO₂-emissions about 33,000 kg;
 - Produces about 100,000 kg of protein-feed, equivalent of annual protein need of 160 pigs.



PRODUCTION

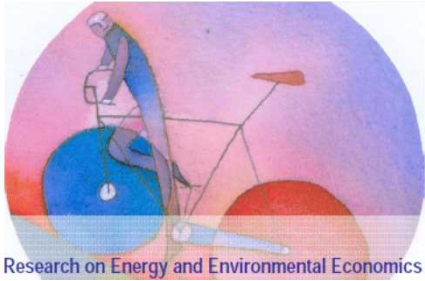
Public Private Partnership



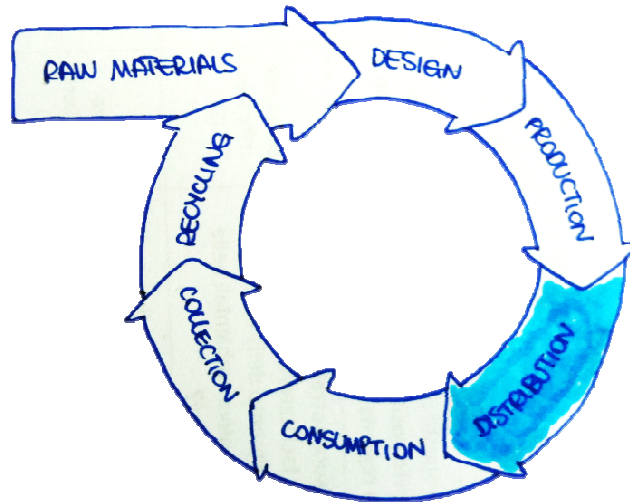
- **Life+ project LOWaste (Italy)**

- The project aims to reduce local waste production by creating **markets for recycled materials and products**.
- To “fuel” these markets, a local cluster and short chains have been created for **waste collection, transformation and valorization** purposes, by applying a virtuous model of **PPP (Public Private Partnership)**
- **Some results:**
 - 3 new authorised recovery plants
 - -241 CO2 eq. tons produced
 - -11,180 raw materials tons for new products

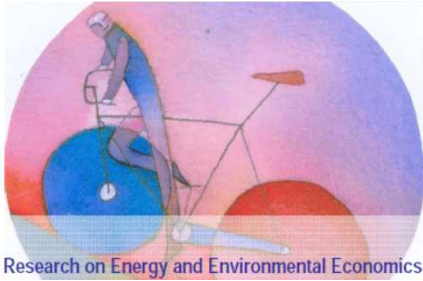




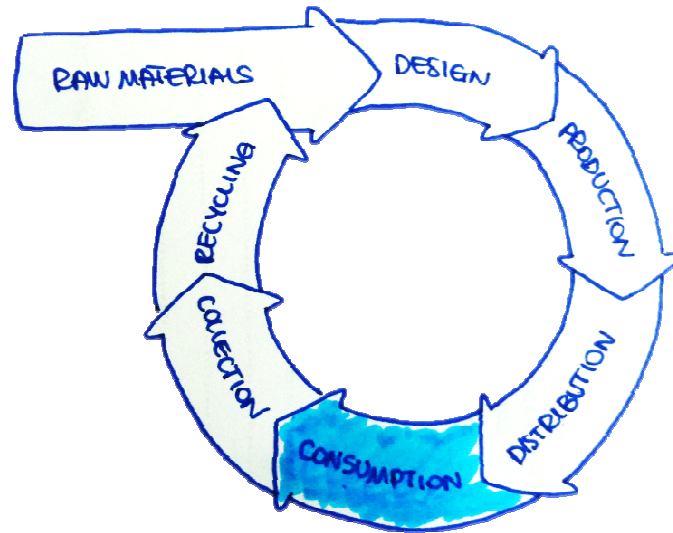
DISTRIBUTION



- **PHILIPS** - Lighting as a service.
 - Philips has a track record in the collection and recycling of lamps. For example, in the EU, Philips has a stake in 22 collection and service organizations that collect 40% of all mercury-containing lamps put on the market and with a **recycling rate greater than 95%**.
 - Philips achieves these results also thanks to a new way of **selling lighting as a service**, not as a product. In this way, Philip can reach more customers (if they retain ownership of the lighting equipment) as customers don't have to pay high upfront costs and Philips ensures the sound environmental management of end-of-life lighting equipment. It's a new way for customers to achieve their sustainability goals: **high lighting performance, high energy efficiency, and a low materials footprint**.



