Environmental LIFE CYCLE Information for Products Used Every Day in Households

INTRODUCTION

The environmental performance of different product options is of growing importance to producers, retailers, well-informed consumers, policy makers and the society as a whole. In this context, it is necessary to consider the impacts and the resources used across the full life cycle of a product: the supply chain, its use, as well as the end-of-life. This is called life cycle thinking (LCT). It is supported by approaches such as Life Cycle Assessments (LCA). Such assessments help to identify key impacts and hotspots or can be used for developing guidance tools and criteria. Such tools and criteria provide a starting point for labelling schemes or are used e.g. by product developers or buyers to distinguish between different product options.

All products have an impact on the environment. What these impacts are, at what stage of the life cycle of the product they occur, how these impacts are measured and opportunities to reduce them can be very complex issues. However, responding to these questions is essential, as the pressures on the environment increase due to our consumption and production patterns and lifestyles. Using the various available instruments can help to identify measures that really matter and provide ecological or even economic benefits.

SCOPE

The objective of this paper is to identify what is needed to support further uptake, and to encourage, a life cycle approach to products. This requires the availability and exchange of reliable and fit-for-purpose information across the whole value chain. When considering the life cycle of a product the identification of main hotspots is the prerequisite to enable manufacturers, retailers and consumers to understand and reduce their impact on the environment, economy and society along the supply chain – in the production, use and disposal (end of life) phase of products.

This paper addresses environmental life cycle information and approaches from the perspective of business to business interactions. This includes the assessment of product life cycles and the identification of criteria related to hotspots. Life cycle information also provides a key input for labelling. The forthcoming issue paper on labelling will address the issue of life cycle information in a business to consumer context.

This paper focuses on products used every day in households, both consumables such as cleaning products as well as durable items such as washing machines or televisions etc. and their packaging.

It is important that all relevant aspects of products are managed and communicated. While a life-cycle approach and product choice/comparisons ought to take into account the social, economic and environmental pillars of sustainability, this issue paper will only focus on the environmental aspects. This is in line with the objectives of the Retail Forum to focus on the environmental aspects of issues. It is noted, however, that there are approaches for life cycle costing of products. Approaches are also emerging, but need to be further refined, on how to consider social issues associated with the supply chain of products in a life cycle context.
DEFINITIONS AND TOOLS

Life cycle: Consecutive and interlinked stages of a product system. A typical life-cycle consists of the following stages:

- raw material sourcing
- ingredients processing
- product manufacturing
- packaging
- transport, distribution and storage
- consumer use
- waste disposal - end-of-life (reuse, recycling, recovery, disposal)

At each stage, there are raw materials consumed and chemicals in the form of emissions are released. These contribute to different environmental impacts and issues such as resource scarcity.

Life Cycle Thinking is the consideration of the environmental impacts and resources used throughout the life cycle of products (goods or services).

Life cycle thinking helps to identify the hotspots and areas of a product for possible improvements in the form of lower environmental impacts, reduced use of resources across all life cycle stages or trade-offs between different product options. Hotspots may occur at any stage in the life cycle ranging from the raw material extraction and conversion, then manufacturing and distribution, through to consumer use and/or consumption. It ends with re-use, recycling of materials, energy recovery and ultimate disposal.

The key aim of Life Cycle Thinking is to help decision making or make explicit any burden shifting. This means minimising impacts at one stage of the life cycle, or in a geographic region, or in a particular environmental impact category, while helping to avoid increases elsewhere. For example, saving energy during the use phase of a product, while not increasing the amount of material needed to provide it and the associated impacts of this provision.

Life Cycle Assessment (LCA) is an internationally standardised approach for assessing the contributions to environmental impacts and resources consumption associated with products (goods and services). An LCA involves four methodological phases:

1. identification of the goal and scope of the study;
2. compilation of an inventory of relevant emissions and resources used that are associated with the product/service;
3. impact assessment involving different indicators/environmental themes (climate change, acidification, human health, use of non-renewable energy etc.)
4. interpretation of the results of the inventory and impact phases in relation to the objectives of the study.

