



ASSOLOMBARDA

Gli strumenti della LCA e l'importanza della valutazione sul ciclo di vita

Giovanni Dotelli - Professore ordinario, Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta" del Politecnico di Milano

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Etichette ambientali

- *Environmental label or declaration is a claim which indicates the environmental aspects of a product or service (ISO 14020:2000 SECOND EDITION)*



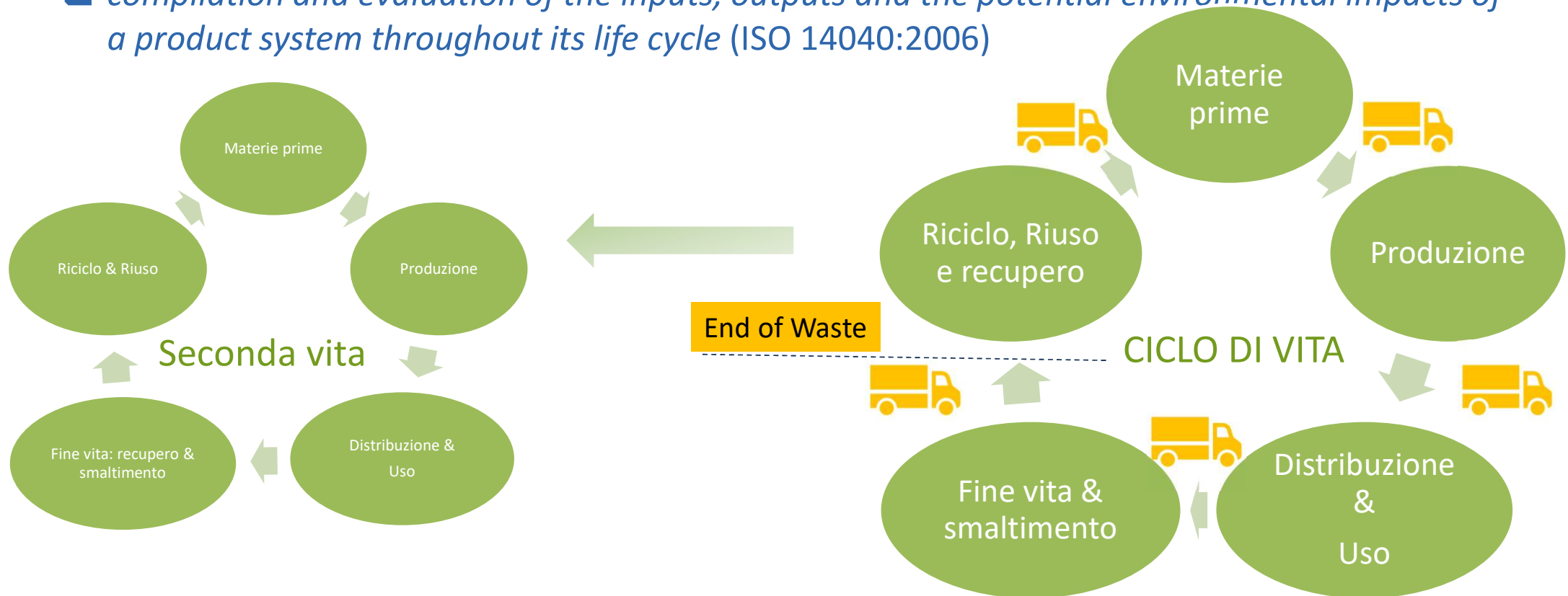
456 ecolabels in 199 paesi e 25 settori industriali



<http://www.ecolabelindex.com/>

<http://www.greenmarketing.com/blog/comments/how-to-choose-the-right-eco-label-for-your-brand/>

- *compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle (ISO 14040:2006)*



Perché una analisi di ciclo di vita (Life Cycle Assessment LCA)?

- compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle (ISO 14040:2006)*
- Metodologia quantitativa per il calcolo degli impatti ambientali potenzialmente connessi ad un prodotto, processo o servizio
- Considera tutte le fasi della vita di un prodotto
- Non permette «burden shift»
- Esistono degli standard internazionali riconosciuti che regolano la metodologia (ISO 14040:2006 e ISO 14044:2006+A1:2018)
- E' alla base delle certificazioni ambientali note come etichette di tipo III (ISO 14025:2006)

- Type I environmental labelling programme is voluntary, multiple-criteria-based third party programme that awards a license which authorizes the use of environmental labels on products indicating overall environmental preferability of a product within a particular product category based on life cycle considerations (ISO 14024:2018)*
- Ecolabels adottano una prospettiva di ciclo di vita, ma non richiedono una LCA



- EU Ecolabel
- Nordic Swan Ecolable
- Blue Angel

Dichiarazioni Ambientali di Prodotto (EPD)

