SWIM and Horizon 2020 Support Mechanism

Working for a Sustainable Mediterranean, Caring for our Future

The Life Cycle Assessment (LCA) and the Product Environmental Footprint (PEF) in tanneries

Tiberio Daddi



This Project is funded by the European Union





























LCA approach

In order to correctly evaluate the ability of a product to offer better **performances** from an environmental point of view, it is necessary to **consider ALL the impacts** it produces throughout its **entire life cycle**.





The starting point is a shared definition:

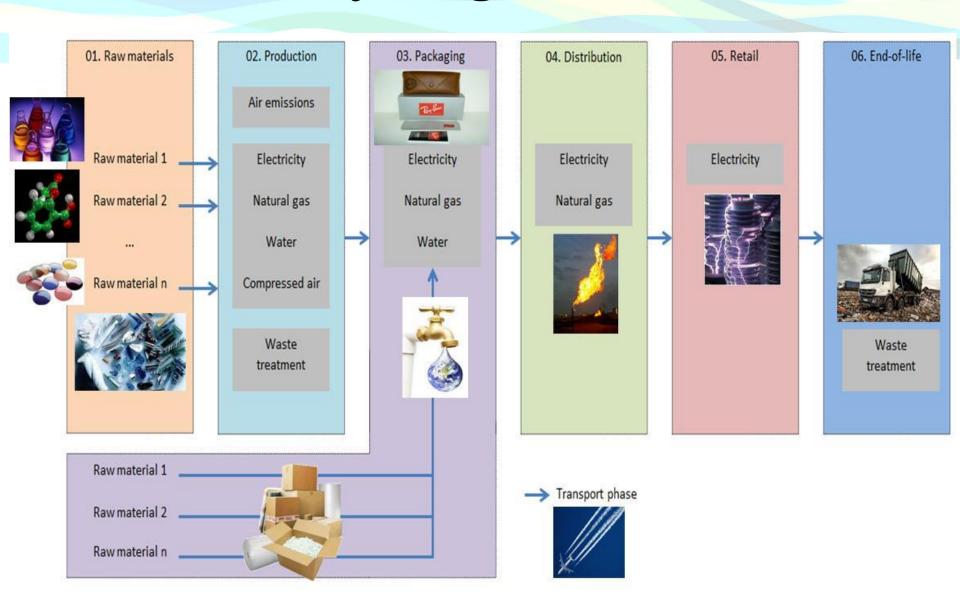
"The Environmental Footprint is a multi-criteria measure of the environmental performance of a good or a service throughout its life cycle."

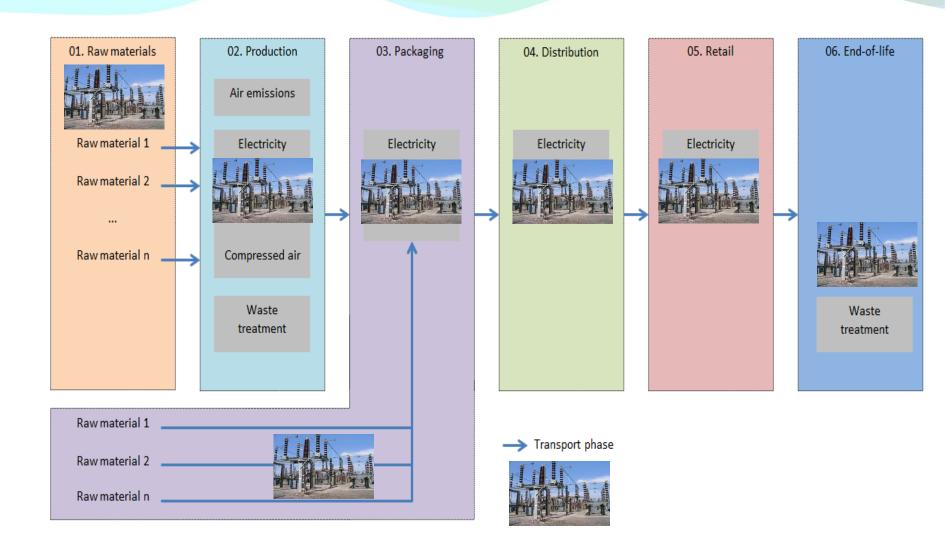


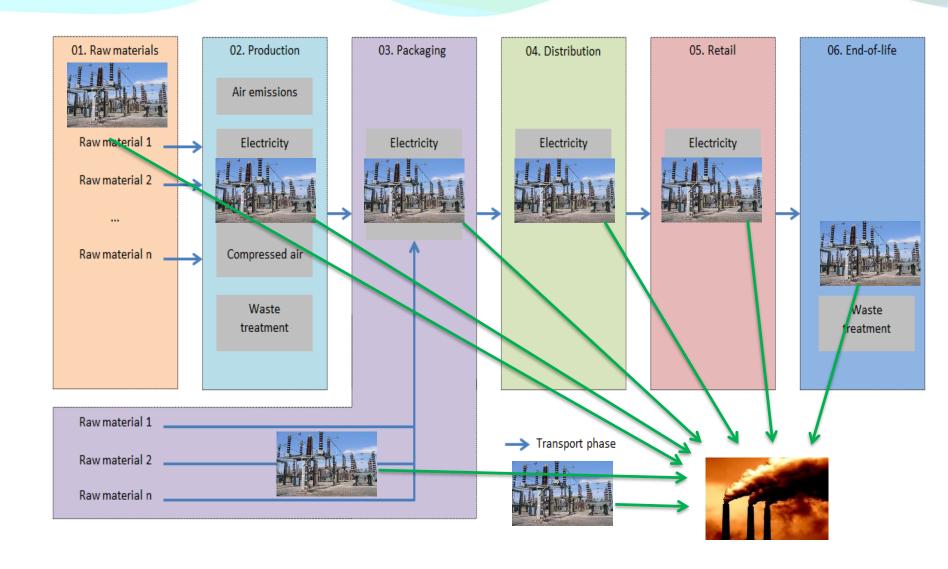
And it "is produced for the overarching purpose of seeking to reduce the environmental impacts of goods and services taking into account supply chain activities: from extraction of raw materials, through production and use, to final waste management".