LCA has become a frequently used tool within business and government.

The goal of an LCA may vary and can include: comparison of the environmental performance of different products, as well as the identification of improvements in a product.

LCAs can be complex. They require experts to perform them. However, the findings of these LCAs about hotspots and related criteria/rules can be used to form the basis for more simplified tools for

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1 ISO 14040.: Life Cycle Assessment – Principles and Guidelines
eco-design as well as for inputs for communicating environmental information such as Environmental Product Declarations or information according to an LCA-based standard in the form of a label. More recently, LCA has been used in a more restricted context as the basis to quantify the climate change impacts associated with products and organisations in the form of carbon footprints.

**Communication Tools:** There are several ways to identify and communicate the “hotspots” and associated criteria for a product or group of similar products: the most credible being based on insights from comprehensive LCAs. In all cases, however, the methods, tools and criteria must be holistic and robust. They must consider all relevant environmental impacts and resources used.

The information from the life cycle thinking and associated approaches can be used to establish communication tools and to help communicate reliable action-relevant messages to different target groups.

**INTERNATIONAL SUPPORT AND POLICY**

**Europe**

Life-cycle information is often used in new policy discussions e.g. to support implementing measures, for impact assessments accompanying legislative proposals etc.

At an EU policy level, the issue of life-cycle thinking was highlighted in 2003 in the Commission communication on IPP (Integrated Product Policy)\(^2\). The Communication noted that Life Cycle Assessments proved to be the best method for assessing the potential environmental impacts of products, but that more consistent data and consensus regarding LCA methodologies were needed. This resulted in 2005 in the Commission establishing the European Platform on Life Cycle Assessment to promote coherence, quality-assurance and availability of life cycle information, and the official launch in 2010 of the International Reference Life Cycle Data System (ILCD) providing amongst other deliverables, a Handbook on methodological recommendations. The importance of life cycle thinking and assessment has since then been further highlighted in the Sustainable Consumption and Production (SCP) Action Plan\(^3\).

The Framework Directive on Eco-design was one of the first pieces of legislation explicitly aiming at reducing the environmental impact of products from a life cycle perspective by removing bad performers from the market, while focusing mainly on energy using products and hence the energy consumption in the use phase. This directive has now been extended to energy-related products that have an impact on energy consumption. The objective is for the least good performing products to be withdrawn from the market, by establishing minimum performance criteria.

There is also the voluntary initiative of the EU Eco-label and other national labels that may take into account the full life-cycle of products. The EU Eco-label was recently revised, strengthening the role of robust life cycle assessments in the development of the labelling criteria. At the same time, e.g. France is considering a mandatory scheme for including environmental information on all products that is based on life-cycle thinking.

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\(^2\) COM/2003/0302

\(^3\) COM(2008)397
In some cases, industry associations are developing life-cycle based schemes with data, specific tools and criteria for their product groups. They are key providers of the most relevant life cycle data and information.

Global
The framework for Life Cycle Assessment is standardised in the ISO 14040 series. Related standards are currently being developed in the context of the carbon and water footprint measurements. ISO standards are also expected to be published, in the coming years, both on eco-efficiency and social LCA. The UNEP SETAC Life Cycle Initiative is also promoting complementary global interactions e.g. the recent publication of guidelines on social LCA.

OPPORTUNITIES AND BARRIERS

Integrating the concept of life cycle thinking in decision-making is a first step towards environmental sustainability and there are already existing tools available to assist designing and purchasing decisions like LCAs and LCA-based tools/criteria.

However, it is relevant to underline the critical role of the ‘life expectancy’ of a product: an LCA based on sole standard average life expectation may provide a wrong perception of the impact of the product. Therefore uncertainties may arise due to inevitable assumptions. The influence of these uncertainties is best assessed by using sensitivity analyses. In addition, full transparency regarding the methodology, underlying assumptions and data needs to be ensured. Quality and coherence are essential. The flourishing of not fully comparable methodologies for calculating Product Carbon footprint is an example of how the presence of a diversity of approaches may become counterproductive and hinder their applicability and the achievements of the objective for which they have been conceived.

