

Circular Wallonia -Textile value chain: feedback on raising awareness of LCA in the Belgian textile industry

Dr Ir Sylvie Groslambert
Prof Angélique Léonard
s.groslambert@uliege.be

Context



Circular Wallonia
The circular economy in Wallonia



- ▶ <https://economiecirculaire.wallonie.be/circular-economy>
- ▶ 6 Priority value chains
- ▶ **Textiles: Assessment of the environmental impact in the Walloon textile and plastics industry**
 - ▶ 2 Webinars by Centexbel (Belgian competence centre for the textile and plastics industries)
 - ▶ Training - ULiège : Module 1 (1 day) : Awareness-raising
 - ▶ Training - ULiège : Module 2 (2 days) : LCA in practice



1 Day of awareness-raising

- ▶ Module 1 – Awareness-raising (28.08.2025)
 - ▶ An Introduction to Environmental Impact Assessment
 - ▶ Environmental communication
- ▶ Participation
 - ▶ **22** registered participants / **12** people present
 - ▶ ? **Motivation** for a **free** training day ?
 - ▶ catering, lunch, room, ...
 - ▶ ⇒ "Responsibility" for a symbolic fee



Circular Wallonia – Chaîne de valeurs TEXTILES Formations Impact Environnemental



MODULE 1 : Introduction à l'évaluation de l'impact environnemental & Communication environnementale

MODULE 2 : ACV dans la pratique

- ▶ Module 2 – LCA in practice (4 & 11.09.2025)
 - ▶ Theoretical introduction to LCA
 - ▶ Introduction to the use of SimaPro
 - ▶ Practical exercises, presentation of results from a case study (comparative LCA of a t-shirt)
 - ▶ Cutting: steps 1–2 and 3–4 (theory and practice)



The ecoinvent logo, consisting of the word "ecoinvent" in a bold, sans-serif font, with a stylized circular icon containing diagonal lines between the "o" and "i".

► Participation:

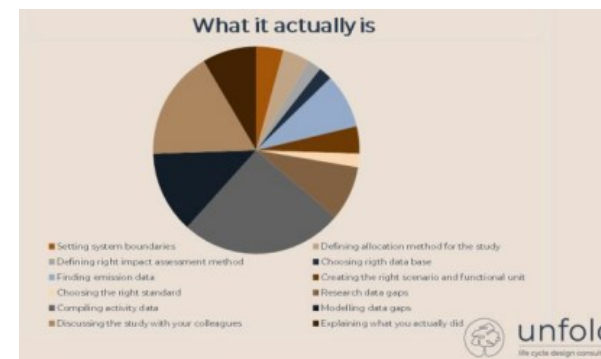
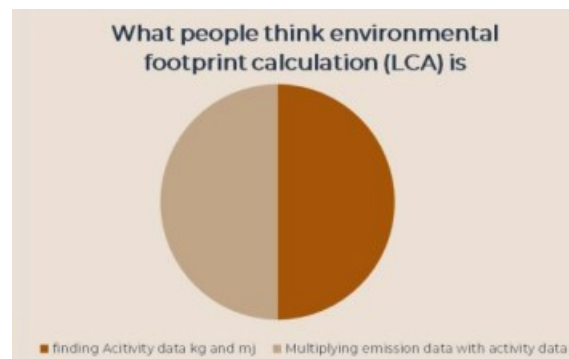
- **13** registered participants
- Module 2/1: **9** people
- Module 2/2: **7** people (1 excused, 1 ?)
- No (scientific) prerequisites



► Satisfaction survey (6 out of 7 people)

- Overall ≥ 4
- Theory: more complex (!)
- Initial expectations: **autonomy** after 2 days (!)
⇒ awareness of the complexity
- Yet it was a "light"/simplified version of LCA

Questions	Average
On a scale of 1 to 5, to what extent did the training meet your initial expectations?	4.2
Did you find the balance between theory and practice to be appropriate?	4.3
Was the theoretical content clear, well-structured and easy to understand?	3.8
Have the practical exercises helped you to consolidate the knowledge you learnt in theory?	4.3
Did you find the division into two sub-modules (steps 1 and 2 / steps 3 and 4), combining theory and practice, helpful?	4
Were the training materials (documents, presentations, exercises) appropriate and useful?	4.2
How would you rate the trainer's teaching skills (explanations, facilitation, interaction)?	4.3
Do you think you will be able to put what you've learnt in the training into practice in your work environment fairly quickly?	2.5
Did the overall organisation (timetable, breaks, pace, logistics) help the training to run smoothly?	4.3
Le lieu de la formation était-il agréable ?	4.3
Would you recommend this course?	4

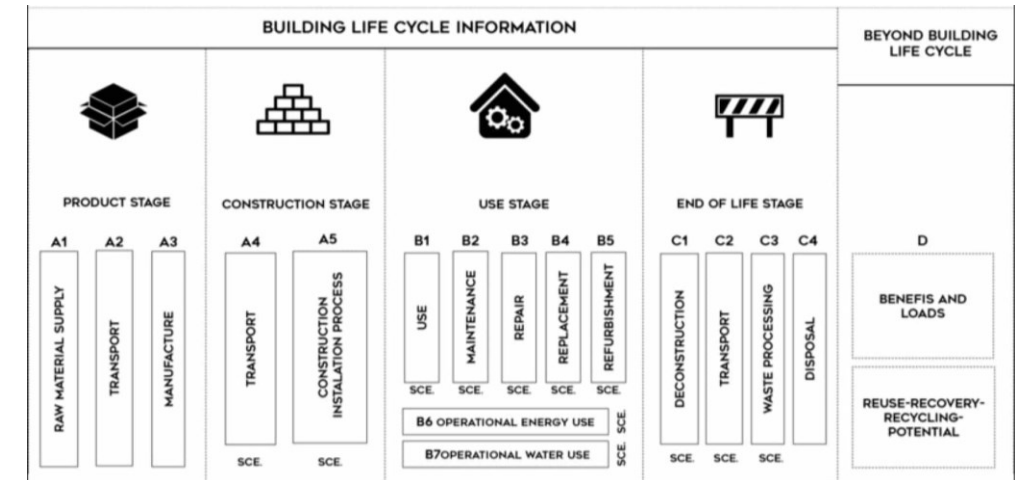
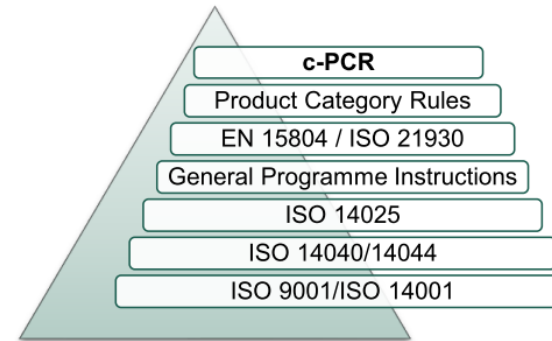