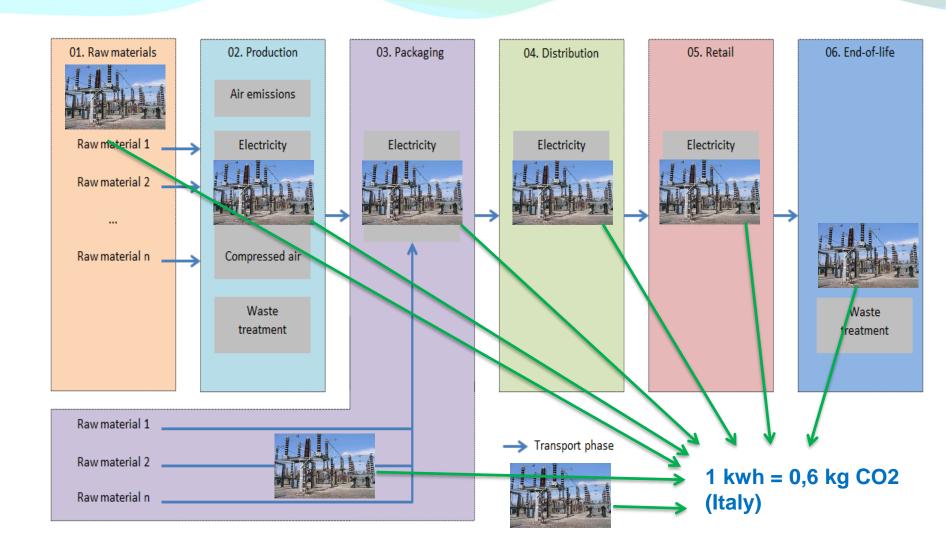
Product Environmental Footprint (PEF) Guide European Commission, JRC

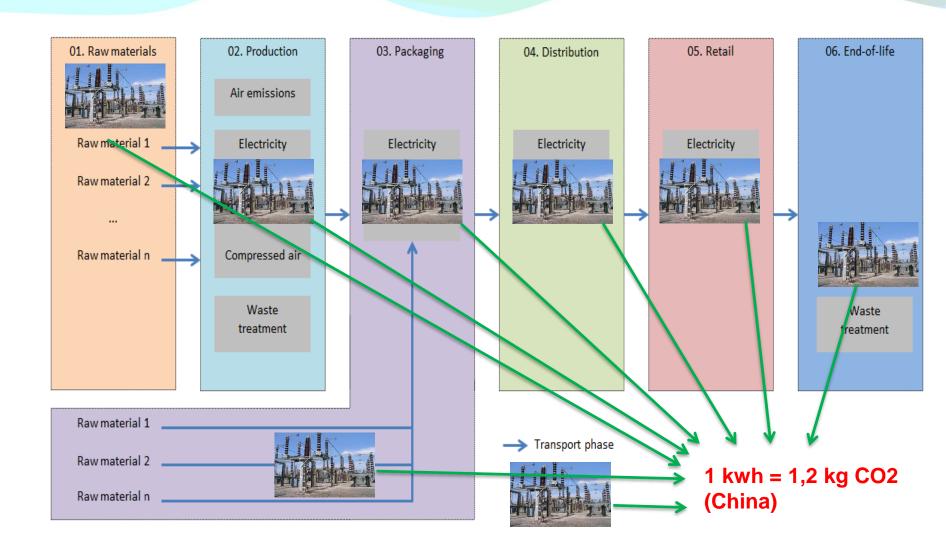
It takes "everything" into account...











The basic evolutionary steps

- 1963: Early studies known as Resource and Environmental Profile Analyses (REPA).
- 1969: First comparative multi- criteria environmental study for Coca Cola became basis for the current method for life cycle studies.
- 1991: The Society of Environmental Toxicology and Chemistry (SETAC) develops the Impact Assessment method for LCA.
- 1992: First European scheme on Ecolabels, established by the European Commission;
- 1996: International Organization for Standardization (ISO) launches first standards on Life Cycle Assessment.
- 2001: European Commission releases Green Paper on Integrated Product Policy (IPP) building on Life Cycle Thinking.
- 2002: United Nations Environment
 Programme (UNEP) / SETAC Life Cycle
 Initiative launched.

2005: European Platform on Life Cycle Assessment established at the European Commission;

2007: Start of development of International Reference Life Cycle Data System (ILCD) Handbook.

2008: European Commission launches Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan.

First public specification for carbon footprinting published (British PAS2050).

2009: ISO initiates development of first international standard for product carbon footprinting; the World Business Council for Sutainable Development (WBCSD) and the World Resources Institute (WRI) start drafting a Green House Gas (GHG) Protocol

2010: Launch of the ILCD Handbook by the European Commission.

2012: the European Commission launches the PEF methodology

The PEF – Product Environmental Footprint of EU Commission and the sensitiveness of consumers toward green products

Carbon footprint: a bit of confusion ... 150 14054 Carbon footprint Measured by: MINISTERO DELL'AMBIENTE EDELLATURE LOS ESSENDED E MURE Sustainable Cambridge Carbon Footprint IMPRONTA AMBIENTALE ZERO CARBON CARBONT

... similar situation for other product environmental footprints



The European Commission raises the problem ...



Issues raised by the Communication 196/2013:

- 1. There are **too many different methods** for calculating the same impact of the products;
- Some methods give too much discretion in the calculations leading to difficulties in comparison even between products that use the same method;
- 3. Some methods are incomplete: focused on a single environmental aspect (eg energy consumption), ignoring other potential impacts.



