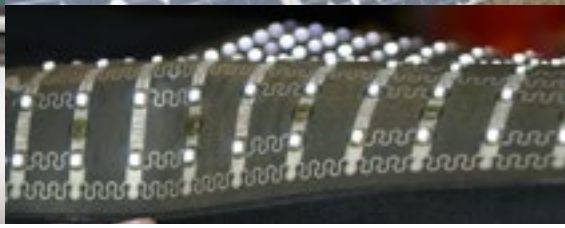
LCA to go

webtools to boost life cycle based assesment in small and medium enterprises

bio-based plastics / industrial machines / printed circuit boards
photovoltaics / sensors / electronics / smart textiles





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SEVENTH FRAMEWORK PROGRAMME

Boosting Life Cycle Assessment use in European Small and Medium-sized Enterprises

Serving the needs of Innovative Key Sectors with Smart Methods and Tools

the challenge

Life Cycle Assessment (LCA) is considered as the most advanced tool for improving the environmental performance of products. There are however barriers that reduce its implementation, especially in small and medium-sized enterprises (SMEs), such as data intensity, costs, and expertise required to run the LCA studies. Sector-specific eco-design approaches, that do not require the designer to have LCA knowledge are a way forward.

Despite the enormous efforts by the scientific community in advancing the methodology LCAs are rarely performed or used by SMEs. A breakthrough is needed in terms of complexity reduction and applicability.

project objectives

LCA to go" develops sectoral methods and tools for bio-based plastics, industrial machinery, electronics (including printed circuit boards, semiconductors and passive components), renewable energy, sensors and smart textiles. These sectors have been chosen, as the manufacturers show a high interest in communicating the environmental benefits of their products to customers, and in reducing their environmental impacts. Product Carbon Footprints (PCF) are a perfect entry point for SMEs to LCA strategies. Thus, implementation of an SME-compatible PCF methodology is a key element of LCA to go. The project has to bridge the "language gap" between the environmental terminology used in LCAs and the engineering language of product developers.

LCA to go sectors

bio-based plastics

machine tools

sensors

printed circuit boards

electronics

smart textiles

photovoltatic

methodology

As every sector is characterised by very specific needs regarding environmental assessments and data, a thorough dialogue with the SMEs on their particular interests comes first. Free webtools ("apps") will serve dedicated needs of the target sectors, addressing the specifics of the technologies and implementing parameterised models, such as calculators for energy-break-even-point of photovoltaics, Product Carbon Footprints (PCF) based on technology parameters of printed circuit boards, energy profiles for passive electronic components based on the umbrella specification approach already implemented for material data, and Key Environmental Performance Indicators (KEPIs) for smart textiles. Selected Product Category Rules will be developed to provide a robust guidance for SMEs. The web-tools will be made available as open source software, to be adapted to other sectors. The approaches will be tested in 7 sectoral case studies, involving suppliers, end-product manufacturers and engineering companies.

key objectives

1. Boosting LCA use in SME

2. Development of simplified operative methods and tools

3. Development of sector-specific eco-design and LCA approaches

4. Development of a webbased, open source toolbox

what is life cycle thinking?

All products have life cycles with interlinked stages that include supply chains, production, distribution, use and disposal. Every product has positive and negative environmental impacts along its life cycle. These environmental impacts are influenced by decisions made within each company involved in the product's lifecycle.

LCA to go uses Life Cycle Based Assessments to quantify these environmental interactions and relate them back to a company's decisions. The results from Life Cycle Based Assessments can be used to identify environmental and commercial performance improvements. These improvements can be in the form of reduced environmental pollutants, reduced energy consumption improved product quality or increased use of environmentally responsible

available support package

- A free webtool that is quickly accessible without the need to install software.
- A quick and easy life cycle based environmental assessment using easily accessible information.
- Free mentoring by LCA and bio-based plastics experts through workshops, site visits, online tutorials and online support.

bio-based plastics

a webtool to enable manufacturers of bio-based plastic products to assess the environmental performance of bio-based plastics

