

Case Study: LIFE CYCLE ANALYSIS OF HEMP BLOCKS by ISOHEMP

Description of the company



IsoHemp develops and manufactures natural products used in building renovation and construction. Hemp blocks, the company's flagship product, are composed solely of hemp fibres and lime. They offer benefits in terms of thermal, hydraulic and acoustic regulation while remaining completely natural. They therefore have applications in new constructions with all types of frames, for external insulation, interior insulation and interior masonry.



Project team



- Séverine Coppée – GreenWin ;
- Life Cycle Champions: Aline Teillet – CoRI and Jonathan Guevorts – ValBiom ;
- Coach: Sylvie Gros Lambert – ULg-PEPs ;
- SME: Jean-Baptiste de Mahieu – ISOHEMP.

Sector



Timeline



June 2015
–
November 2015

Motivation factors



- Environmental and economic motivations:
- Decision-making support for ideas for enhancements already planned in order to improve the process ;
 - Exploring any improvement that could increase competitiveness.

Key objectives of the project



- IsoHemp would like to quantify the current manufacturing process in order to:
- Identify any improvements that could be made ;
 - Guarantee to consumers that the product has a zero environmental cost on an objective scientific basis ;
 - Establish an Environmental Product Declaration.

LC approach used in the project



- Life Cycle Analysis (LCA) according to the standards ISO 14040 and ISO 14044.
- LCA in accordance with the standard EN 15804 with a view to establishing an Environmental Product Declaration.

Short description of the project



The aim of the project was to assess the environmental impacts of the manufacturing process for hemp blocks made by IsoHemp in order to evaluate and improve the eco-design approach developed for the manufacture of this natural insulation solution. The functional unit was defined as 1 pallet of hemp blocks ready for dispatch to the customer.

Case Study: LIFE CYCLE ANALYSIS OF HEMP BLOCKS by ISOHEMP

Description of the project



A "cradle-to-gate" Life Cycle Analysis of IsoHemp hemp products was conducted in order to quantify the environmental impacts of the current process. The functional unit was defined as 1 pallet of hemp blocks ready for dispatch to the customer. A pallet of blocks is equivalent to 1.296 m³ of blocks composed of hemp fibre, hydrated lime, hydraulic lime and water. The block therefore contain no additive that could be harmful to human or to environment. A lifespan of 100 years was used in the final calculation of environmental impacts. This analysis was used to identify the stages in the life cycle of hemp blocks with the biggest impacts and to identify avenues for improvement.

Implementation challenges/ lessons learnt



Block manufacturing requires premium quality raw material inputs in order to supply customers with a product with a constant technical performance. To achieve this, there are currently only a few industrial firms that can supply raw materials suitable for block manufacture. Other local production would be positive for the global environmental balance but this product would require improvement... So is it economically and environmentally effective?

Results of the project



The environmental impact of IsoHemp hemp blocks affects mainly the categories of global warming potential over 100 years (GWP100a) and abiotic depletion (fossil fuels). The impact on the global warming category has a negative value of -1.04 kg CO₂ eq. for 1 m³ of hemp blocks (for a lifespan of 100 years). This negative value indicates long-term storage of CO₂, which is beneficial for the environment. Sequestration is linked to both the use of CO₂ for growing the hemp (photosynthesis) and carbonation of lime (hydraulic and hydrated). The abiotic depletion (fossil fuel) is mainly due to hydraulic lime and its importation from France. This product has specific properties that could however be replaced by an alternative material with a lesser impact. The replacement of French hemp with Belgian hemp has also been considered but the trials conducted by IsoHemp are not yet conclusive.

Expected impact

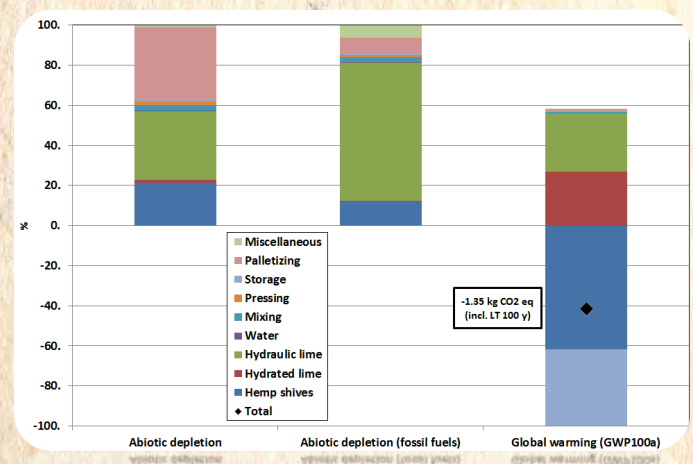


Environmental impact

The only avenue for improvement identified in this study concerned the galvanised steel corner pieces used to hold the blocks together on the pallets without degrading them. One solution would be to put a returnable deposit on them to reduce their impact by reusing them, or to replace them with thinner products, or by corners made of another material (plastic, or better still, folding cardboard).

Economic impact

An estimated saving of 1 euro/pallet in the case of replacing the current corner pieces with a less harmful alternative.



Environmental impact of a pallet of IsoHemp hemp blocks ready for dispatch – CML-IA Method.