Bruxelles, 9.4.2013 COM(2013) 196 final

COMUNICAZIONE DELLA COMMISSIONE AL PARLAMENTO EUROPEO E AL CONSIGLIO

Costruire il mercato unico dei prodotti verdi

Migliorare le informazioni sulle prestazioni ambientali dei prodotti e delle organizzazioni

(Testo rilevante ai fini del SEE)

{SWD(2013) 111 final} {SWD(2013) 112 final}

... then proposes the solution: the PEF methodology (Product Environmental Footprint)



Recommendation 179/2013 details the method for calculating PEF in a technical annex of approximately 100 pages:

- it is based on the LCA (Life Cycle Analysis) approach;
- defines **15 different categories of environmental impact** of the products to be calculated;
- imposes minimum requirements on data quality;
- II 4.5.2013 Gazzetta ufficiale dell'Unione europea L 124/1 (Atti non legislativi) RACCOMANDAZIONI RACCOMANDAZIONE DELLA COMMISSIONE relativa a relativa all'uso di metodologie comuni per misurare e comunicare le prestazioni ambientali nel corso del ciclo di vita dei prodotti e delle organizzazioni (Testo rilevante ai fini del SEE) (2013/179/UE) LA COMMISSIONE EUROPEA, Le conclusioni del Consiglio su "Gestione sostenibile dei materiali e produzione e consumo sostenibili" del 20 dicembre 2010 (3), invitavano la Commissione a elaborare una metodologia comune per la valutazione quantitativa visto il trattato sul funzionamento dell'Unione europea, in pardegli impatti ambientali dei prodotti nel corso del loro ticolare l'articolo 191 e l'articolo 292. intero ciclo di vita, a sostegno della valutazione e dell'etichettatura dei prodotti stessi.
- defines precise instructions for **allocation of impacts**;
- refers to common rules for conducting the **verification and** certification of the PEF calculations
- Etc.

Why carry out the PEF and LCA?

- Evaluate the **environmental impacts** related to the product life cycle
- Identify the most critical areas related to the phases of the product life cycle for the identification of areas for improvement
- Provide the basis for **comparative analysis** with respect to production processes or alternative solutions on the market
- Provide scientific support for external communication and information addressed to customers, the market and stakeholders, increasing competitiveness through green marketing actions

PEF and competitiveness: companies invest in green products, but what do consumers think?

Green products and consumers

Eurobarometer survey: "European's attitudes towards the issue of sustainable consumption and production"

Sample: 26,500 European

citizens

Geographical area: 27 member

states + Croatia





Europeans' attitudes towards the issue of sustainable consumption and production

Analytical report

Fieldwork: April 2009 Publication: TBD 2009

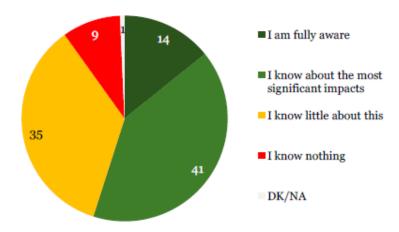
This survey was requested by the Directorate-General for the Environment and coordinated by the Directorate-General for Communication.

This document does not represent the point of view of the European Commission.

The interpretations and opinions contained in it are solely those of the authors.

Green products and consumers (1)

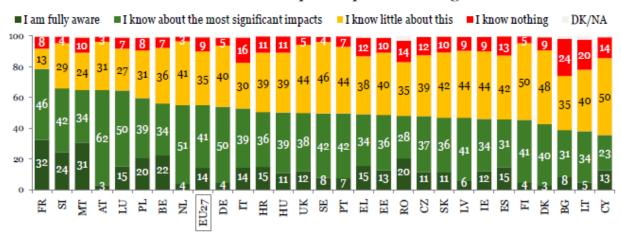
Awareness about the environmental impact of products bought or used



Q1. In general, how much do you know about the environmental impact of the products you buy and use?

Base: all respondents, % EU27

Awareness about the environmental impact of products bought or used

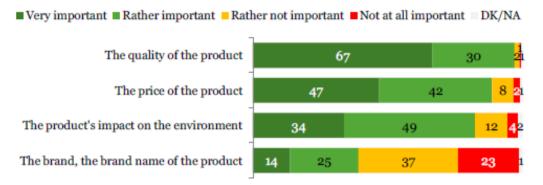


Q1. In general, how much do you know about the environmental impact of the products you buy and use?

Base: all respondents, % by country

Green products and consumers (2)

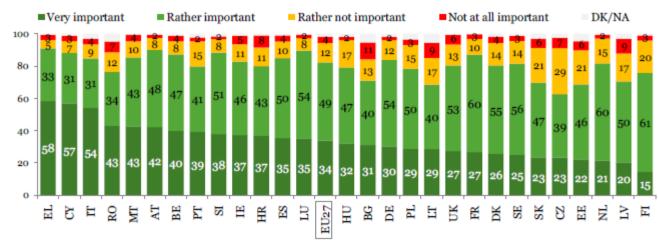
Importance of various aspects of products when deciding which ones to buy



Q2. How important are the following aspects when making a decision on which products to buy? Very important, rather important, rather not important, not at all important?

Base: all respondents, % EU27

Importance of a product's impact on the environment

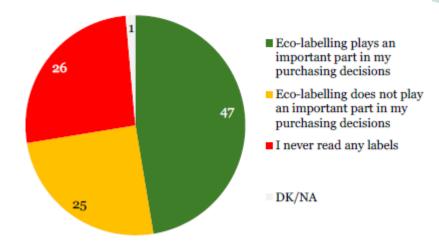


Q2. How important are the following aspects when making a decision on what products to buy? Very important, rather important, rather not important, not at all important?

Base: all respondents, % by country

Green products and consumers (3)

Importance of eco-labels in purchasing decisions



Q3. Some products have an eco-label which certifies that they are

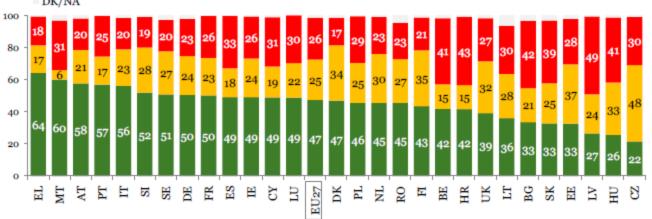
Base: all respondents, % EU27

environmentally-friendly. Which statement characterises you the best?