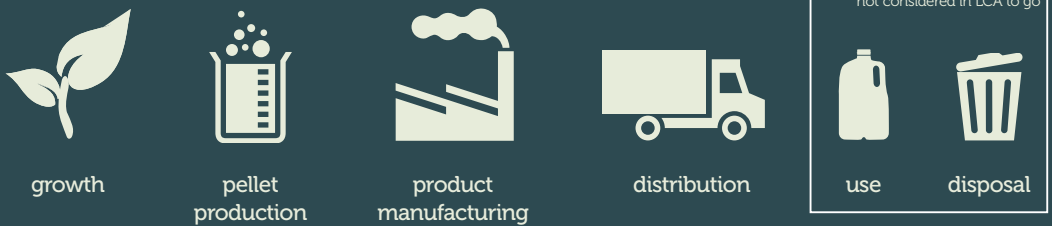
The LCA to go webtool enables manufacturers of plastic products to investigate the potential use of bio-based plastics* as a raw material. By entering design specifications into the LCA to go webtool, users are able to benchmark the environmental performance of alternative designs based on bio-based plastics. This enables users to support internal ecodesign related decision-making and inform environmental product development strategies.

The LCA to go webtool introduces users to the Key Environmental Performance Indicators of bio-based plastics. This information provides users with in-depth knowledge about the processes and life cycle phases that cause the most significant environmental impacts. This information can be used to prioritise environmental improvements when designing bio-based plastic products. The LCA to go webtool enables users to perform their own financial cost calculation for alternative bio-based plastic designs.

**Bio-based plastics are man-made or processed organic macromolecules derived from biological resources for plastic applications. Bio-based plastics can be used for certain applications as substitutes for oil-based plastic products. They can often be processed and converted into products using conventional equipment requiring minor adjustments.*

the life cycle of bio-based plastics

land use	acidification	photochemical ozone creation potential
eutrophication	carbon footprint	
water footprint	cumulative energy demand	



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machine tools

a webtool to enable machine tool manufactures to identify potential environmental improvement options

The LCA to go webtool enables machine tool designers and manufacturers to improve their products energy or resource efficiency. By entering technical and design specifications users can quantify the energy and resource consumption of the machine tools over their lifecycle. This enables users to understand the environmental impacts of their design decisions and inform them of the environmentally important life cycle stages beyond their own production facilities. This information can be used to make energy and resource saving opportunities for customers.

The LCA to go webtool highlights components that contribute significantly to the machine tool's environmental performance. Machine tool designers and producers can use this information to make better-informed design decisions, which will lead to a more efficient machine tool design. The LCA to go webtool further enhances the design process by providing additional guidelines on ecodesign as well as machine tool improvement strategies. The results of the LCA to go webtool can be used to inform customers of the environmental benefits, in particular energy savings of a machine tool.

**Machine tools are machines that shape manufacturing components in various ways. They are generally energy intensive and have long operating life spans.*

the life cycle of machine tools

cumulative energy demand	energy efficiency index	energy and material consumption

material extraction | product manufacturing | distribution | use | disposal

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sensors

a webtool to enable industrial sensor providers to quantify the environmental and financial benefits of installing a sensor system

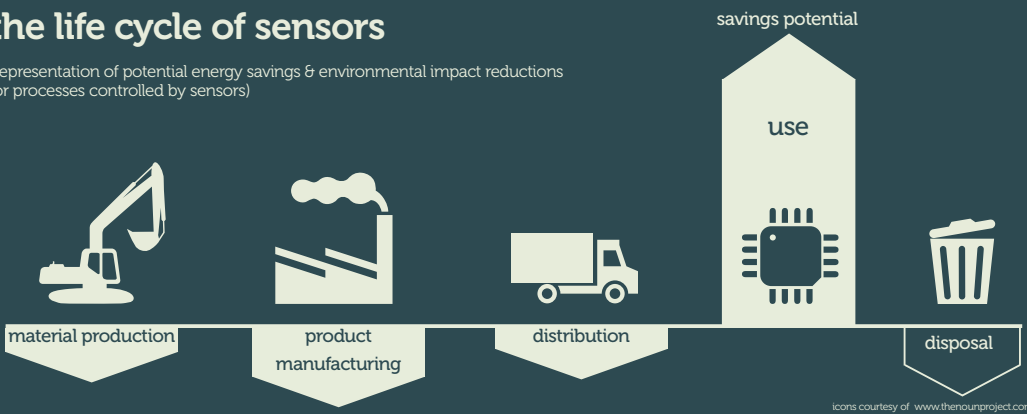
The LCA to go webtool enables sensor providers to compare the environmental performance of a non-monitored industrial system to a monitored sensor-based system. Better monitoring and control of industrial systems can lead to a reduction of downtimes, higher machining speeds, improved product quality, reduced yield losses and epitomised auxiliary dosing.