- ▶ 5 life cycle assessments
- ▶ Areas for improvement
- ▶ 4 companies
 - ▶ Sioen
 - ▶ Deltrian
 - ▶ Utexbel
 - ▶ de Poortere
- ▶ 5th LCA: no candidate!?
- ▶ 3 reports
 - ▶ Confidential → company
 - ▶ Public → accessible (Walloon Region, ...)
 - ▶ Public – Summary → wider distribution (3 pages)



PEF ApparelFootwear

- ▶ PCR: EN15804+A2
- ▶ Cut-off (PPP – Polluter pays principle)



- ▶ Simapro (versions 9.6 et 10.2)
- ▶ ecoinvent (versions 3.10 et 3.11)
- ▶ Environmental Footprint 3.1

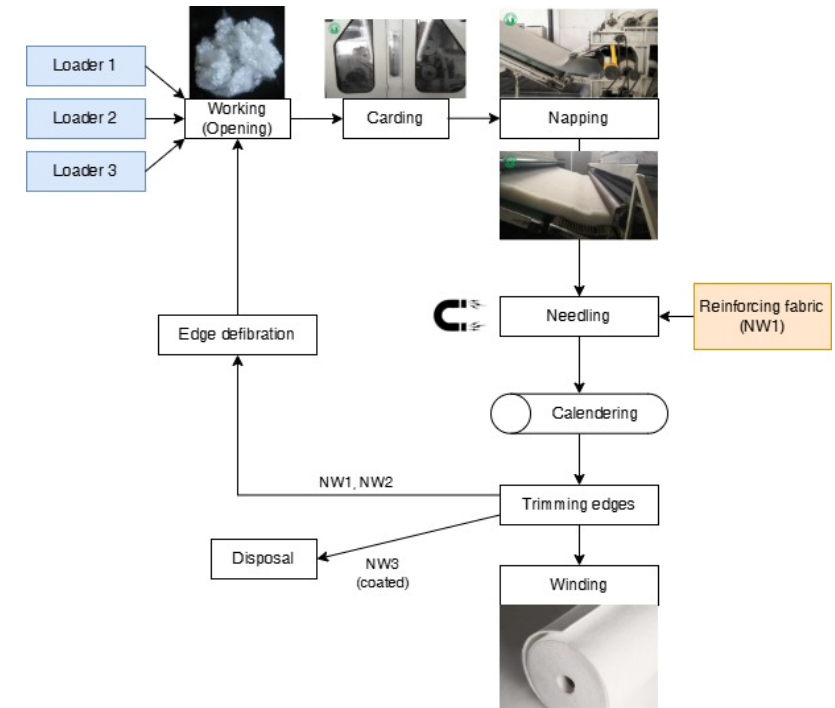


- **Sioen Nordifa** (Liège): specialist in the production of technical fabrics, used in particular in filtration and technical felts

