ATISOL C2C

Life cycle assessment as a tool for ecodesigning a "vapour and air barrier membrane – insulator" system, in a cradle to cradle approach

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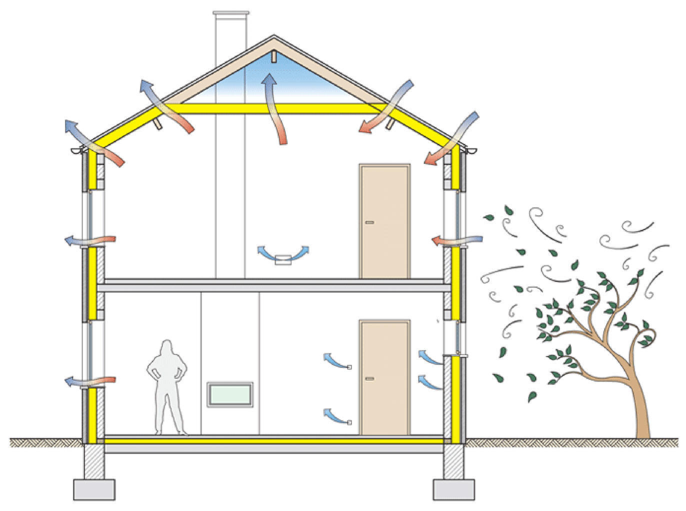


Presentation

Buildings account for 40% of the total energy consumption of the European Union. This sector is growing, as its energy demand. The construction sector is also one of the most important contributors of waste generated at the EU level (up to one third).

The European directive on the energy efficiency of buildings requires the members to put on the market solutions for insulation of buildings that are simple, effective and lasting, but also respectful of the environment and of the users.

As part of the improvement of energy performance of buildings, the **ATISOL C2C** project aims **to develop a complete solution "insulation + vapour barrier + clay finishing coating", with the lowest environmental impact on its whole life cycle.** This solution includes a **renewable and recyclable ecodesigned vapour/air barrier.** It can be used both in new construction in timber or during renovation. The constructive system will be validated in both existing buildings and new construction.

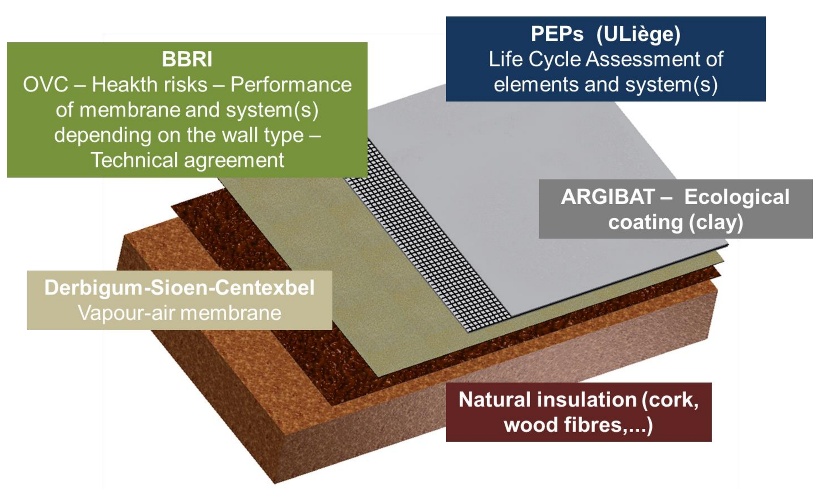
Context

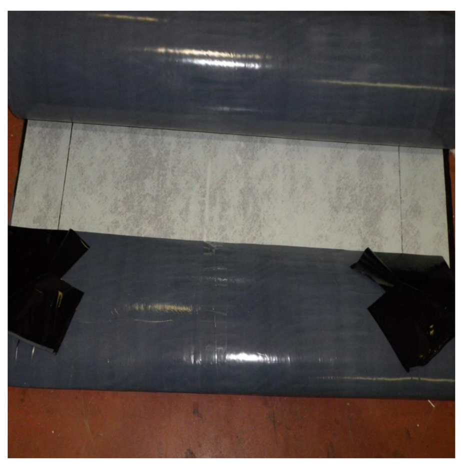
- ✓ Low energy consumption house → thermal insulation & effective ventilation
- ✓ Necessity of vapour/air barrier between insulation (cold) and inside (warm and moist) to prevent humidity consensation and mould growth
- ✓ Implementation of insulation system combined with vapour barriers presents 3 major problems:
  - important time for placing
  - random durability in time (tapes junction, adhesion to wall,...)
  - low disassembly and re-use level
- ✓ Market:
  - Renovation: Belgium 3 Mm² - France 40 Mm²
  - New wood constructions: Belgium 3 Mm² - France 25 Mm²