The LCA to go webtool links Overall Equipment Effectiveness to Key Environmental Performance Indicators. These Key Environmental Performance Indicators enable users to easily communicate the environmental and financial benefits of installing sensors on industrial processes. This information could be beneficial to both process operators and sensor providers.

**Industrial sensors are used in a manufacturing environment to monitor an event in any automatic processes with the intention of improving the process's performance.*

the life cycle of sensors

(representation of potential energy savings & environmental impact reductions for processes controlled by sensors)





printed circuit boards

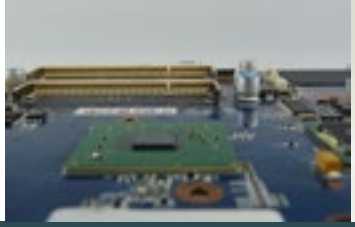
a webtool to enable designers of electronic products and producers of printed circuit boards (PCBs) to assess and improve the environmental performance of PCBs

The LCA to go webtool enables PCB* producers and electronic product designers to quantify the environmental performance of their PCBs. By entering technical performance specifications users can calculate the PCB relevant Key Environmental Performance Indicators. These Key Environmental Performance Indicators can be used to optimise the design of a PCB.

The LCA to go webtool quantifies the energy and water consumption, the carbon footprint and the amount of recyclable material contained within a PCB. This information can be shared with potential clients, be used to optimise production, increase energy savings and improve product quality. The LCA to go webtool provides users with PCB relevant RoHS compliance information, which have to be considered during the production process. (Note: RoHS relates to the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

**A PCB or Printed Wiring Board is a board that mechanically supports and electrically connects electronic components through conductive pathways manufactured onto a non-conductive substrate. It forms part of a larger electronic product.*

the life cycle of printed circuit boards



electronics

a webtool to enable designers, assemblers or producers of computer like devices to assess and communicate the environmental benefits of reliable, long-lasting products

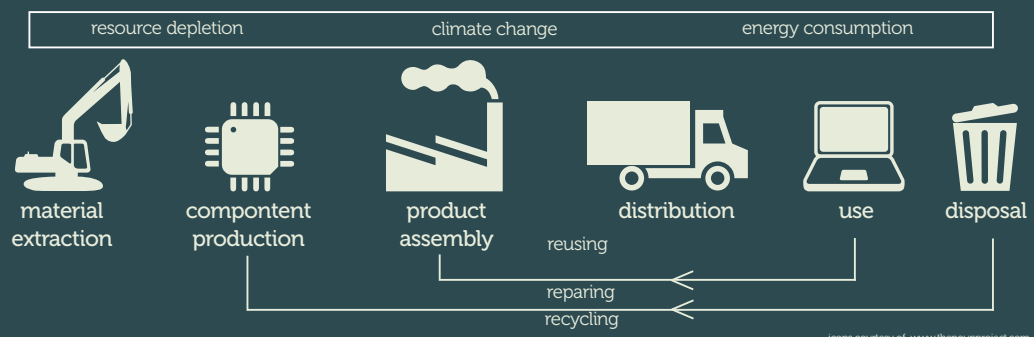
The LCA to go webtool enables the selection of environmentally optimal product specifications. By entering the technical specifications of a device's main components, users are able to perform an environmental performance assessment of a computer like device*. The LCA to go tool evaluates the options of replacing, repairing or reusing electronics compared to buying a new product. Such a comparison benchmarks the reuse concept with a conventional product.

The results of the LCA to go webtool could be used to:

- identify subassemblies with the highest environmental impacts at production
- decide the best strategy to enhance longevity, reparability or reusability for the maximum benefit of the user and the environment
- develop environmentally efficient electronic product specifications to suit customer needs
- improve the design and production of computer like electronic devices

**Computer like devices are products that mainly consist of electronic components but do not consume additional materials during use. Examples include but are not limited to desktops, laptops, servers, industrial and medical computers, LCD monitors and consumer electronics.*

the life cycle of computer like devices



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smart textiles

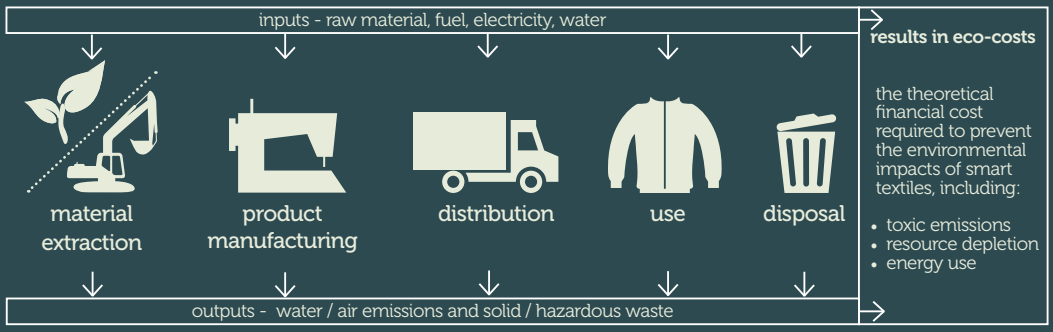
a webtool to enable designers and producers of smart textiles to assess the environmental performance of their products