<https://sioentechnicalfelts.com/en>



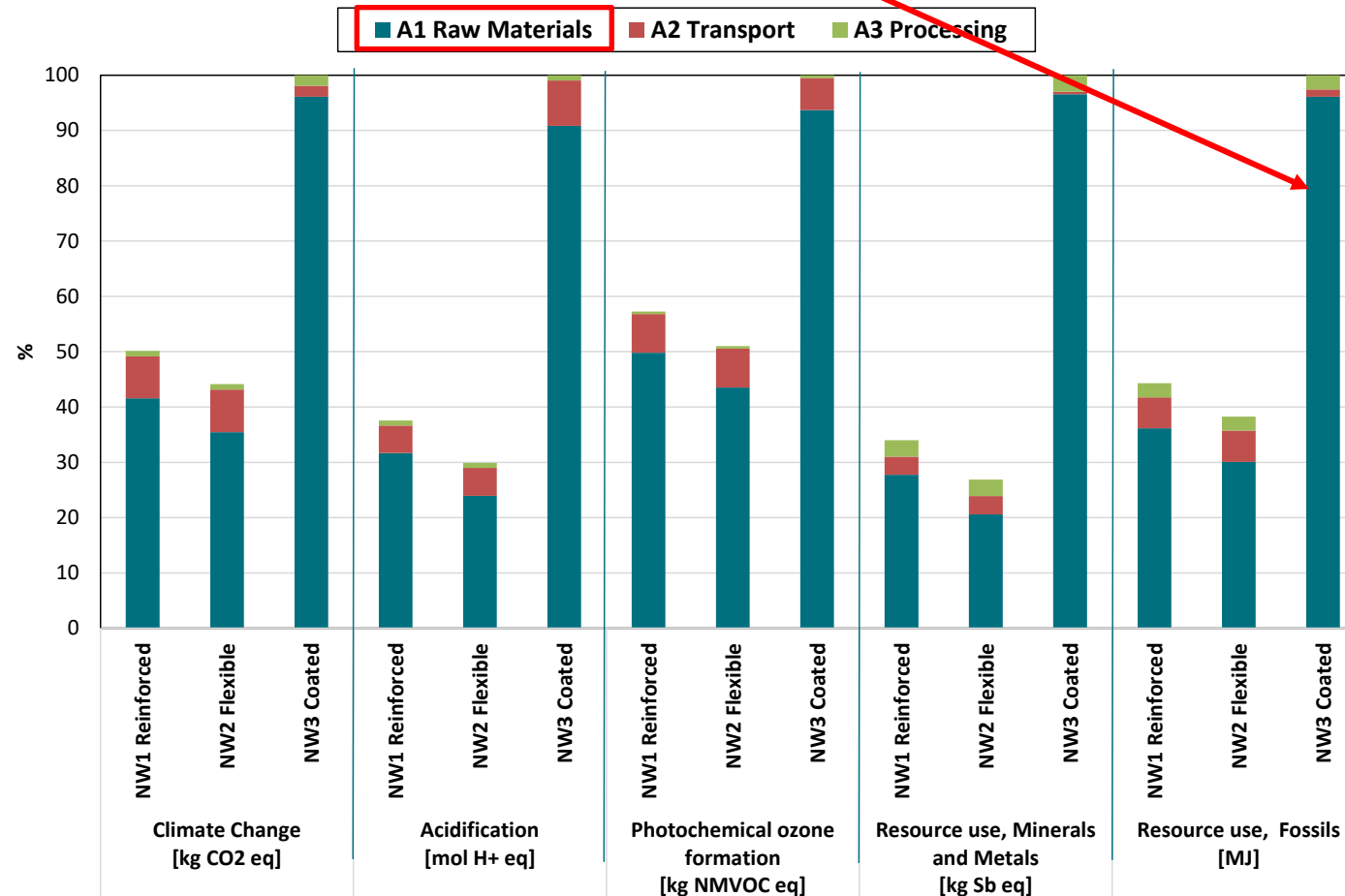
- LCA of 3 non-woven felt
- CIPP (Cure-in-place-pipe)
- Felts "unfinished" (uncoated, untreated → by client)
- **NW1** (rPET + reinforcement PET fabric) : 450 to 1200 g/m²
- **NW3** (PET, to be coated) : 450 to 650 g/m²
→ **NW1 + NW3** : sewer mains (~ straight)
- **NW2** (rPET, flexible) : 600 to 1200 g/m²
→ lateral connections (complex geometry)
- Cradle to gate (A1-RM, A2-tr RM, A3-Prod)
- FU = 1 m² non-woven felt at the factory gate



1. Sioen

SimaPro 9.6
ecoinvent EN15804 3.10
Method EN15804+A2
(EF3.1)

N°	Name	Fibres	Woven reinforcement	In-line calendering	Recycling of fabric offcuts
NW1	Reinforced felt	rPET 13	Yes	No	Yes
NW2	Flexible felt	rPET	No	Yes	Yes
NW3	Coated felt	Virgin PET	No	Yes	No



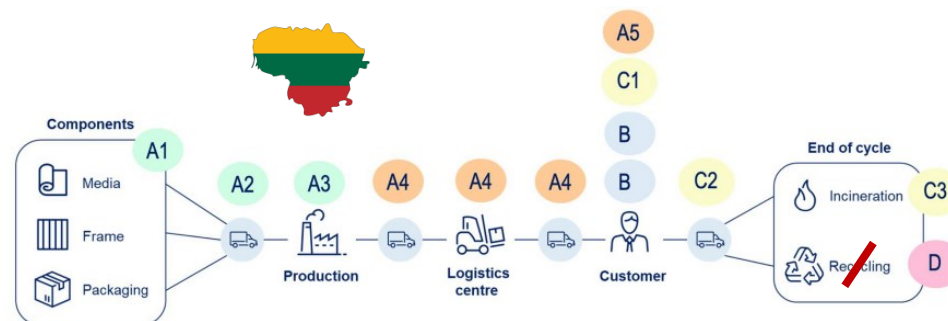
Improvements?

- ▶ The benefits of recycled plastic (rPET)
- ▶ Not always possible (→ properties)
- ▶ 'Green' energy mix
Residual mix 2022 :
 - ▶ 55.9% nuclear
 - ▶ 32.4% fossil
 - ▶ 11.7% renewable