Importance of eco-labels in purchasing decisions

- Eco-labelling plays an important part in my purchasing decisions
- Eco-labelling does not play an important part in my purchasing decisions
- I never read any labels

DK/NA

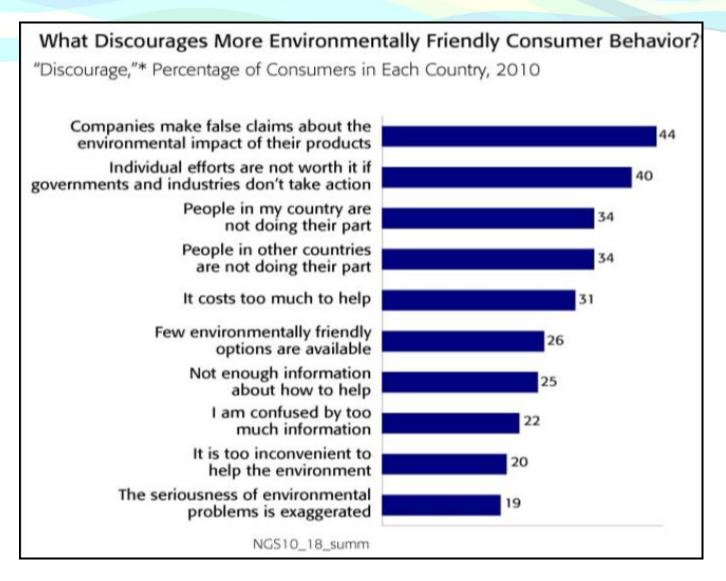


Q3. Some products have an eco-label which certifies that they are environmentally-friendly.

Which statement characterises you the best?

Base: all respondents, % by country

Green products and consumers



Source: Greendex - National Geographic

"Famous" cases of using the LCA as a tool for competitiveness



DICHIARAZIONE AMBIENTALE DI PRODOTTO (EPD)

CONVALIDATA



BIRRA Carlsberg®





international (PAP) — parented by The International (PAP) Consortium (BIC) PAP, colori- 2010 — parented from with (Ptro), Avantaurum spill-productiving (stry) hegicules 70148 (gr. (\$6.0×36.3)) Sichlanatione Anticientale di Prodomo Certificata - Numero di Registratione: 54-90312

Pagina 1 di 17













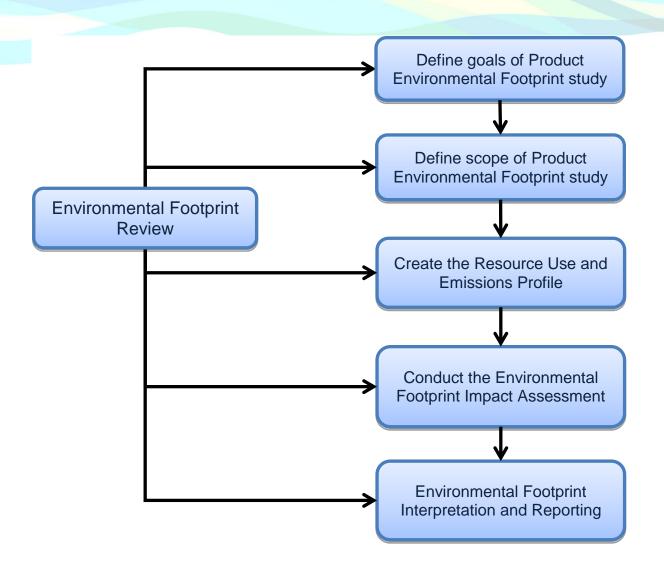
Technical phases of PEF – Product Environmental Footprint

Product Environmetal Footprint

The Product Environmental Footprint (PEF) is a multi-criteria measure of the environmental performance of a good or service throughout its life cycle.

PEF information is produced for the overarching purpose of seeking to reduce the environmental impacts of goods and services.

Phases of a PEF



Defining the goal(s)

Goal definition is the first step of a PEF study, and sets the overall context for the study.

Goal definition study shall include:

- Intended application(s);
- Reasons for carrying out the study and decision context;
- Target audience;
- Whether comparisons and/or comparative assertions are to be disclosed to the public;
- Commissioner of the study;
- Review procedure.

Example - Environmental Footprint of a T-shirt: goal definition

| Aspects | Detail |
|--|--|
| Intended application(s): | Provide product information to customer |
| Reasons for carrying out the study and decision context: | Respond to a request from a customer |
| Comparisons intended to be disclosed to the public: | No, it will be publically available but it is not intended to be used for comparisons or comparative assertions. |
| Target audience: | External technical audience, business-to-business. |
| Review: | Independent external reviewer, Mr Y |
| Commissioner of the study: | G company limited |

Defining The Scope

In defining the scope the system to be evaluated and the associated analytical specifications are described in detail.

The scope definition shall be in line with the defined goals of the study and shall include:

- •Unit of analysis (functional unit) and reference flow;
- System boundaries;
- Environmental Footprint impact categories;
- Assumptions/Limitations.

System definition (Unit of analysis and reference flow)

The term "unit of analysis" is used in PEF studies in place of the term "functional unit" used in ISO 14044 and shall be defined according to the following aspects:

- •The function(s)/service(s) provided: "what";
- ■The extent of the function or service: "how much";
- •The expected level of quality: "how well";
- •The duration/life time of the product: "how long";
- ■The NACE (Nomenclature statistique des activités économiques dans la Communauté européenne) code(s).

The reference flow is a measure of the outputs from processes in a given product system required to fulfil the function expressed by the unit of analysis. All input and output flows in the analysis quantitatively relate to the reference flow.

System definition (Unit of analysis)

Example: define functional unit of T shirt

WHAT: T shirt (average for size S, M, L) made

from polyester,

HOW MUCH: One T shirt,

HOW WELL: Wear One time per week and use

washing machine at 30 degree for

cleaning

HOW LONG: for 5 years.