The LCA to go webtool enables smart textile designers and producers to assess the environmental profiles for typical smart textile applications. These environmental profiles can be referenced at the early product design phases to direct users towards ecodesign practices. By providing the relevant technical performance data of smart textiles, users are able to gain a deeper understanding of the life cycle environmental impacts of their design decisions.

The LCA to go webtool is based upon a fast-track Life Cycle based Assessment approach. The webtool translates the environmental impacts of smart textiles into eco-costs. Eco-costs represent the amount of money theoretically required to prevent the environmental impacts of a product. This enables the environmental costs over the product's life cycle to be related to the value of the product. LCA to go users can use this insight to prioritise environmental improvements when designing smart textiles.

**In the context of LCA to go, smart textiles have been defined as textile products that are integrated with electronic components.*

the life cycle of smart textiles



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photovoltatics

a webtool to enable planners, installers or assemblers of PhotoVoltatic (PV) systems to assess and communicate to their customers the environmental benefits of their systems

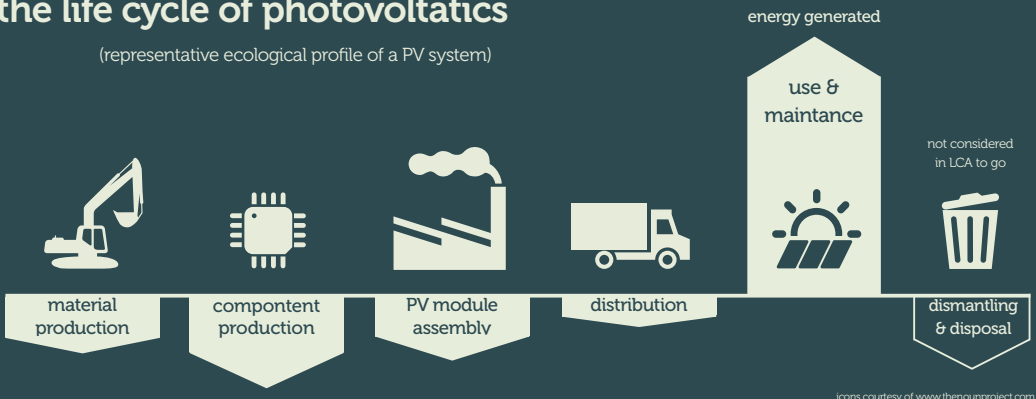
The LCA to go webtool enables planners, designers, assemblers and installers to develop environmentally and financially beneficial PV systems. By entering the energy and technical performance data of a planned PV system, users will be able to assess the environmental benefits of installing the PV system. This is achieved by weighing the impacts of production, installation and maintainence of the system against the lower carbon footprint and energy savings achieved by replacing grid electricity. The LCA to go webtool compares the environmental performance of planned PV systems against a similar generic system.

The LCA to go webtool calculates PV relevant Key Environmental Performance Indicators, which can be used to plan efficient PV systems and to choose optimal component specifications. The results from the LCA to go tool could inform potential customers about the planned PV system's environmental payback time and net energy gains.

**PV systems convert solar radiation into electrical energy using panels of solar cells made from PV materials. These PV systems can vary in size from small scale domestic to large commercial installations.*

the life cycle of photovoltatics

(representative ecological profile of a PV system)



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at a glance

Total Cost: 5.09 million Euro
EC Contribution: 3.5 million Euro
Start Date: 2011-01-01
Duration: 48 months
Instrument: FP7, Small or medium-scale focused research project
Consortium: 18 partners from 9 countries
Project Coordinator: Fraunhofer-Gesellschaft

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key words

open source tools, KEPIs, LCA, ecodesign, ecological profiles, Environmental Product Declarations

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sectors

bio-based plastics, industrial machinery, electronics, renewable energy, sensors, smart textiles

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