2. Deltrian



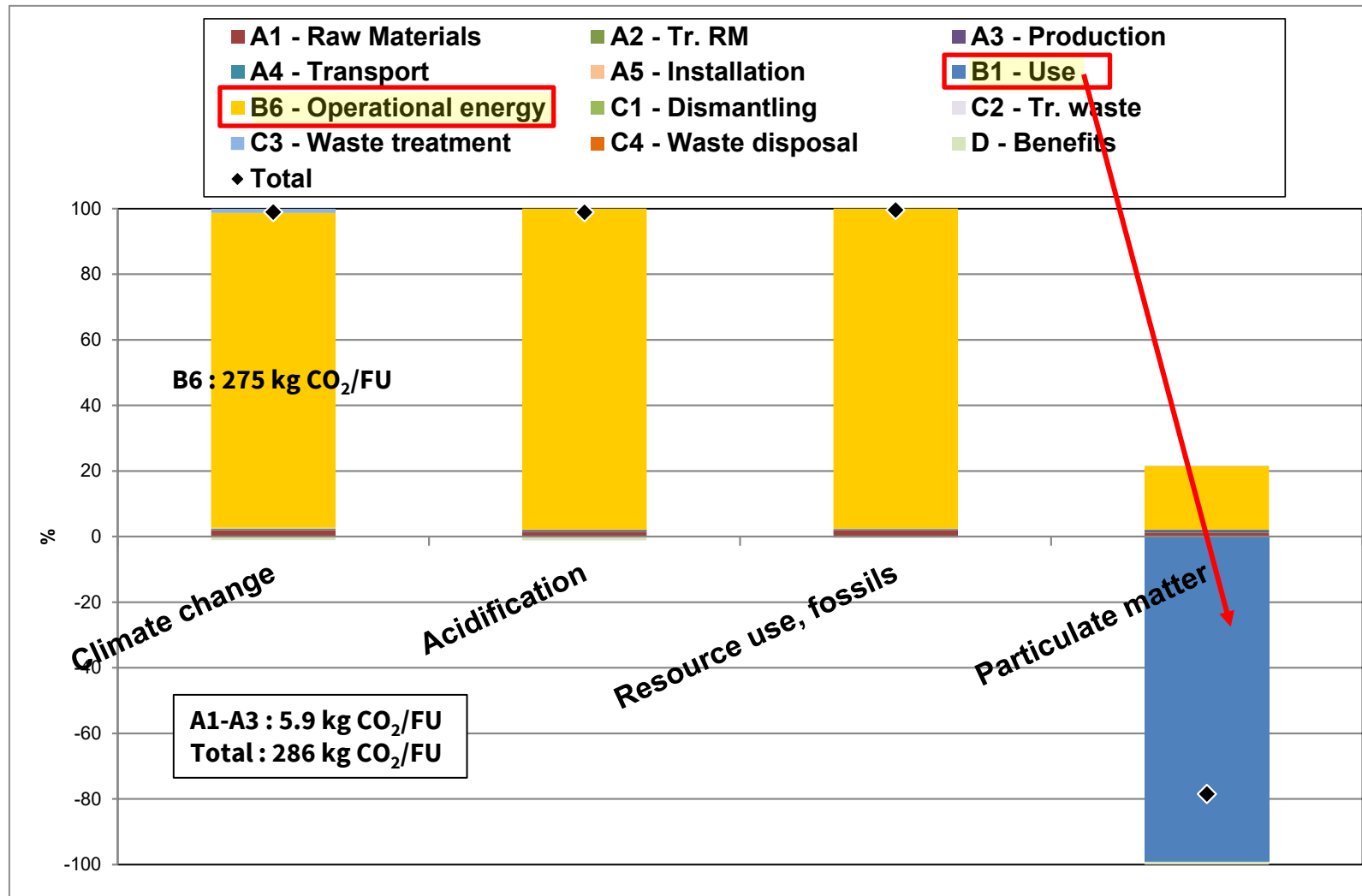
- ▶ **Deltrian** (Fleurus): design, manufacture and distribution of air filters in Europe and worldwide
<https://www.deltrian.com/>
- ▶ LCA of **TNWES-1 70 LFC** : bag filter with a filtration class ePM1 70% in accordance with the standard ISO 16890 (Deltrian **Lituanie**)
- ▶ Galvanised steel frame with removable PP filter
 - ▶ Lifespan of the filter: 1 year
 - ▶ Lifespan of the frame: 10 years
- ▶ Cradle to grave with options (A, B, C + D)
- ▶ FU = 1 filter TNWES-1 70 LFC used to filter the air with this level of efficiency for a year



2. Deltrian



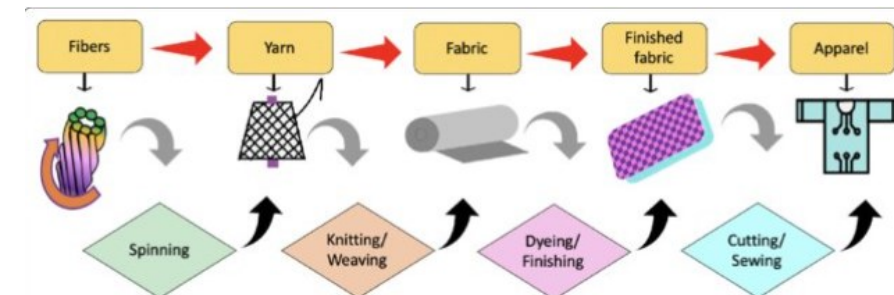
SimaPro 10.2 / ecoinvent EN15804 3.11
Method EN15804+A2 (EF3.1)



Improvements?