- Type III environmental declaration is an environmental declaration providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information (ISO 14025:2006)*
- Si basano su una analisi di ciclo di vita
- Sono necessarie delle regole di categoria di prodotto (PCR)
- E' previsto un operatore di programma indipendente che organizza e gestisce un sistema di EPD
- Gli operatori di programma nel mondo sono parecchie decine



<https://aclca.org/pcr/program-operators/>

- Banca dati di EPD (<https://www.eco-platform.org/the-mission.html>)
- La maggioranza delle EPD disponibili è nel settore delle costruzioni
- Environdec è l'operatore di programma europeo che copre molti settori



PRODUCT CATEGORY RULES (PCR)
DATE 2019-11-08

PACKAGING
PRODUCT CATEGORY CLASSIFICATION: MULTIPLE CPC

PCR 2019:13
VERSION 1.0

VALID UNTIL: 2023-11-08



PCR NAME	PROGRAMME	REGISTRATION NUMBER
Closable flexible plastic packaging	International EPD® System	2017:05
Beverage cartons	International EPD® System	2011:04
Containers of paper and paperboard, n.e.c.	International EPD® System	2010:17
Crates for food	International EPD® System	2018:02

- *The Product Environmental Footprint (PEF) is a multi-criteria measure of the environmental performance of a good or service throughout its life cycle¹³. PEF information is produced for the overarching purpose of helping to reduce the environmental impacts of goods and services (EU, 2012)*

 Ref. Ares(2012)873782 - 17/07/2012



EUROPEAN COMMISSION
JOINT RESEARCH CENTRE

Institute for Environment and Sustainability
H08 Sustainability Assessment Unit

Product Environmental Footprint (PEF) Guide

https://ec.europa.eu/environment/eussd/smgp/PEFCR_OEFSR_en.htm

Circular Footprint Formula CFF

- *This formula is used to model at one side the recycled content of products and on the other side the end-of-life of materials, through landfill, incineration and recycling.*

The CFF is a combination of "material + energy + disposal", i.e.:

$$\text{Material } (1 - R_1)E_V + R_1 \times \left(AE_{recycled} + (1 - A)E_V \times \frac{Q_{Sin}}{Q_p} \right) + (1 - A)R_2 \times \left(E_{recyclingEoL} - E_V^* \times \frac{Q_{Sout}}{Q_P} \right)$$

$$\text{Energy } (1 - B)R_3 \times (E_{ER} - LHV \times X_{ER,heat} \times E_{SE,heat} - LHV \times X_{ER,elec} \times E_{SE,elec})$$

$$\text{Disposal } (1 - R_2 - R_3) \times E_D$$

Product Environmental Footprint Category 1 Rules Guidance 2, Version 6.3 – May 2018

- L'idea di ciclo di vita e conseguente analisi nasce alle fine degli anni '60 in USA (REPA Resource and Environmental Profile Analysis)

The idea of the complexity of environmental issues was likely first realized by the scientific community in the 1960s. However, the formal analytical scheme that was to become LCA was first conceived by Harry E. TEASLEY, Jr. in 1969. At that time, **he was managing the packaging function for The Coca-Cola Company.** Over a period of many months he visualized a study that would attempt to quantify the energy, material and environmental consequences of the entire life cycle of a package from the extraction of raw materials to disposal. At that time, The Coca-Cola Company was considering whether they should self-manu-

facture beverage cans, and was looking at a number of issues relating to package manufacture. This encompassed analysis of all issues that were pertinent to that decision, including environmental consequences of manufacture and use of packaging. In addition, the possibility of using a plastic bottle was being considered, which was a revolutionary idea at that time. Identifying the key issues relating to the use of refillable bottles as compared to disposable containers was an important part of the deliberations.

Hunt, Robert G. & Franklin, William E., LCA - How it Came about - Personal Reflections on the Origin and the Development of LCA in the USA, IJLCA (1), 1996



Imballaggi in plastica e bevande

The Coca-Cola study was never published because of its confidential content, but was used by the company in the early 1970s as an input into their many packaging and business decisions. A summary of the study was released in June 1976 to the Office of Technology Assessment of the U.S. Congress, and an article on the subject appeared in the April 9, 1976 issue of Science Magazine. No further dissemination of that study ever occurred. One of the interesting outcomes of the Coca-Cola work was that they gained a “comfort” with the idea of switching from glass to plastic bottles. Previously, plastics had a reputation as somewhat of an environmental villain, but the REPA study showed that this reputation was based upon misunderstanding.