CONSUMPTION

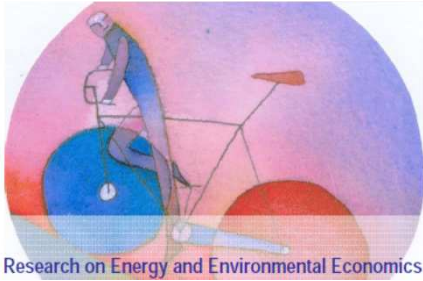


• Repair Café

- Begun in the Netherlands in 2007 and now in more than a dozen countries with approximately 400 shops, Repair Café is a nonprofit organization that brings together handy volunteers and people who would like to **fix rather than replace** their small appliances and other items. The service is free and is sponsored by local and larger businesses.

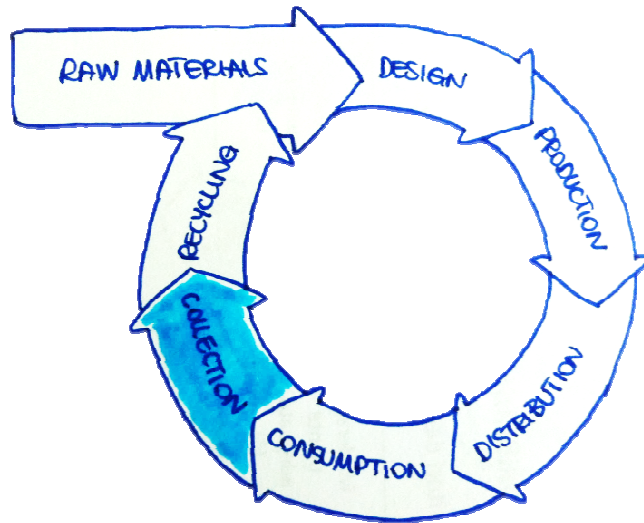


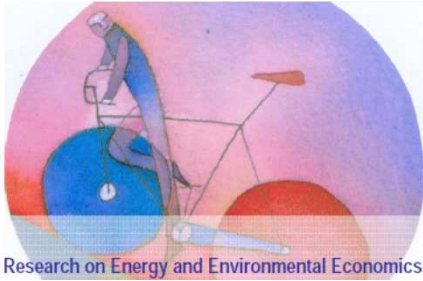
- During an eight-week promotion, Sweden's IKEA turned its Facebook page into a **digital flea market** where people could **buy and sell used IKEA furniture** every Sunday. The campaign was intended to inspire customers to live more sustainably by selling their old furnishings rather than throwing them out.



COLLECTION

- **H&M**
 - Starting in early 2013, H&M launched a global **in-store clothing collection program** to encourage customers to bring in end-of-use clothes in exchange for a voucher.
 - To manage downstream processing of the clothes H&M collects, they **collaborate with I:CO**, an apparel reverse logistics service provider, which handles the manual sorting for re-wear, reuse, recycling or energy generation.
 - Of the total clothing collected:
 - 40 to 60%: selected for marketing as re-wear—second-hand clothes that are sold worldwide;
 - 5 to 10%: reuse: these are textiles no longer suitable for wear, which are cascaded into other products, including cleaning cloths;
 - 30 to 40%: textiles that can't be reused and get a new chance as textile fibres or are used to manufacture products such as damping and insulating materials in the auto industry.
 - When these three options have been exhausted, textiles are used to produce energy.