Opportunities

- Getting a better understanding of the environmental impacts of products, including identifying trade-offs between different options
- Providing a more complete assessment than when considering only parts of the supply chain or specific environmental issues.
- Better understanding the supply chains, use and end-of-life products,
- Identifying opportunities for environmental improvements of products (e.g. gaining efficiency and improving the supply chain and therefore cost savings)
- Measure and verify achievements in product improvements or innovations
- Helping decision making by allowing comparison between products or product groups
- Quantifying the environmental impacts of products and communicating them through the supply chain
- Increasing market shares/sales by achieving public procurement requirements
- Tool for marketing “quality” i.e. environmentally friendlier products
- Improving company and brand reputation
- Support companies argumentations on environmental claims or product performance

4 e.g. The European SCP Food Roundtable is an example of an entire sector where the Commission is working together with business representatives of the food/drink product supply chain as well as NGOs. The Roundtable has established a set of related principles and is now developing a methodology framework for the sector
Barriers

- Obtaining the relevant life cycle information in a practical to use form (criteria or straightforward life cycle tools for different product groups may not exist or are not robust)
- Obtaining relevant and robust life cycle information in a rapidly globalising world, where environmental performance of supply chains may not be well documented
- Conducting initial detailed comprehensive LCAs according to ISO/ILCD is in general burdensome and costly, especially if to be conducted for a large range of individual products
- Confusion among the different initiatives for non-experts (due to lack of expertise and knowledge to interpret LCAs), including relationships between different tools like LCA and carbon footprinting
- Burden on producers and inability to provide information due to potential inconsistencies among different initiatives (LCA, carbon footprinting etc.) if not strictly adopting ISO, ILCD, etc.
- Comparability of LCA is very hard to achieve, if the goals, scopes, methods and data of the studies are different
- “Quality” and reliability of the LCAs vary
- Limits of some of the tools. LCAs do not measure exposure to contaminants associated with specific emissions at given times and locations, hence they cannot be used in e.g. a legislative limits or safety context. LCAs therefore provide complementary information for decision support (a tool for making better informed decisions, not a decision-making tool!)
- Cost of carrying out full LCAs restricts their use to selected products, requiring extrapolation to others through tools/criteria for broader uses. This applies to all, but in particular SMEs. Therefore focusing on key products and developing criteria for product groups using representative LCAs especially if working together can be feasible
- Buyers along the supply chain are not sufficiently sensitised or knowledgeable about life cycle thinking or related criteria/tools to directly understand the results of LCAs or related tools/criteria
- Buyers may not have sufficient incentives to consider the life cycle performance of products
- If the LCA is mainly based on generic data for the different stages of the life-cycle and uses general assumptions e.g. on consumer behaviour or transport distances the methodology is not sufficient to compare product A with B. In this case, it can only support comparison on a product group level (e.g. laundry liquids to laundry powders but not brand A to B.
- LCAs generally focus on environmental performance. They do not necessarily consider social and economic impacts, such as social standards, etc.

CONCLUSIONS

Life cycle thinking is essential when considering the environmental performance of products. This can be supported by comprehensive assessments for a limited number of products, or more widely by using tools/criteria that build on these for broader product groups. Life cycle assessments are generally considered the most robust, comprehensive assessments of the environmental performance of a product.

Knowledge and aspects learnt from the LCA can be used by all the actors along the supply chain for improvements leading to better environmental performance improvement and probably as a basis for customer or consumer information.

There is a need to further improve the knowledge base, the public accessibility of relevant and useful information, the harmonisation of assessment methods and alignment of the different initiatives. This should preferably build on initial work of ISO or other global or European initiatives. The European
Commission supports the process through the European Platform on LCA, ILCD Handbook and Data Network). Data sharing by producers and sectorial initiatives to provide data, tools and criteria already exist and should be encouraged.