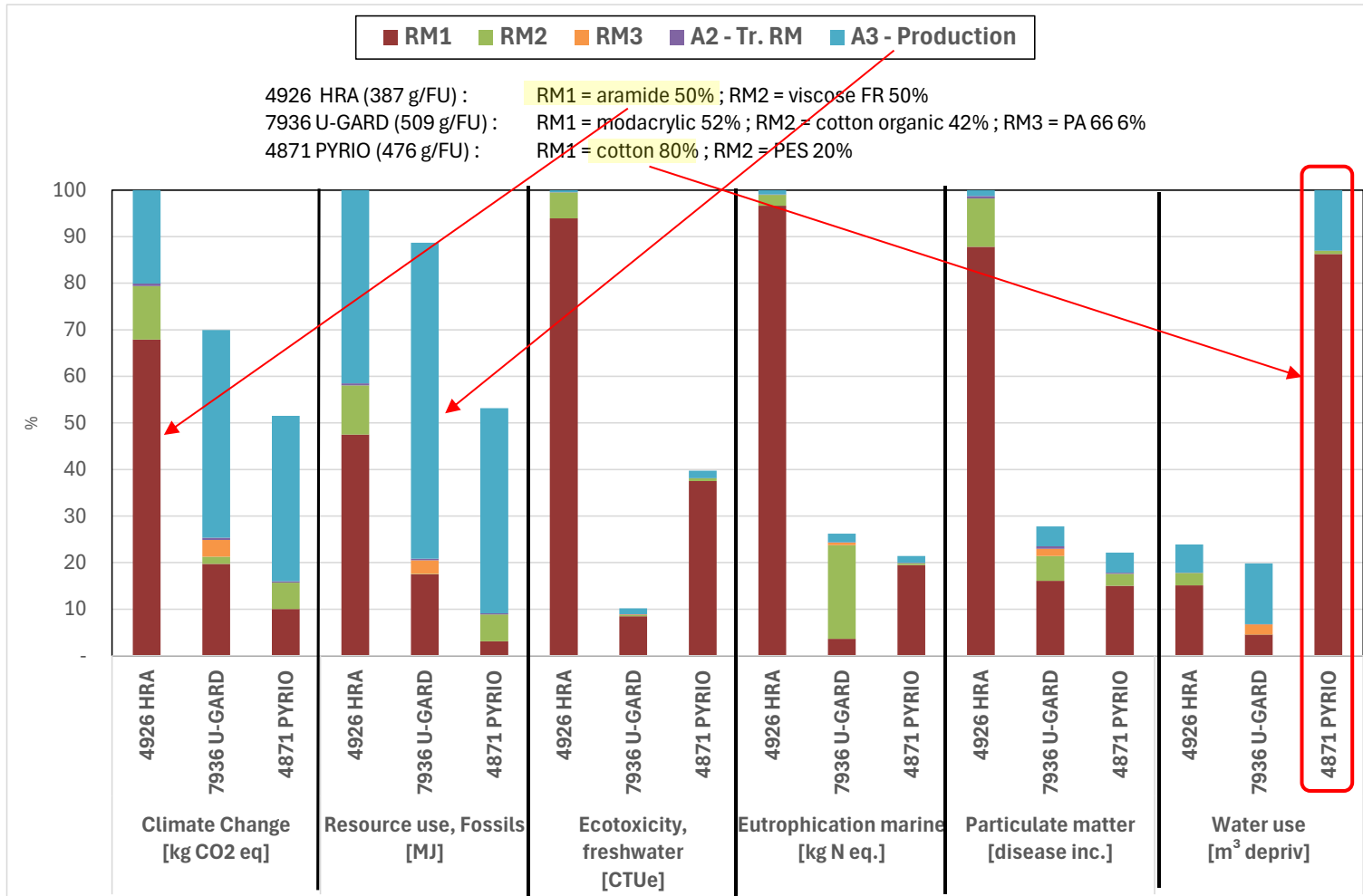
- ▶ Already improved with the removable filter
- ▶ Recycled PP when possible? (→ properties)
- ▶ Frame recycling
- ▶ 'Green' energy mix → user responsibility

- ▶ **Utexbel** (Renaix): integrated industrial group and a market leader in public procurement, protective clothing, sportswear and technical fabrics.
<https://utexbel.com/>
- ▶ LCA of 3 fabrics with flame-retardant properties → protective clothing
- ▶ **4926 HRA** : **Aramide/Viscose FR** fabric, flame-resistant, with dope-dyed fibres (mass-dyed)
 - ▶ Manufacturing process with low environmental impact, but the components have a significant one. The 4926 HRA doesn't need additional dyeing.
- ▶ **7936 U-GUARD** : **Modacrylic/Organic Cotton** fabric, **dyed** and **finished** with an oil-repellent
- ▶ **4871 PYRIO** : **Cotton/PES** fabric, **dyed** and **finished** with a fire-retardant finish and an oil-repellent finishing.
 - ▶ 7936 U-GARD et 4871 PYRIO: processes with a greater impact.
- ▶ Cradle to gate (A1-RM, A2-tr RM, A3-Prod)
- ▶ FU = 1 m² of 1.5 m wide fire-retardant fabric at the factory gate
- ▶ 1 outfit (blouse + trousers) = 2 metres of fabric (x 1.5 metres wide)