System boundaries

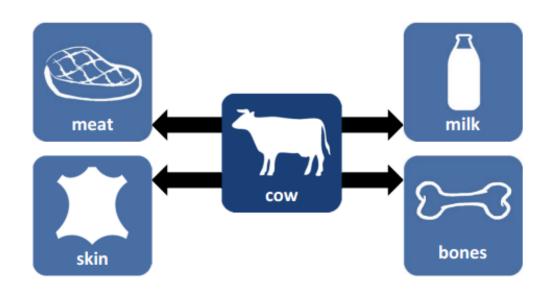
The system boundaries define which parts of the product life cycle and which associated processes belong to the analysed system (i.e. are required for carrying out its function as defined by the unit of analysis).

The system boundary shall be defined following general supply-chain logic, including all stages from raw material extraction through processing, production, distribution, storage, use stage and end-of-life treatment of the product (i.e. cradle-to-grave), as appropriate to the intended application of the study.

"cradle to grave" is the approach to be used by default.

Allocation might be needed

Physical flows, economic value, etc.



Environmental Footprint Impact Categories and Assessment Methods

The purpose of EF impact assessment is to group and aggregate the inventoried Resource Use and Emissions Profile data according to the respective contributions to each EF impact category.

This provides the necessary basis for interpretation of the EF results relative to the goals of the PEF study

•for example, identification of supply chain "hotspots" and "options" for improvement.

Environmental Footprint Impact Categories and Assessment Methods

The selection of EF impact categories should be comprehensive in the sense that they cover all relevant environmental issues related to the product supply chain of interest.

Impact categories (Racc. PEF)

| | Impact | Indicat | Description |
|----------|---|------------------|---|
| | categories | or | |
| C | limate | kg CO2 | Capacity of a greenhouse gas to influence changes in |
| c] | hanges | eq | the global mean air temperature |
| | eduction of he ozone layer | kg CFC- 11 eq | Stratospheric ozone degradation due to emissions of substances such as chlorine and bromine gases of long duration (eg CFC, HCFC, halon). |
| h ca | oxicity to umans - arcinogenic ffects | CTUh | Negative effects on the health of human beings caused by the intake of toxic substances to the extent that they are carcinogens. |
| h ca | oxicity to umans - non- arcinogenic ffects | | Negative effects on the health of human beings caused by the intake of toxic substances in so far as they are non-carcinogenic substances |
| | articulate / mog | J | Adverse effects on human health caused by particulate emissions (PM) and its precursors (NOx, SOx, NH3). |
| ra ei | onizing adiation - ffects on uman health | _ | Negative effects on human health caused by radioactive emissions. |
| O: | hotochemical zone | kg NMVOC | Ground level ozone formation caused by photochemical oxidation of volatile organic compounds (VOC) and carbon monoxide (CO) in the |

Impact categories (Racc. PEF)

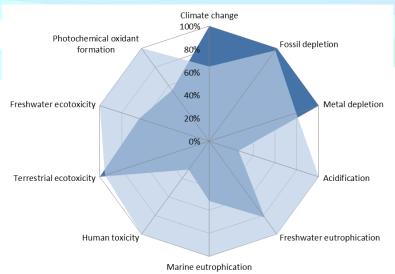
| Impact category | Indicator | Description |
|--|-----------------|---|
| Acidification | molc H+ eq | The emissions of NOx, NH3 and SOx involve the release of hydrogen ions when the gases are mineralized. Protons promote acidification of soils and waters. |
| Earth eutrophication | mol N eq | Nutrients (mainly nitrogen and phosphorus) of sewage |
| Fresh water eutrophication | kg P eq | discharges and fertilized agricultural land accelerate the growth of vegetation. The deterioration of organic |
| Marine eutrophication | kg N eq | material consumes oxygen, thus causing its deficiency. |
| Ecotoxicity of freshwater environment | CTUe | Toxic impacts on an ecosystem, which damage individual species and modify the structure and function of the ecosystem. |
| Land transformation | kg C deficit | Use and transformation of the territory with activities such as agriculture, construction of roads, houses, mines, etc. The transformation of the soil considers the extent of changes in the properties of the soil and the area affected (variations in quality multiplied by the surface). |
| Water resource depletion | m3 water eq | Use of m ³ of water connected to the local water shortage |
| Impoverishment of mineral resources, fossils | kg Sb eq | kg of antimony (Sb) equivalent |

Product Environmental Footprint reports

A PEF report consists of at least three elements:

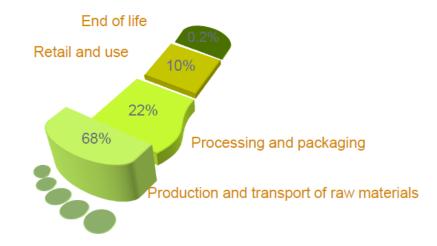
- Summary: includes main information specifying the objectives of the study, the purpose, limitations and assumptions adopted, the system under study, the data quality, the main impacts highlighted, the recommendations made and the environmental improvements identified.
- Main report: includes a detailed description of the objectives, the scope, the Resource Use and Emissions Profile, the main impacts highlighted in the phase of impact assessment and the interpretation of the PEF results.
- Annex: includes supporting elements to the main report which are of a more technical nature.

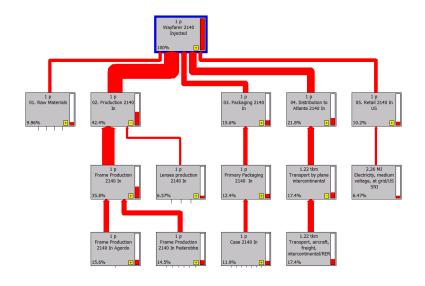
How to use and valorise the PEF





results





Example by the EC: PEF of 1 cup of coffee

FXAMPLE - RESULTS

Most important life cycle phase for a cup of coffee: USE

Most important impact categories (relevant phases along the life cycle):

- Climate change (energy use in production and use phase)
- Water use (raw material and use)
- Resource depletion (mineral, fossil)

COMMUNICATING RESULTS

Environmental impacts Water

NO PEFCR (2012)

Climate

Verified by ...