Il secondo studio REPA

The second REPA study to be completed at MRI was sponsored by the Mobil Chemical Company. They manufactured polystyrene foam meat trays on which meat was wrapped for sale in grocery stores. The manufacturers of the competing molded pulp trays were telling their customers that the plastic trays were a serious environmental problem. The Mobil staff actually thought it was probably true, but wanted to know just how bad it really was. They commissioned a REPA to find out. Much to their surprise, and ours, the plastic tray compared quite favorably. The reason was that the foam tray was very lightweight, and used very little material as compared to the much heavier pulp tray. The Mobil people told us that the results of the study had a profound effect on morale, because their staff had assumed their product was an “environmental villain.” They were very pleased to find that there were some desirable environmental attributes to their product.



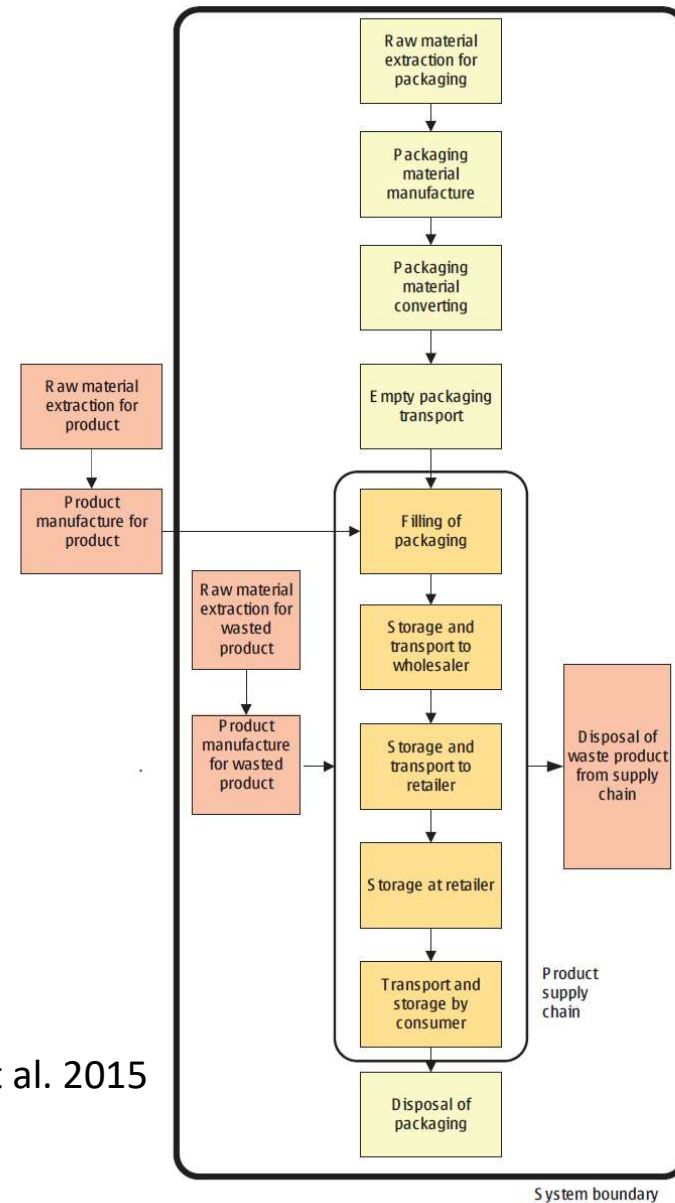
- ❑ *“Replacing nonrecyclable, lightweight flexible packaging with alternative, easy-to-recycle packaging materials may lead to adverse environmental effects. It is, however, important to note that circularity is rather a political and legal requirement for packaging producers and not per se environmentally preferable (Pauer et al., 2020, Sustainability)”*

Per valutare la sostenibilità del packaging occorre tenere in conto

- ❑ Impatti diretti causati dalla produzione e dallo smaltimento del packaging
- ❑ Impatti indiretti causati da un fallimento delle prestazioni del packaging (ad esempio perdite di cibo a causa di contaminazioni dovute ad una inefficace protezione da parte dell'imballaggio)
- ❑ Circolarità del packaging

Ciclo di vita del packaging

- ❑ La produzione del prodotto è esclusa
- ❑ Lo smaltimento del prodotto perso nella supply chain è incluso
- ❑ L'effetto del prodotto sul packaging non viene oscurato





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MILANO 1863



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dipartimento di chimica,
materiali e ingegneria chimica
"Giulio Natta"



*La gestione del fine vita degli imballaggi
Scenari tecnologici ed esempi pratici tratti dalle attuali
ricerche*

*Gli strumenti della LCA e l'importanza della valutazione sul
ciclo di vita*

Laboratorio di Materiali per l'Energia e l'Ambiente – Mat4En2

giovanni.dotelli@polimi.it