3. Utexbel

SimaPro 10.2 / ecoinvent 3.11 – EF3.1
Method EF 3.1/NF & WF EF 3.1



Results: CC

4926 HRA : 9.2 kg CO₂ eq/FU

7936 U-GARD : 6.4 kg CO₂ eq/FU

4871 PYRIO : 4.74 kg CO₂ eq/FU

7936 Organic cotton (in green)

↔

4871 Conventional cotton (in red)

► "Raw" results

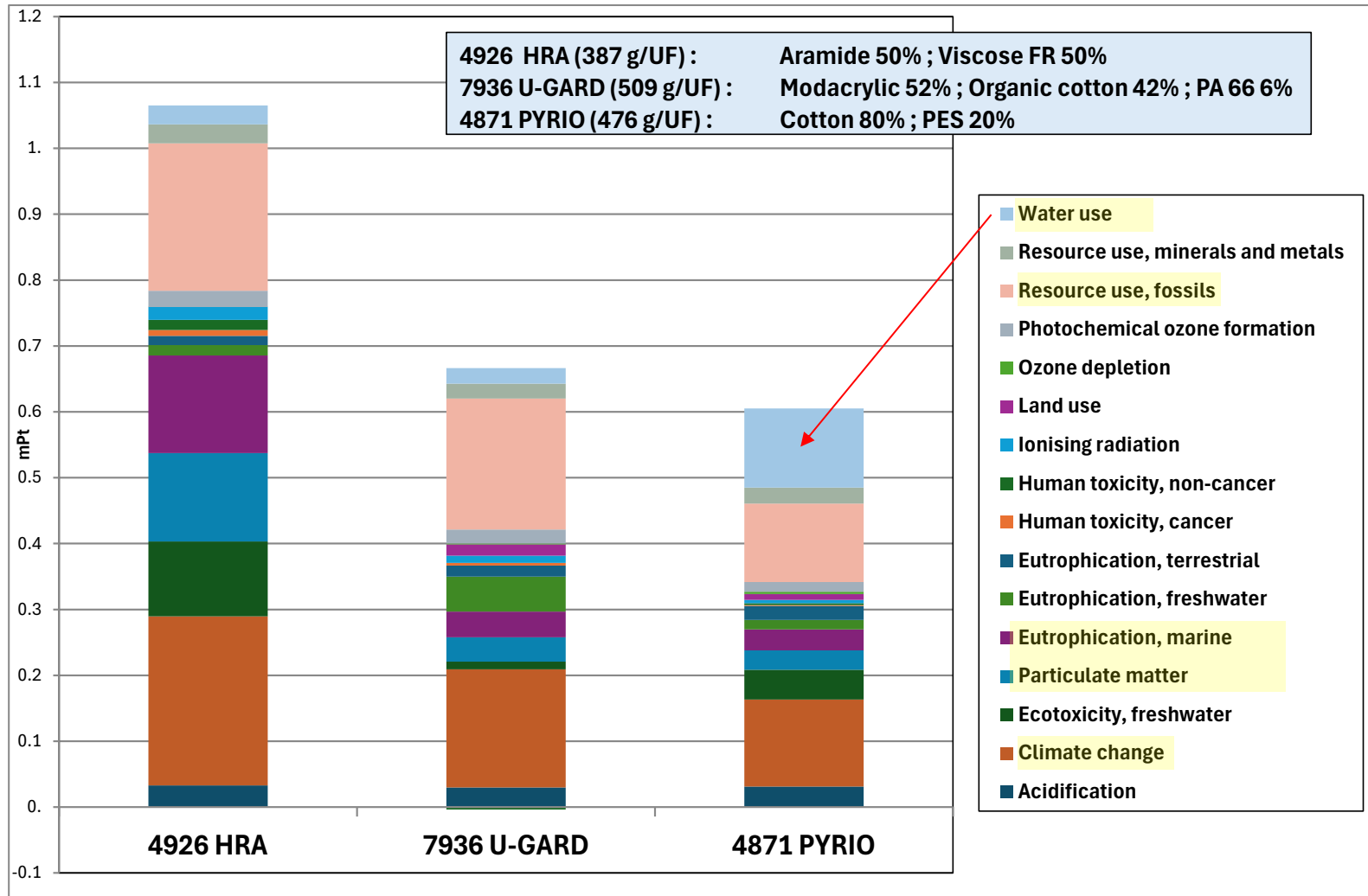
► Lifespan: wear → replacement if less than 3 years / 50 washings (ok 4926 HRA)

► "Function": Performances

► Cradle to gate : EoL : recyclability not taken into account (4926 HRA)

3. Utexbel

SimaPro 10.2 / ecoinvent 3.11 – EF3.1
Method EF 3.1/NF & WF EF 3.1



Improvements?

- Composition determined by technical performance (fire resistance)
- Integration of performance and lifespan (dope-dyed ↔ surface dyed or coated)
- Incorporating recyclability(EoL) for 4926 HRA
- 'Green' energy mix

- ▶ **De Poortere** (Mouscron) : Louis de Poortere is world-renowned as a carpet manufacturer and is celebrated for his commitment to tradition in the creation of its high-quality carpets and rugs.
<https://www.depoortere.com/>
- ▶ LCA of 2 carpets
- ▶ **Single-material carpet** (PES – PET) : **LS = 12 ans**
80% PES + coating PES 20% (total = 93% PES)
⇒ EoL : **recycling**
- ▶ **Conventional carpet** cotton (fibres) – PES (back) : **LS = 6 ans**
66% cotton + 14.5% PES + 19.5% latex coating
⇒ EoL : **incineration (energy recovery)**
- ▶ Cradle to grave with option (A-B-C + D)
- ▶ FU = 1 m² carpet for 12 years
Carpet : 2 m x 3 m = 6 m²
- ▶ Replacement of the conventional carpet after 6 years! (B4)