Resources

WITH PEFCR (fictitious example; possible if PEFCR available)



Performance level B



Performance level A



Performance level C



PEF: activities in the tanning sector

Example 1: Product Environmental Footprint of finished leather

The context: PREFER project and UNIC study



PREFER project

Objective: To disseminate the use of PEF and LCA in Italian industrial districts

Partners: Sant'Anna School of Advanced Studies (Capofila), Centro Tessile Cotoniero and Abbigliamento S.p.A, Consortium for the protection of Asti, Patto dell'Agro SpA, ERVET, Regione Lombardia

Times: beginning 1 October 2013, duration 38 months

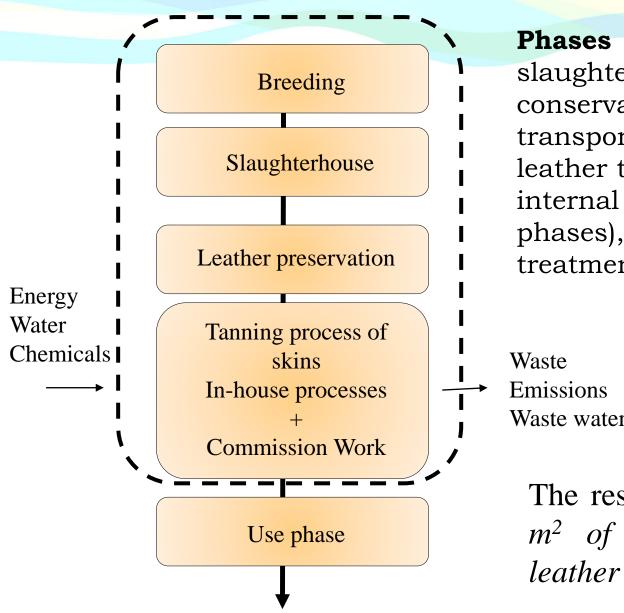
Product environmental footprint Enhanced by Regions

UNIC Stydy

Objective: it is the assessment of the environmental impacts of Italian leathers during their life cycle

Times: year 2015

The boundaries of the LCA / PEF study



Phases included: breeding, slaughter, preparation and conservation of hides, transport of raw material, leather tanning process (both internal and externalized phases), waste and waste treatment

Waste water

The results are presented for 1 m^2 of leather and 1 kg of

District and national average LCA sample

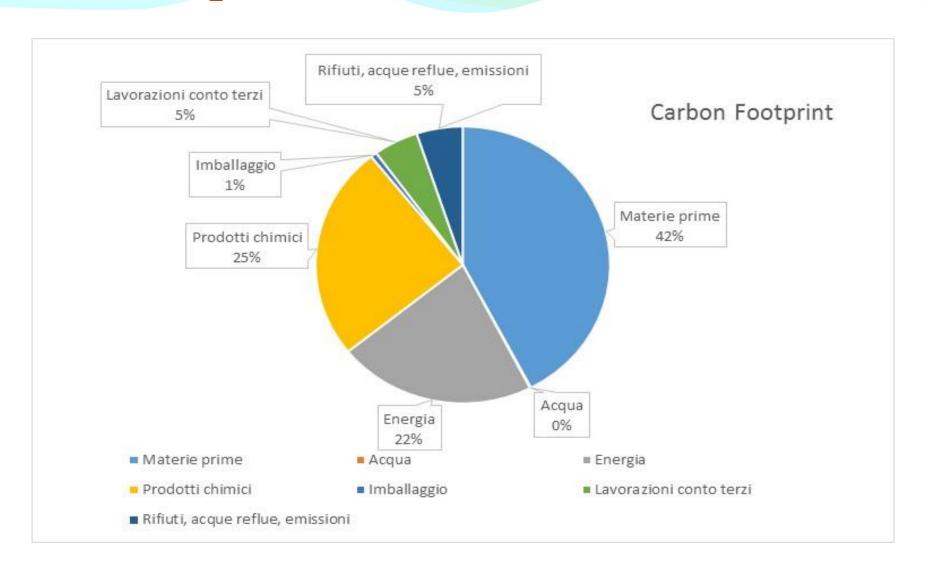
Data district S.Croce sull'Arno: 22 tanning companies for a total of 8,806,551 kg of leather (equal to 26% national production) 6,300,104 m² of leather (equal to 14% of the production of the district and to 5% of the national production)

National data: 32 companies belonging to 3 Italian regions that together produce 8,344,456 kg of leather and 16,693,207 m² of leather (12.9% of national production)