Case Study: LIFE CYCLE ANALYSIS OF HEMP BLOCKS by ISOHEMP

Description of maturity in LC approaches before the project



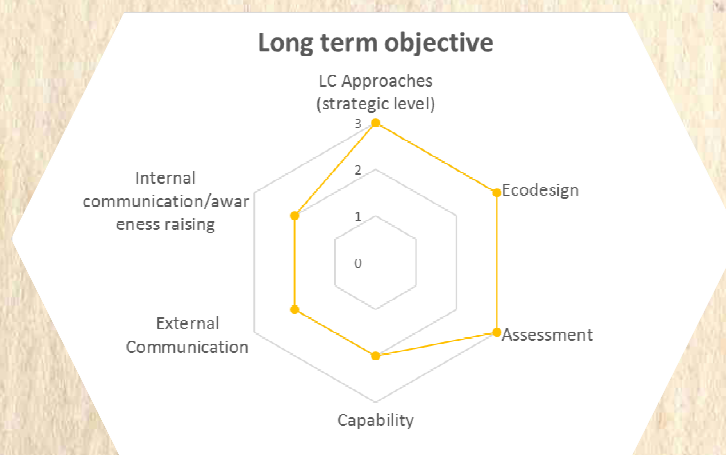
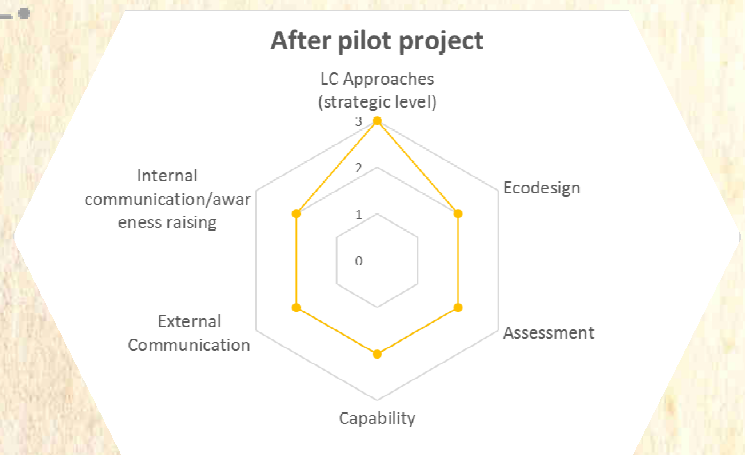
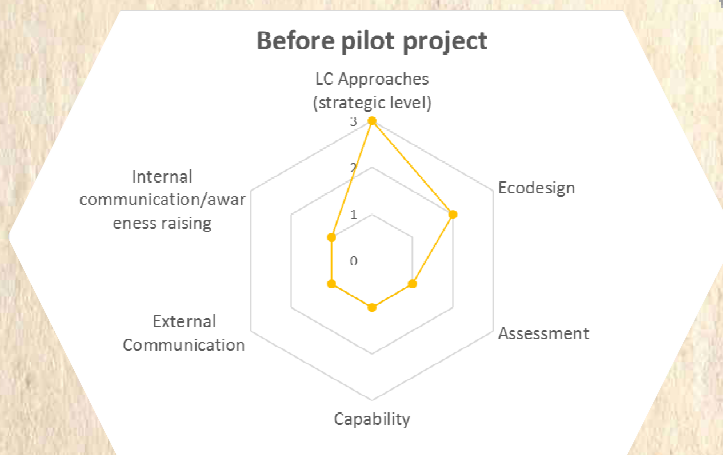
IsoHemp was already aware of Life Cycle approaches. The product and the process were initially the subject of an eco-design approach and therefore already optimised from an environmental impact standpoint, leaving little room for significant improvement.

Description of maturity in LC approaches after the project



The project raised awareness through a quantitative analysis of the process and identified the most significant impacts that IsoHemp will attempt to improve, namely the packaging of pallets of hemp blocks and, to a lesser extent, transport logistics. The company also wishes to introduce wider external communication concerning its product, notably by lodging an EPD.

Maturity and strategy



Case Study: LIFE CYCLE ANALYSIS OF HEMP BLOCKS by ISOHEMP

Economic feasibility



Using corners to replace the galvanised steel corner pieces currently used would necessitate protecting the pallets from rain. However this represents an investment of around EUR 150,000, which is too costly for the company in the short term but will be implemented over the next 2-3 years.

Evaluation of the project



The LCiP project highlighted the strengths and weaknesses of management decisions on the environmental performance of the company. These impacts are consistency directly linked to high economic costs. Although it is not possible to reduce an environmental impact with an economic impact, this provides a development opportunity, either directly for the company or for specialised researchers.

Environmental assessment

The analysis of raw data was used to objectively assess the performance and make relevant choices.

Economic assessment

The results of the analysis allow a better identification of the advantages of changes.

Social assessment

The project was used to integrate the entire team and give them a sense of involvement. No decision is made without the team that implements it.

Planned follow-up activities



The actions currently planned are:

- To set up communication linked to the environmental approach ;
- To establish an Environmental Product Declaration ;
- To make a market analysis of new corner pieces ;
- To minimise the impact of lime and hemp.

Links and contacts for further information



Jean-Baptiste de Mahieu,
Managing Director
jb@iso hemp.be
www.iso hemp.be

Sylvie Gros Lambert,
University of Liège – Chemical Engineering
s.gros lambert@ulg.ac.be
www.chimapp.ulg.ac.be

Séverine Coppée,
Project Manager
severine.coppee@greenwin.be
www.greenwin.be

LCiP project
www.lifelcip.eu



This project has been funded with support from the LIFE+ Programme of the EU. The views expressed here are purely the authors' own and the Commission cannot be held responsible for any use which may be made of the information contained herein.