4. De Poortere

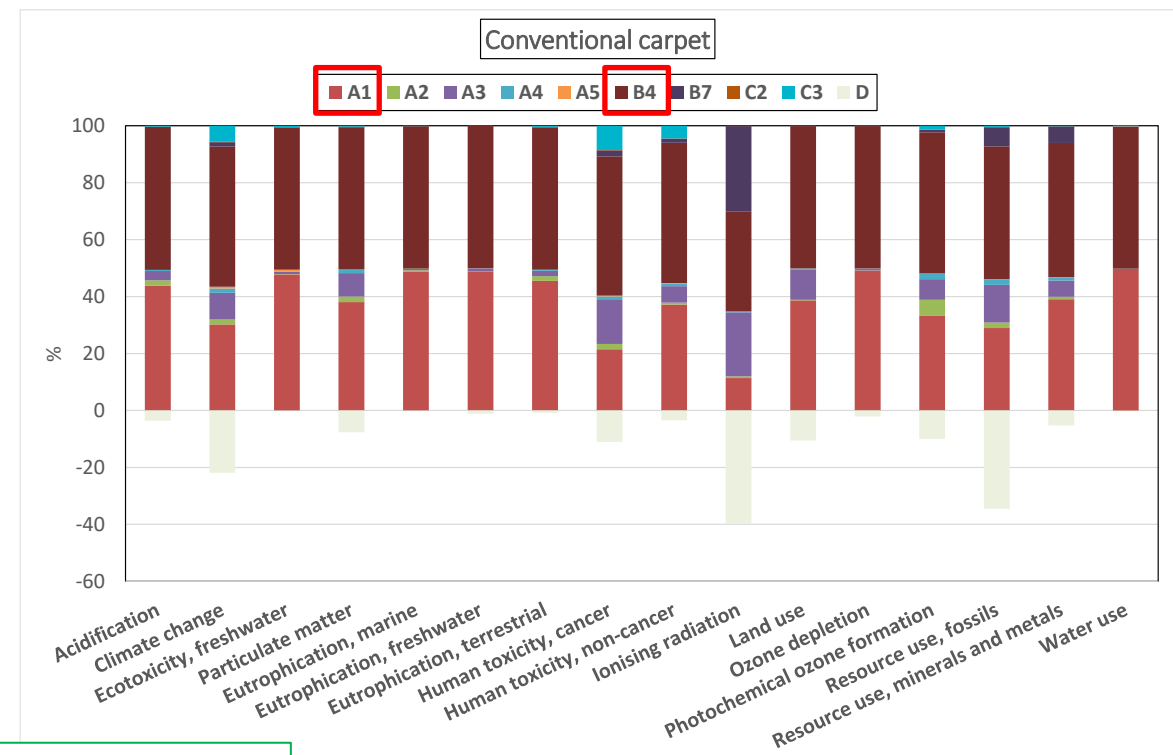
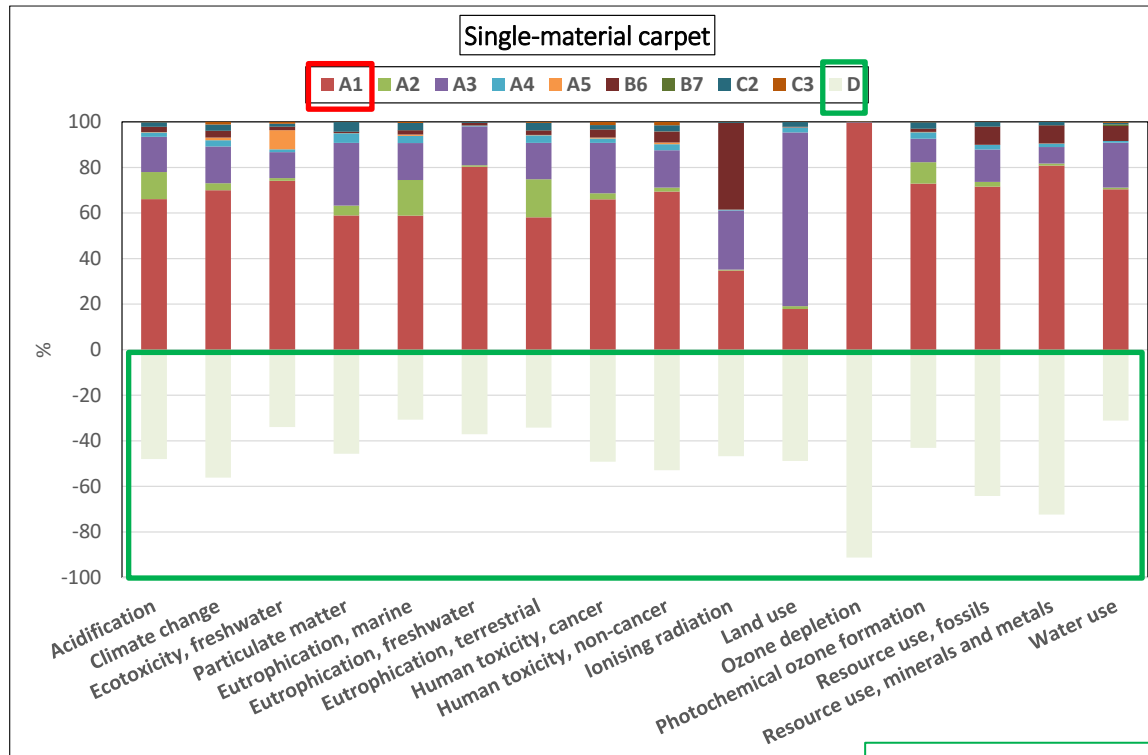
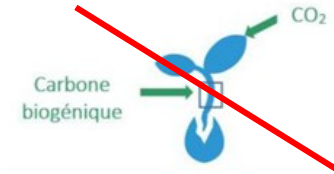
Results: CC