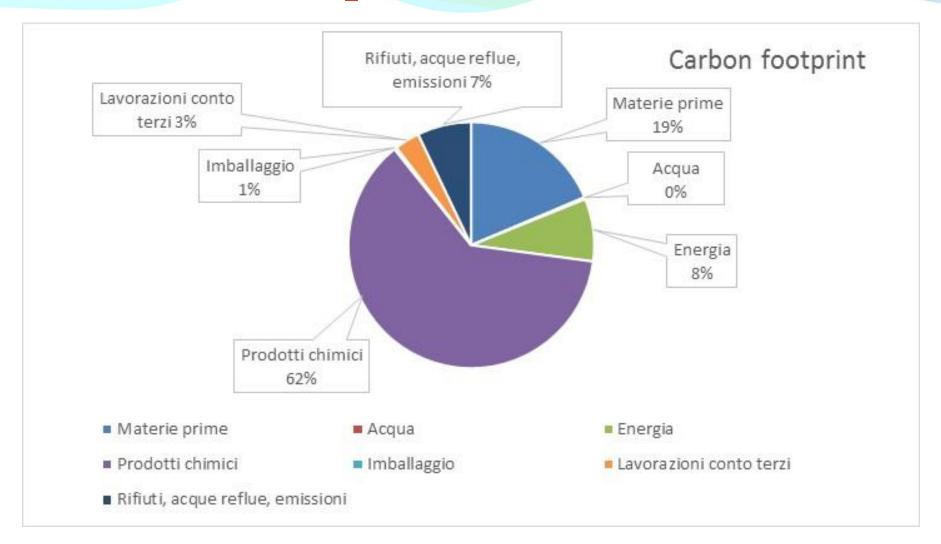
Results

| Impact category | Unit of measures | m2 of leather | | Kg of leather |
|--------------------------|---------------------|-----------------------|-----------------------|-----------------------|
| | | District | National | District |
| Carbon footprint | $kg\ CO_2\ eq$ | 20,773 | 15,587 | 10,579 |
| Water footprint | m³ water eq | 0,857 | 0,361 | 1,281 |
| Ozone layer reduction | kg CFC-11 eq | 1,09*10 ⁻⁵ | 7,36*10 ⁻⁶ | 1,82*10 ⁻⁶ |
| Aquatic eutrophication | kg P eq | 0,0048 | 0,0034 | 0,0033 |

Contributions to the Carbon Footprint of the national leather



Contributions to the Carbon Footprint of leather



Carbon footprint for final use

| Categoria | kg di CO ₂ -eq |
|---|---------------------------|
| 1 m ² of leather for clothing | 8,34 |
| 1 m ² of leather for furniture | 14 |
| 1 m ² of leather for automotive | 13,6 |
| 1 m ² of leather for footwear | 13 |
| 1 m ² of leather for leather goods | 16,7 |
| 1 m ² of leather for footwear and | |
| leather goods | 10,4 |

NB: non-representative sample!

Deepening of chemical products: the most relevant for the carbon footprint of the leather

| Acetic acid | Drum dyestuff (Coloranti di botte) - Finishing | Nitrocompounds | Sodium formate |
|--|---|---|---|
| Acetone | Dyeing auxiliaries (Impregnanti e distendenti) | Organic deliming agents | sodium ftalate |
| Acrylic resins (stucco) | EDTA (Sequestranti) | Organic filler | Sodium hydrosulphiDe (Solfidrato di sodio) |
| Aldeyds | Enzimatic Product * | Organic pigments | Sodium hydroxide |
| Aluminium salts | ethoxylated alcohol | Oxalic acid | Sodium hypochlorite |
| Ammonia | ethoxylated amine | Protein | Sodium Polyphosphate (Polifosfato di sodio) |
| Ammonium bicarbonate | Formic acid | Recovered chrome (CRC) ******** | Sodium sulfate (solfato di sodio) |
| Ammonium sulfate | Hydrochloric acid | Resins | Sodium sulfide (Solfuro di sodio) |
| Antifoam agents | Hydrogen peroxide | Resins - Finishing | Sodium sulfite |
| Antiwrinkle products (Prodotti antiruga) | Inorganic filler | Sodium acetate | Sodium thiosulfate (iposolfito di sodio) |
| Aziridine | Inorganic pigments | Sodium bicarbonate | |
| | morganic pignicitts | Sodium dicardonate | Solvents |
| Biocides | Isocyanates | Sodium bicarbonate Sodium bisulfite (bisolfito di sodio) | Solvents Sulfuric acid |
| Biocides Calcium formate | | Sodium bisulfite (bisolfito | |
| | Isocyanates | Sodium bisulfite (bisolfito di sodio) Sodium carbonate (soda | Sulfuric acid |
| Calcium formate chromium sulphate | Isocyanates Lime | Sodium bisulfite (bisolfito di sodio) Sodium carbonate (soda solvay) Sodium chloride (cloruro | Sulfuric acid syntetic fatliquors |

Deepening of chemical products: the most relevant for the leather carbon footprint

| Ammonium sulfate | Formic acid | Resins | |
|--|-------------------------|--------------------------------------|--|
| Antifoam agents | Hydrochloric acid | Resins - Finishing | |
| Antiwrinkle products (Prodotti antiruga) | Inorganic filler | Sodium bicarbonate | |
| Aziridine | Inorganic pigments | Sodium bisulfite | |
| Biocides | Isocyanates | Sodium carbonate (soda solvay) | |
| Bleaching agents | Lime | Sodium chloride (cloruro di sodio) | |
| Chemicals, average (sole leather) | Natural fatliquors | Sodium formate | |
| Drum dyestuff (Coloranti di botte) | Natural tannins | Sodium hydroxide | |
| Drum dyestuff (Coloranti di botte) - Finishing | Nitrocompounds | Sodium hypochlorite | |
| Dyeing auxiliaries (Impregnanti e distendenti) | Organic deliming agents | Sodium sulfide (Solfuro di sodio) | |
| EDTA (Sequestranti) | Organic filler | Solvents | |
| Enzimatic Product * | Oxalic acid | Sulfuric acid | |
| ethoxylated alcohol | Protein | syntetic fatliquors | |
| | | Synthetic Tannins | |

International recognition of the study on the tanning district of S Croce

Enhancing the adoption of LCA by SMEs grouped in industrial cluster: the case study of the tanning cluster in Tuscany Region (Italy)

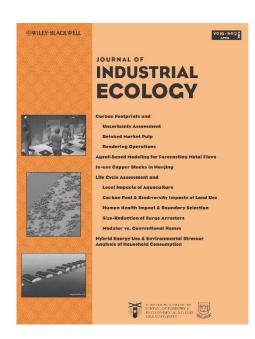
Tiberio Daddi, Benedetta Nucci, Fabio Iraldo, Francesco Testa

Sant'Anna School of Advanced Studies, Institute of Management, Piazza Martiri della Libertà 33, 56127 Pisa, Italy

Keywords: small medium enterprises (SMEs), life cycle assessment (LCA), industrial cluster, tannery sector