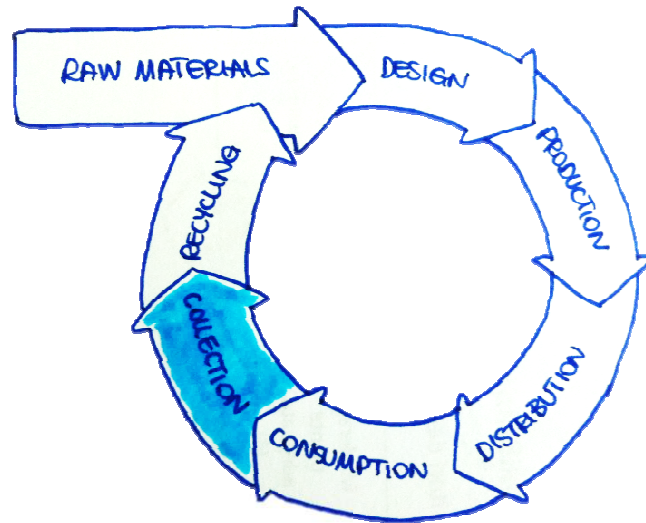




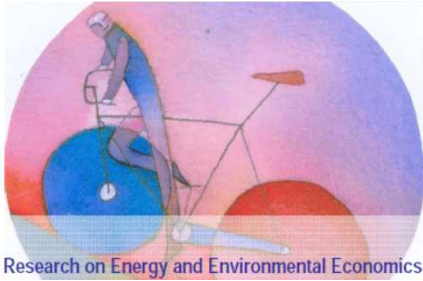
COLLECTION



ecopneus



- Ecopneus scpa is a non-profit Limited Company for the **traceability, collection, treatment and recovery of End-of-Life Tyres (ELTs)**, set up by the leading tyre manufacturers operating in Italy on the basis of art. 228 of Legislative Decree 152/2006.
- Since September 2011 more than **500K tons of ELTs (62.5M units)** have been collected and recovered by Ecopneus, that has realised sports fields, “silent” asphalts, playing areas, street furniture, energy and more.
- The system is **financed by an environmental tax** - to be paid buying a new tyre - that guarantees the correct management of end-of-life tyre. For this purpose Ecopneus has adopted an **innovative organisational model**, coordinating a national network of qualified societies, in charge of collection and delivery of ELTs to specialised centres for treatment and recovery.

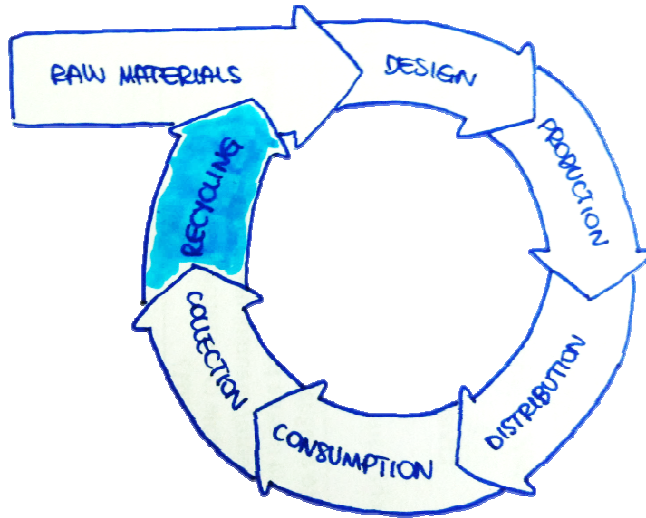


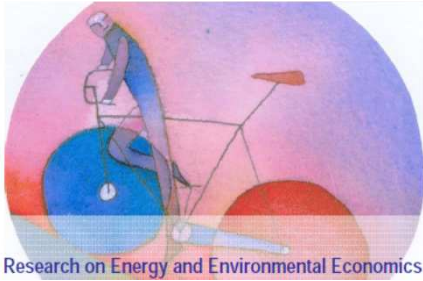
RECYCLING



- **Plasmix**

- A **co-operative project** between Revet, a company that operates for the Italian consortium for plastic recovery (Corepla), a research center (Pontech) and a user-company (Piaggio)
- **15,000 tons of lower quality and heterogeneous collected plastic waste** (plastic film, parts of toys, detergent bottles, etc.), traditionally considered non-recyclable, **to produce an innovative plastic mix**, sold to Piaggio for Vespa components



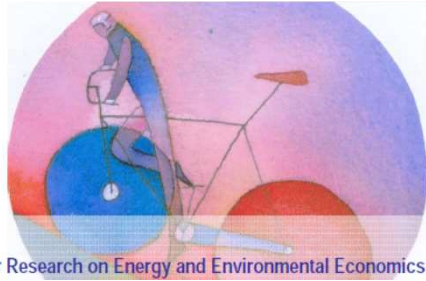


Quali lezioni possiamo trarre?

- Le aziende sviluppano soluzioni “circolari” quando hanno forti incentivi a farlo al proprio interno.
- Nel modello economico attuale, gli “auto-incentivi” sono frenati da inerzie di diverso tipo: regolamentazioni, limiti tecnologici, barriere di mercato, ecc.
- Servono incentivi esterni: il ruolo delle politiche è cruciale per superare le inerzie e sbloccare le potenzialità dell’economia circolare.