ATISOL C2C response

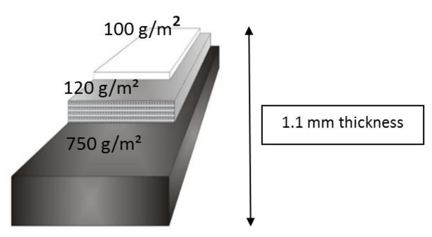
- ✓ Simplicity in terms of materials: integration of a vegetal self-adhesive binder to the spunbond reinforcement of the membrane (from renewable resources)
- ✓ Application on different wall coverings
- ✓ Easier implementation due to self-adhesive characteristics both on common surfaces (walls, roofs, ceilings) and to the level of details such as corners or junctions
- ✓ The offer is completed by a natural top coating (e.g. clay coating)
- ✓ Dismantling at the end-of-life of the building and recovering of the various elements with valuation in a cradle-to-cradle perspective
- ✓ Starting point/reference: **Derbiskin® → optimisation of formulation, design, reinforcing spunbond support, characteristics, and environmental impacts**

Project objectives ≤ 2.5 €/m²

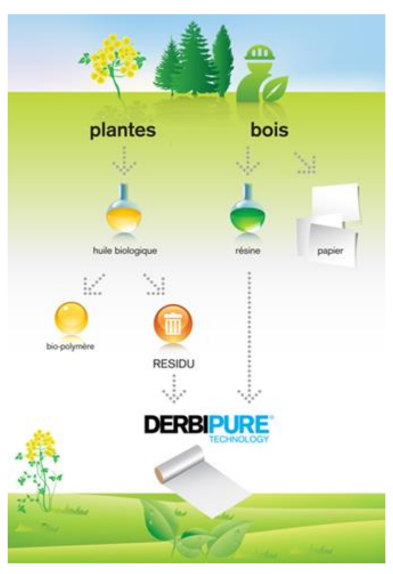




State of the art (after 18 months) ⇒ *in progress*

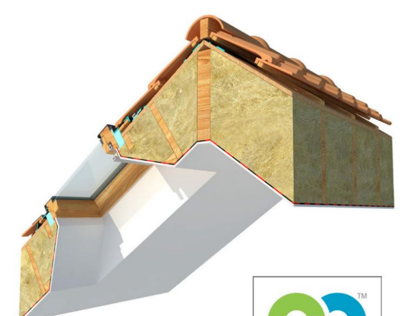


- ✓ Total thickness: 1.1 mm ⇒ *final goal: 1 mm*
- ✓ **Membrane:**
  - polyester spunbond reinforcing support
    ⇒ *to be replaced by renewable raw matter*
    ⇒ *reinforcing support processing*
  - self-adhesive binder based on vegetal oil →
    ⇒ *improvement of the formula, characterisation, adhesive properties,...*
  - ⇒ *membrane processing and properties (tightness, adhesion,...)*
    → acrylic coating is unnecessary!
  - ⇒ *coating application and resistance tests*
  - Data collection for LCA ⇒ *inventory and LCA*



