

## Introduction

The application of Life Cycle Approaches – including Life Cycle Assessment (LCA), eco-design and environmental labelling – is becoming an increasing reality for business, and a growing challenge in many economic sectors.

Businesses are facing increasing legal and market requirements to enhance resource efficiency and reduce the environmental impact of their products & services. To significantly address this challenge, the **Life Cycle in Practice project (LCiP - LIFE12 ENV/FR/001113)** was conceived, aiming to promote the uptake of LC approaches particularly in SMEs.

The overall aim of the LCiP project was to **help SMEs in France, Belgium, Portugal and Spain in reducing the environmental impacts of their**

**products and services across the entire Life Cycle and to foster the implementation of circular economy** in these regions. Three sectors were selected: Buildings & Construction, Waste Management and Energy Equipment.

Thirty-two businesses were involved in the four regions, twelve being located in Wallonia. GreenWin, the Walloon partner, has mandated several teams well-known for their expertise in LCA to coach them, including ULiège.



## Material & Method

ULiège-PEPs coached three SMS's to help them to carry out the Life Cycle Assessment of their product and accordingly to identify the strengths and weaknesses of the products and/or processes.

Two of them are involved in **building insulation (hemp concrete blocks by IsoHemp and Acoustix panels by Pan-terre)**, and the third one, **EcoCleaner**, is developing an **accelerated composting equipment for food waste**.

Concretely, the LCA of the three products were realized in a cradle to gate perspective. The results showed possible environmental impact improvement for all the products, even if they are eco-designed. The LCA was made according to the standards ISO 14040/44:2006 [1] [2].

Databases: Ecoinvent 3.0.1 [3] and ELCD v3.0 [4]; software: SimaPro 8.0.5.13 [5]; method: CML-IA 3.03 [6].

## Results – Discussion

### Isohemp blocks – EcoCleaner accelerated composter



Isohemp blocks and EcoCleaner system were already ecodesigned, only little improvements can be done to lower their environmental impact, except the replacement of electricity from grid by on-site photovoltaic panels for the EcoCleaner to supply the electricity necessary to operate the machine.

Anyway, LCA confirms the judicious choices for their designs.

### Pan-terre Acoustix panels



On the contrary, Acoustix panel process is quite old and can only get better.

- ▶ Complete and effective acoustic insulation solutions
- ▶ Obtained from a judicious mix of two cellulose based materials: **waste paper and flax shives**
- ▶ Paper waste (62.5%) + flax shives (37.5%) + water are mixed together without any other additive → the pulp is pressed in panels with a hydraulic press → the panels are dried in a gas oven → calibration (thickness adjustment) and cut-out (borders) to the right size → palletization with plastic foils.
- ▶ All the waste is recycled into the process, including pressing water, dust and cuts.
- ▶ LCA is made in a cradle-to-gate perspective, with a 100 years life span.

### Hot spot of the process:

The use of **natural gas for the drying of the panels** has the biggest environmental impact, especially on global warming potential (GWP100).

### Solutions:

- ▶ The substitution of the natural gas hot air generator by a **waste burning system** (textiles, paper, panel offcuts) could drastically reduces most of the impacts.
- ▶ Main businesses of the Groupe Terre (that includes Pan-terre) is the recovery of clothes/textiles and recyclable (paper, plastic, beverage carton and can, and glass).
- ▶ ⇒ Groupe Terre has **ultimate textile waste** (→ ≠ municipal incineration) in sufficient quantities to ensure its full autonomy if this option is chosen.
- ▶ Gain: 74% for abiotic depletion–fossil fuels, and even a negative tally for GWP100 due to carbon sequestration in flax (139% of reduction!) (Figure 1).
- ▶ Other possible improvements: the optimization of the drying process (recovery of heat and water), and the replacement the present press by a more powerful and continuous one (leading respectively to less residual water in the panel to be dried, and less cut-outs).
- ➔ Since the present process is 30 years old and needs to be renewed, the conclusions of this study can help the company to make the most sustainable - and economical - choice of their energy source when they design their new production line, on the basis of scientific evaluation of the environmental impacts.