Tornando al punto di partenza, ovvero la teoria di Porter, confermata da molti studi successivi: *«**Well designed and properly crafted environmental policies** and regulations are able to trigger innovation, they produce efficiency through waste avoidance or recovery and, by doing so, they boost competitiveness that partially or more than fully offsets the cost of compliance»*



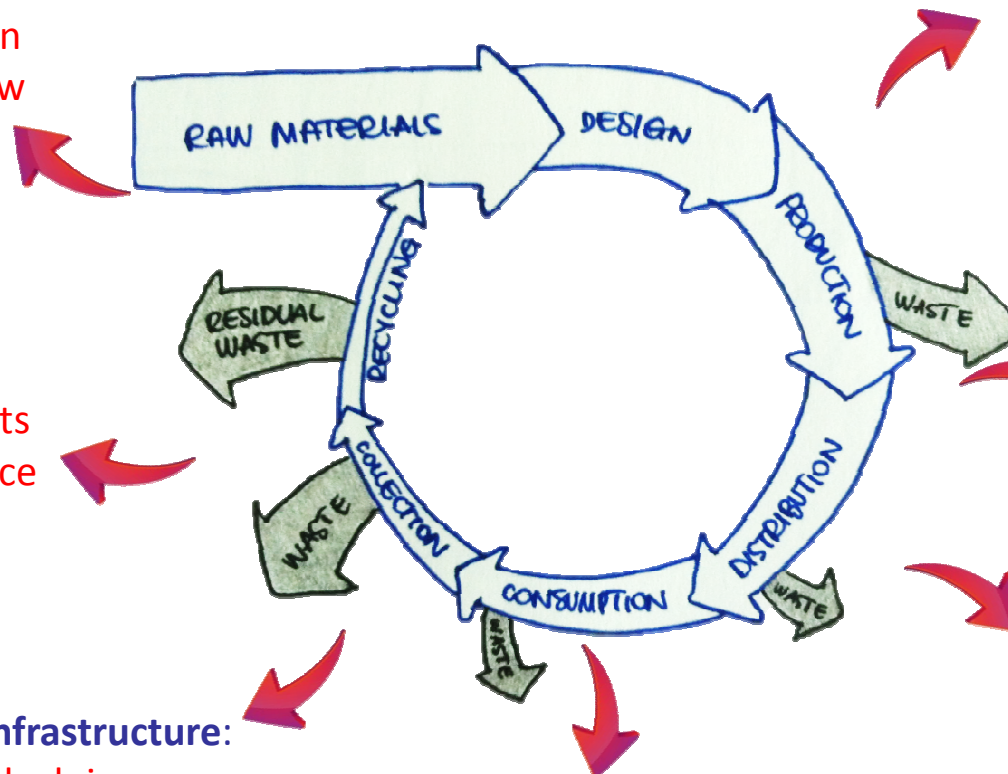


Il nostro Osservatorio ha proposto politiche che contrastino le forze centrifughe:

Rules: constraints in using secondary raw materials

Technology: limits to innovation pace

Geography and infrastructure: globalization and lock-ins, e.g. preventing reverse logistic

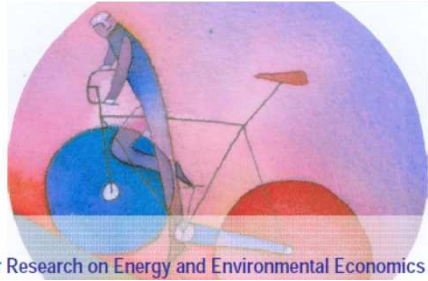


Information: asymmetries relating to environmental impact

Business priorities: emphasis on short run performance

Market barriers: price bias, lack of demand

Culture and habits: consumer behavior



Il nostro Osservatorio ha proposto politiche che contrastino le forze centrifughe:

Increase room for recycling waste, product passport,...

Rules: constraints in using secondary raw materials

Boost innovation through incentives, risk sharing, patents...

Technology: limits to innovation pace

Support covenants, PPP, virtual infrastructuring through ICT solutions,...