Key challenges

- Improving the overall impact on the environment without shifting one problem from one life-cycle stage to another, from one geographic region to another, from one generation to another or from one environmental medium (air, water, soil) to another. Integrating/implementing life-cycle thinking in the day-to-day business
- Making life cycle thinking and LCA derived information accessible and understandable for all relevant actors
- How to make LCAs understandable and relevant for companies and retailers and encourage their uptake
- How to make the correct assumptions regarding individual consumer behaviour in the use and end-of-life phase of a product.
- Identify the products with the most potential for improvement or highest impacts, while not being able to assess all products according to ISO/ILCD and having to rely on e.g. emerging but limited other approaches; focus on voluntary initiatives e.g. European Food SCP Roundtable
- Going from the small number of products to criteria/tools for broad product categories in a structured, multi-stakeholder, multicriteria process
- Setting up a process for the development of harmonised methodology, criteria, system-boundaries etc. per product category
- Find the most acceptable and balanced methodology: e.g. an improper choice of indicators to perform the LCA could increase the contribution to environmental impacts of one phase to the detriment of another

What can retailers do?

- Use straightforward tools/criteria to identify products with a better environmental performance
- Encourage the use of Life Cycle thinking, tools, and scientifically sound criteria when developing and designing own-brand products
- Interact with associations to provide robust life-cycle tools for different product groups
- Initiate company buyers to the concepts of Life Cycle Thinking and life cycle based criteria, tools, information
- Develop incentives for buyers to promote better environmentally performing products based on life cycle thinking and related tools/criteria
- Take-over existing scientifically sound information for own-purchasing, particularly from related business associations
- Contribute to supporting producer groups to providing studies, assessments, criteria and tools for different products and product groups of interest to retailers, working together to pool resources
- Promote life cycle thinking in corporate responsibility and quality assurance schemes

What producers can do?

- Working together to provide life cycle data, criteria and tools for products/product groups
- Encourage the use of life cycle thinking, tools and criteria when developing and designing products
- Initiate company buyers/sellers (of components, ingredients, raw materials) to the concepts of life cycle thinking and life cycle based criteria, tools, information
• Provide studies, criteria and tools for different products and product groups of interest to retailers, working together with other producers to pool resources
• Take-over existing information for own-purchasing, particularly from related business associations
• Ensure that data and life cycle information is made available down the supply chain or to public databases/directories etc. (see e.g. upcoming ILCD Data Network and European Platform on LCA Directories)
• Household appliance manufacturers propose to develop an extended product compliance scheme that goes beyond legal requirements. This tool would provide all stakeholders additional information – such as investment in durability - useful for LCA

What can policy-makers do?
• Establishment of a central public repository of high quality and consistent life cycle data, including data from suppliers all over the world. This central repository would highly enhance the application and reliability of life cycle approaches whilst reducing the related costs
• Promote voluntary government/producer initiatives to provide coherent, quality assured life cycle information for key product groups
• Promote development, improvement, availability and use of standards and recommendations for life cycle information
• Promote fiscal and pricing policies that reflect the cost of environmental impacts and resource consumption from a life cycle perspective (internalisation of external costs)
• Promote and widen the scope of e.g. eco-design legislation to remove poor environmentally performing products from the market as well as eco-label to help identify better performing products, taking into account all environmental impacts beyond energy efficiency
• Provide support, especially for SMEs (smaller and medium) companies by working with e.g. business associations to provide more LCAs, product group criteria/tools, etc.
• Further develop the one-stop shop via the European Platform on Life Cycle Assessment to help companies access scientifically sound product environmental information.
• Promote and extend Green Public Procurement, with a view to making it mandatory in the medium term
• Strengthen the coordination and synergies between instruments based on life cycle approach, such as eco-design, eco-label etc. by identifying common criteria that are applicable to different instruments as far as possible.