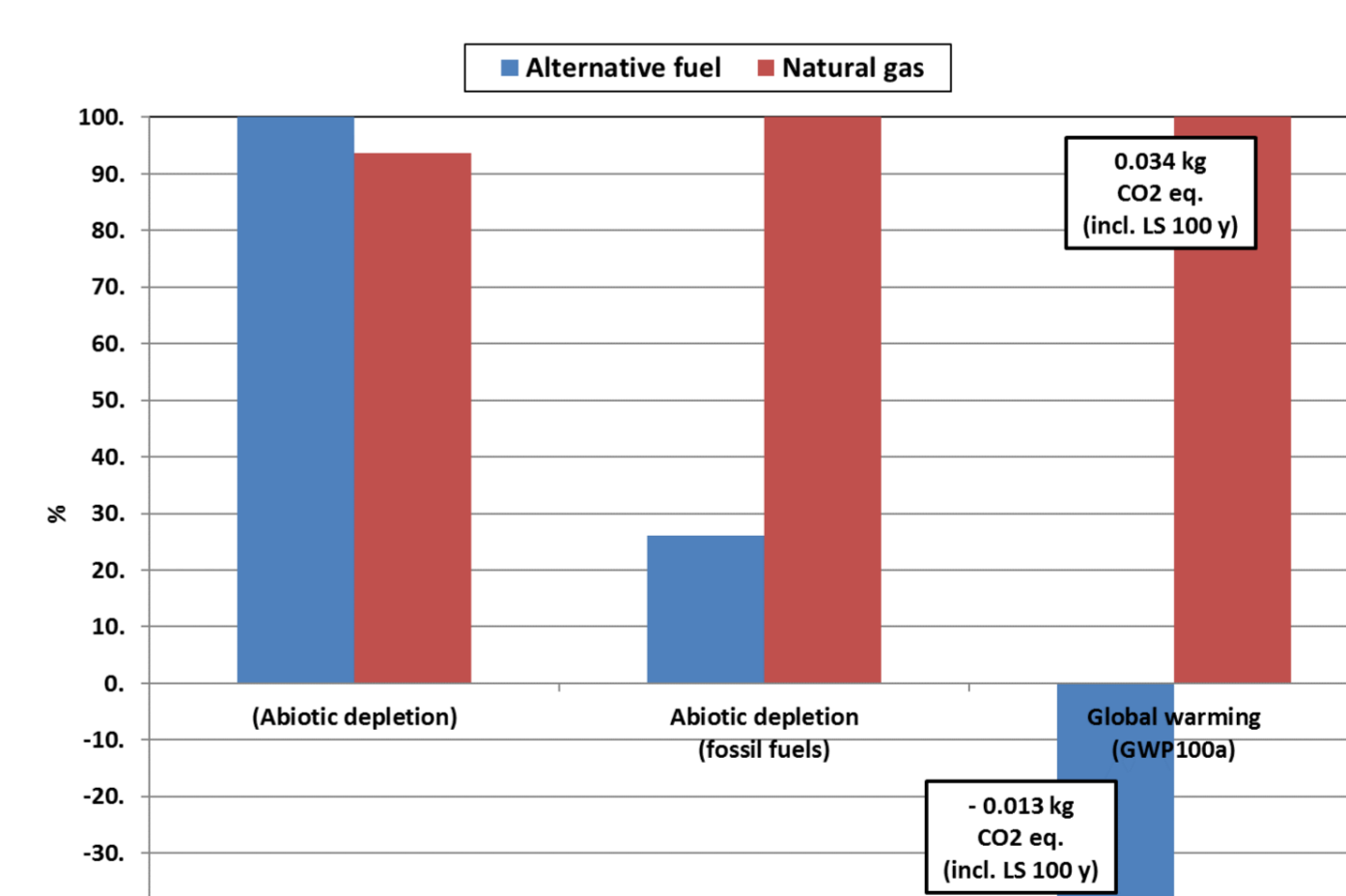


Figure 1. Comparison of the impacts in abiotic depletion, abiotic depletion (fossil fuels) and climate change categories of Acoustix panels with the use of alternative fuels (blue) compared to natural gas (red) for the drying of the panels. CML-IA method.

## Conclusions

- ▶ **Life Cycle Assessment** proves its value as a scientific tool to point out weaknesses of a process and estimate the environmental benefits that can be done by changing some parts of the manufacturing chain of a product.
- ▶ **As a coach**, the experience of working closely with highly motivated people in small structures is very gratifying and a smart way to help life cycle approaches to develop in our region. For the SMEs, it is a convenient and inexpensive way to get involved in sustainable development and life cycle thinking, together with a way to reduce costs and support sustainable choices when they want to change or evolve their process. The benefits are therefore both economical and environmental.
- ▶ For an **Environmental Product Declaration (EPD)** to be effective, the information on which it is based has to be consistent, reproducible and comparable. This is the role of the European standard EN

15804:2012+A1:2013, which requires a LCA. Most of the SMEs need to be helped in this approach as they can't afford to have internal LCA specialists.

- ▶ That's why we are pleased to go on this initiative by hosting one of the **Physical Resource Centers** in the University of Liège to welcome SMEs seeking to integrate LC approaches into their businesses, and to give them access to selected LCA tools, reading material, expertise, training and advice.
- ▶ **Results and Online Resource Center** are centralized on the LCiP website: <http://www.lifelcip.eu/>.

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### References

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