Geography and infrastructure: globalization and lock-ins, e.g. preventing reverse logistic

Reduce VAT for recycled products

Culture and habits: consumer behavior

Information: asymmetries relating to environmental impact

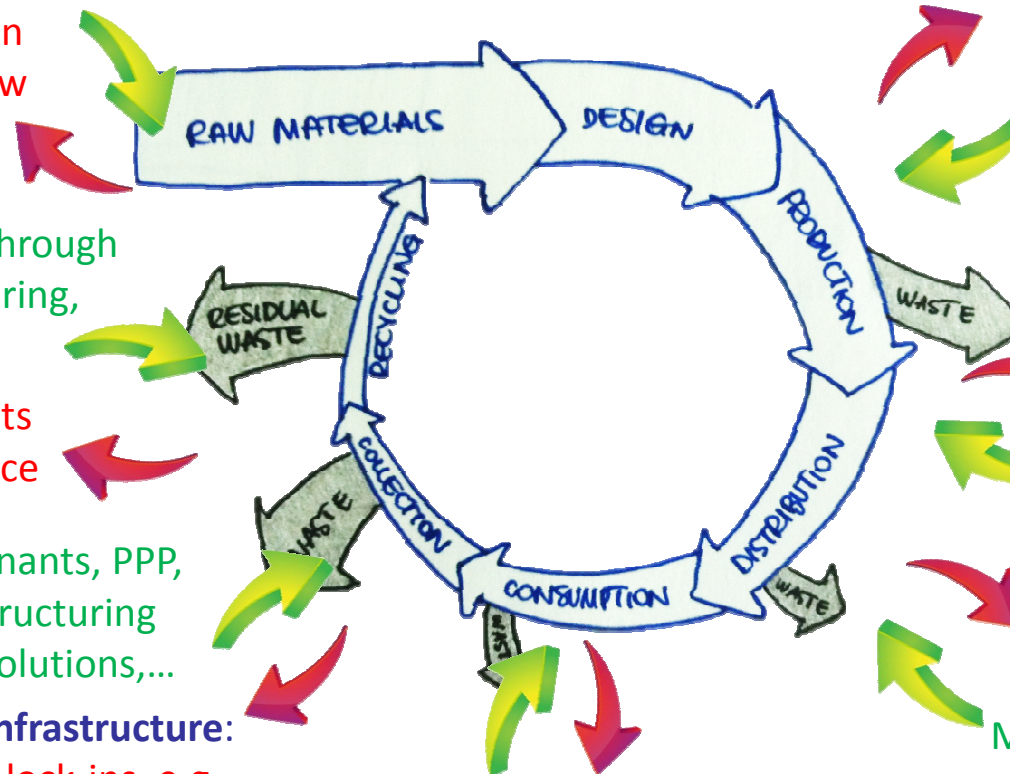
Use the EU footprint to support design and info flows in the supply chain

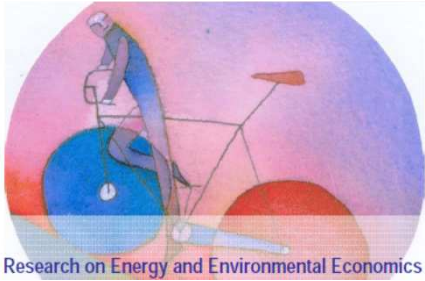
Business priorities: emphasis on short run performance

Resource efficiency (long termism) in accounting & reporting system,...

Market barriers: price bias, lack of demand

Market creation (e.g. GPP), consumer engagement, externalities in price...





Latest news from Europe

05/03

geo took part in
The 2015 European
Circular Economy
Conference, in
Bruxelles.

Karmenu Vella -
Commissioner for
Environment,
Maritime Affairs
and Fisheries

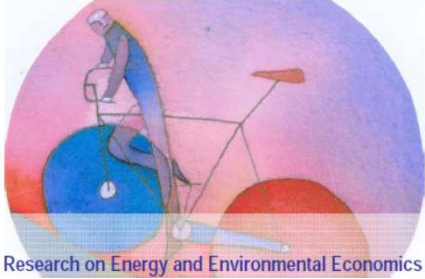


*“The Commission is aiming to present a **new, more ambitious circular economy package** late in 2015, to transform Europe into a more competitive resource-efficient economy, addressing a range of economic sectors in addition to waste.*

*The Commission, when re-tabling the package, will include a **new legislative proposal on waste targets**, taking into account the input already given to us during public consultations, and by Council and in Parliament, in particular the comments made by many that the previous waste proposal needed to be more country-specific.*

*We need a combined approach, where **smart regulation is blended with market-based instruments, innovation and incentives**. These would **provide businesses, including SMEs, with concrete tools and instruments and incentives to promote the transition to a circular economy**. [...]*





Grazie per l'attenzione

Prof. Fabio Iraldo

geo - THE **g**REEN **e**CONOMY **O**BSERVATORY

IEFE - Bocconi University, Milan

fabio.iraldo@unibocconi.it

Let's connect on LinkedIn