Abstract

Greenhouse gases emissions from small and medium enterprises (SMEs) accounts for 70% of the industrial pollution in the European Union. Anyway, due to limited economic and human resources, only a few SMEs start procedures for the evaluation of the environmental impact of processes and products adopting a life cycle assessment approach. In this work, the methodology of cluster life cycle assessment (Cluster-LCA) is suggested as an instrument for the spreading and realization of LCA analysis in clustered SMEs. This methodology is illustrated by a case study performed in the tanning cluster in Tuscany region. This methodology allows to establish a cooperative approach involving public-private partnership and the tenant SMEs. The approach aims to involve companies collectively reducing direct costs for firms, and providing shared and representative data from every



Example 2: Product Environmental Footprint of finished sole leather

Functional Unit

The functional unit adopted in the study for the calculation of the Consorzio average PEF is:

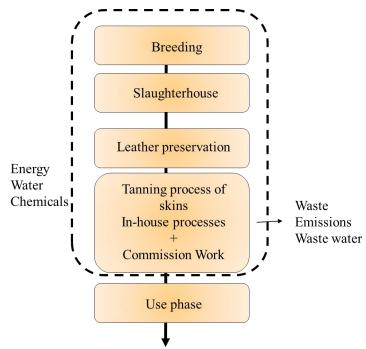
- defined in the PEFCR leather pilot;
- the unit of measure to which all the results of the PEF analysis are referred;
- represented by 1 m2 of leather sole.

The conversion factor kg / m^2 of leather was calculated for each tannery knowing the thickness ranges sold, the weight of the rump by thickness range and the average surface of a rump $(0.95m^2)$

System boundaries

The system boundaries are defined in the PEFCR leather pilot, drawn from the cradle to the gate and include the following steps:

- Production and supply of raw materials.
- Tannery activities.



Data source

The data used are those provided by the tanneries associated with the Consorzio Vero Cuoio Italiano referring to the year 2015.

8 tanneries for a total of 7.309.901 kg of leather products (corresponding to 1.692.128 m² of leather products)

Therefore primary data have been used and only in some cases has been resorted to database sources (Ecoinvent 3.2) to fill some gaps (breeding and slaughter of animals, preservation of raw hides).

Results of the PEF study (results supplied for 1m² of

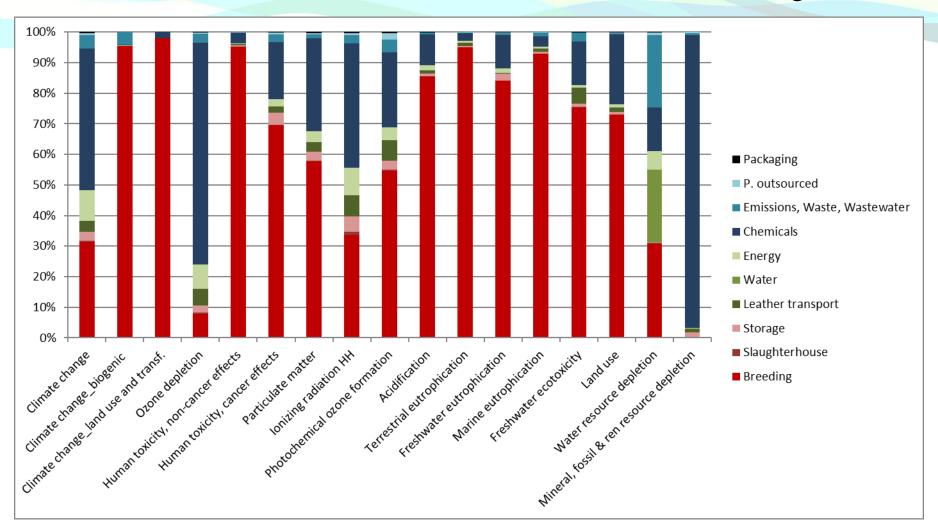
| Categoria d'impatto | Unità | Totale | Produzione e approvvigionamento pelli grezze | Processo di concia |
|--|--------------|----------|--|--------------------|
| Climate change | kg CO2 eq | 38,19 | 38% | 62% |
| Climate change_biogenic | kg CO2 eq | 17,97 | 96% | 4% |
| Climate change_land use and transformation | kg CO2 eq | 3,99 | 98% | 2% |
| Ozone depletion | kg CFC-11 eq | 4,58E-06 | 16% | 84% |
| Human toxicity, non-cancer effects | CTUh | 5,79E-05 | 96% | 4% |
| Human toxicity, cancer effects | CTUh | 5,36E-07 | 76% | 24% |
| Particulate matter | kg PM2.5 eq | 0,03 | 64% | 36% |
| Ionizing radiation HH | kBq U235 eq | 1,30 | 47% | 53% |
| Photochemical ozone formation | kg NMVOC eq | 0,16 | 65% | 35% |
| Acidification | molc H+ eq | 0,95 | 87% | 13% |
| Terrestrial eutrophication | molc N eq | 3,79 | 97% | 3% |
| Freshwater eutrophication | kg P eq | 0,01 | 87% | 13% |
| Marine eutrophication | kg N eq | 0,30 | 95% | 5% |
| Freshwater ecotoxicity | CTUe | 103,71 | 82% | 18% |
| Land use | kg C deficit | 316,64 | 75% | 25% |
| Water resource depletion | m3 water eq | 0,15 | 60% | 40% |
| Mineral, fossil & ren resource depletion | kg Sb eq | 0,01 | 3% | 97% |

Results of the PEF study

For a better interpretation, impact results were disaggregated in the following process steps:

- Animal breeding
- Animal slaughter
- Preservation of raw hides
- Raw leather transport
- Consumption of chemicals for tanning activities
- Energy consumption for tanning activities
- Water consumption for tanning activities
- Generation of waste, emissions into the atmosphere and waste water
- Outsourced processes
- Consumption of packaging materials

Results of the PEF study



Example 3: Product Environmental Footprint report of a tannery



SWIM and Horizon 2020 Support Mechanism

Working for a Sustainable Mediterranean, Caring for our Future

Thank you!

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This Project is funded by the European Union

