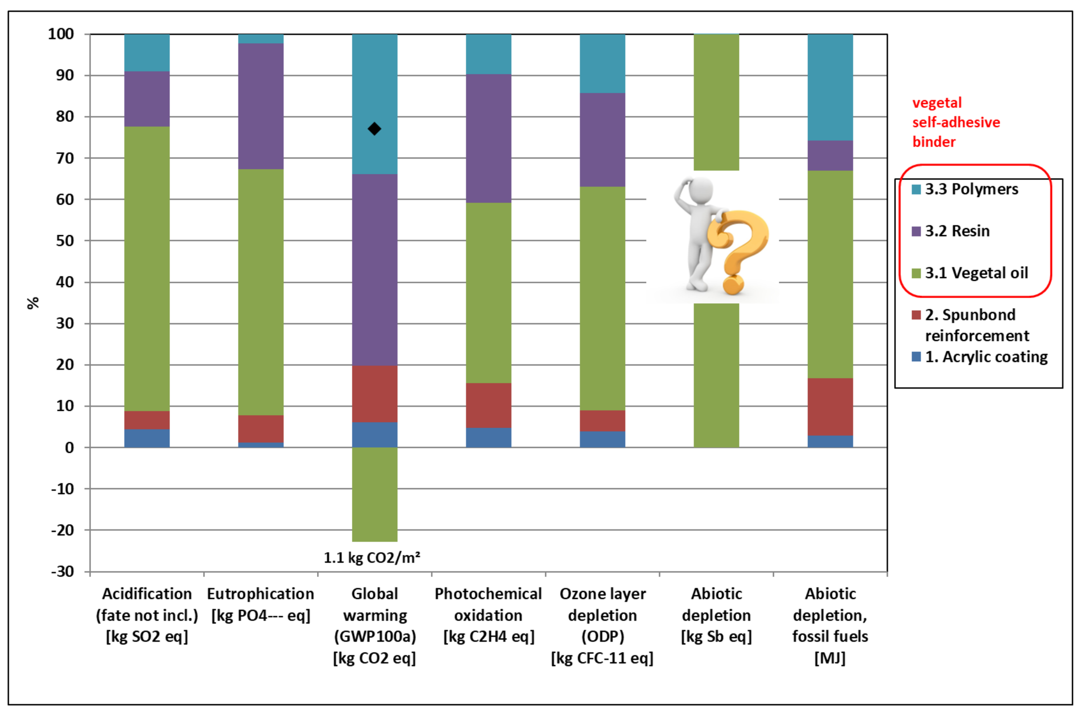
Properties of Derbiskin®

- ✓ Self-adhesive vegetal blend reinforced by a coated non-woven polyester
- ✓ Durability of performances and suitable for the whole envelope of the building - thanks to the unique Derbigum Technology (adapted evolution for indoor application of the patented vegetal waterproofing Derbipure®)
- ✓ Quick and simple application due to self-adhesiveness and conception
- ✓ Reduced costs (1 product for all applications – no tapes)
- ✓ Self-repairing (e.g. nail or staples holes)
- ✓ Can be used on any support
- ✓ Can be directly plastered (clay finishing and skim coating)
- ✓ Sustainable, C2C certified and 100% recyclable



First LCA Results

- ✓ Preliminary LCA
- ✓ Only raw materials + transport to production site (no processing)
- ✓ CO_2 sequestration by vegetal oil [1]
- ✓ Characterisation: FU = 1 m² EPD (2013) v. 1.03 Simapro 8.4 & EI 3.3



Project and Partnership

- ✓ **4 years project** - started on September 1st 2016, ~2.7 M€
- ✓ **2 phases**
  - 25 months Industrial Research → **GO**/NO GO
  - 23 months Experimental Development
- ✓ **Industrial Research: optimisation of Derbiskin®**

WP0 & WP12 – Coordination & Communication: Derbigum
WP1 - Membrane design: Derbigum, Centexbel, BBRI, ULiège-PEPs
WP2 - Renewable spunbond reinforcing support: Sioen
WP3 - Life cycle assessment: ULiège-PEPs
WP4 - Self-adhesive binder: Derbigum, BBRI, ULiège-PEPs
WP5 - Lab scale membrane processing: Centexbel
WP6 - Characterisation: BBRI

- ✓ **Funded by The Walloon Region and supported by GreenWin**

[1] Cashman SA, Moran KM, Gaglione AG (2015) Greenhouse Gas and Energy Life Cycle Assessment of Pine Chemicals Derived from Crude Tall Oil and Their Substitutes. J Ind Ecol 20: . doi: 10.1111/jiec.12370