Single-material carpet → A1

- RM : 6.82 kg CO₂/FU
- A1-C4 : 9.75 kg CO₂/FU
- A1-D : 4.28 kg CO₂/FU

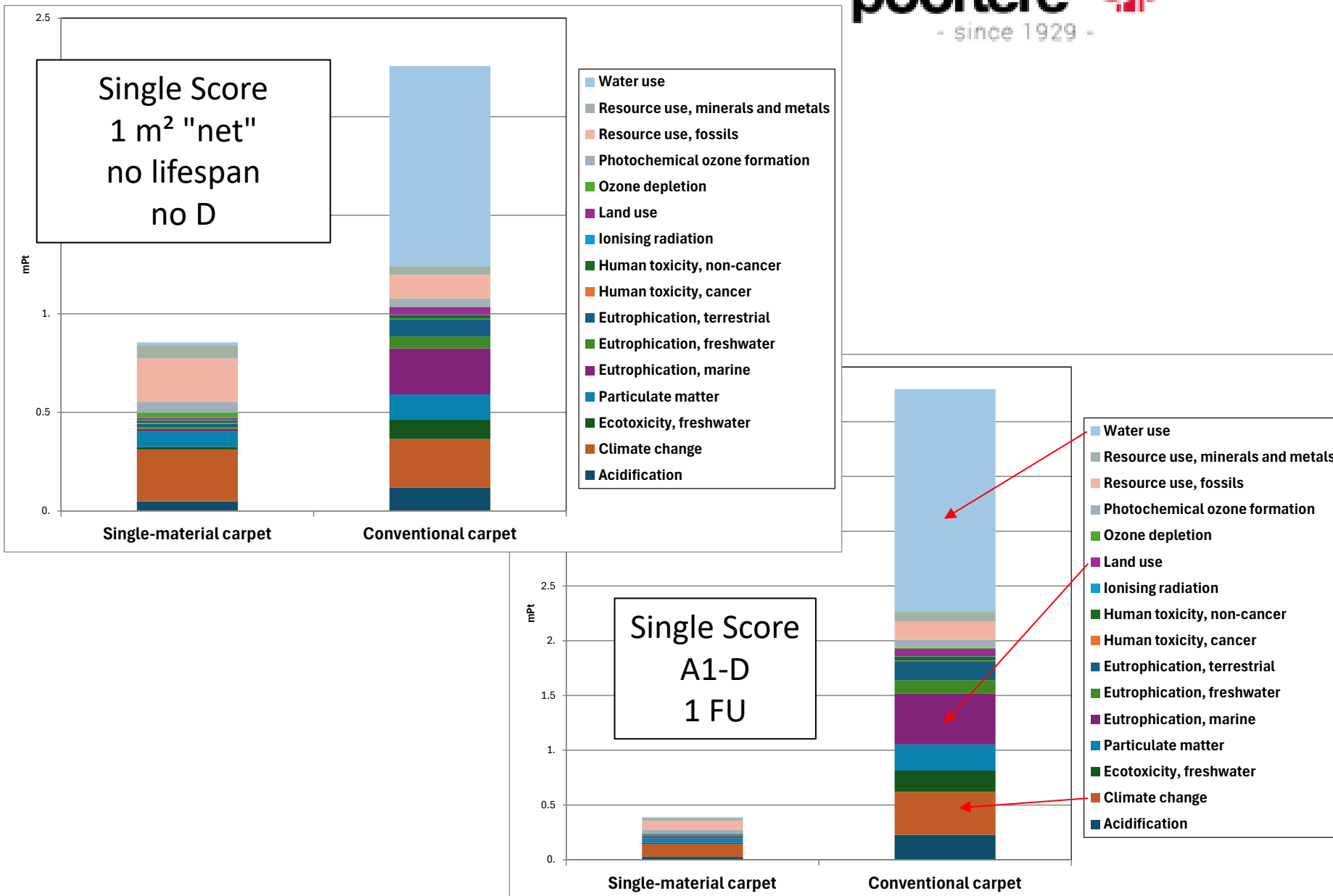
Conventional carpet → A1 + B4

- RM : 5.43 kg CO₂/FU
- A1-C4 : 18 kg CO₂/FU
- A1-D : 14 kg CO₂/FU



SimaPro 10.2 / ecoinvent 3.11
Method EF 3.1/NF & WF EF 3.1

4. De Poortere



Improvements?

- ▶ Single-material carpet: recycled PET (but $D < \text{cf "net"}$ benefits)
- ▶ Conventional carpet: organic cotton
- ▶ 'Green' energy mix

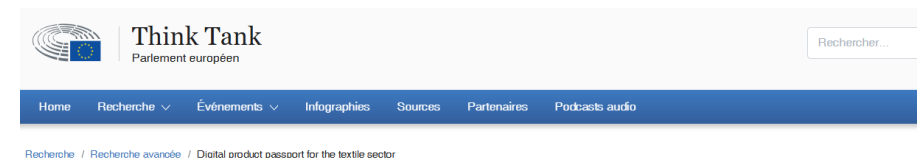
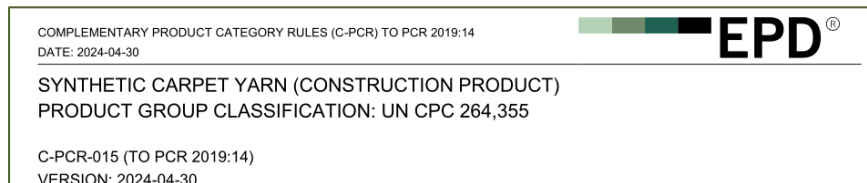


- ▶ Free LCA but no "client"
- ▶ Unfavourable timing (project duration <)
- ▶ Not specific to the textile sector!
- ▶ Availability: staff, time, etc.
Difficulties in collecting primary data
- ▶ Confidentiality





- ▶ "Unfavourable" results, reputation, loss of control over their environmental communications (cfr. public results)
- ▶ Consequences? → actions to be taken (€)
- ▶ **No obligation**
⇒ lack of awareness of (future) obligations
 - ▶ France : ecobalyse October 1st, 2025
 - ▶ EU : DPP
 - ▶ EPD → public procurement
(textiles used in the construction industry)



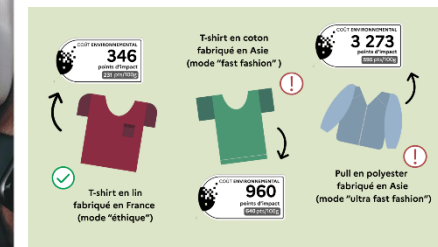
Digital product passport for the textile sector

Étude – 28-06-2024



A European digital product passport (DPP) could enhance textile industry traceability, circularity, and transparency. This study focuses on the possibility to introduce a DPP, framed within the European Union's strategy for sustainable and circular textiles. It examines the potential, needs, benefits, and challenges associated with deploying a DPP for all stakeholders throughout the European textile sector's value chain. A DPP could benefit all actors in this complex value chain, including producers, supply-chain tiers, regulatory authorities, sorters, recyclers, and consumers. To enhance EU textile industry traceability, sustainability and business strategy, identifying where added value can be generated is crucial. This research is grounded in a review of regulatory texts, scientific literature and existing initiatives, and proposes a generic DPP model for the textile sector. Drawing on a survey of over 80 stakeholders, it gathers essential insights and outlines a three-phase deployment scenario with policy options aimed at fostering a circular economy to minimise the sector's overall footprint.

- ▶ Complexity to encourage the Belgian textile industries to carry out environmental assessments
- ▶ Lack of awareness
 - ▶ of complexity of LCA
 - ▶ of benefits or usefulness of LCA/EPF/PEF
 - ▶ regulations (communication, public procurements, ...)
 - ▶ importance of labelling based on LCA in the UE
 - ▶ mandatory in France since October 1st, 2025 (PEF)
- ▶ Necessity to spread the information in the Belgian textile companies to avoid blocking of sales in UE (France)
- ▶ Necessity of introduction of legal obligations or incentives by policy makers including financial support for LCA (by external experts)



<https://ecobalyse.beta.gouv.fr>



Society and Materials (SAM)

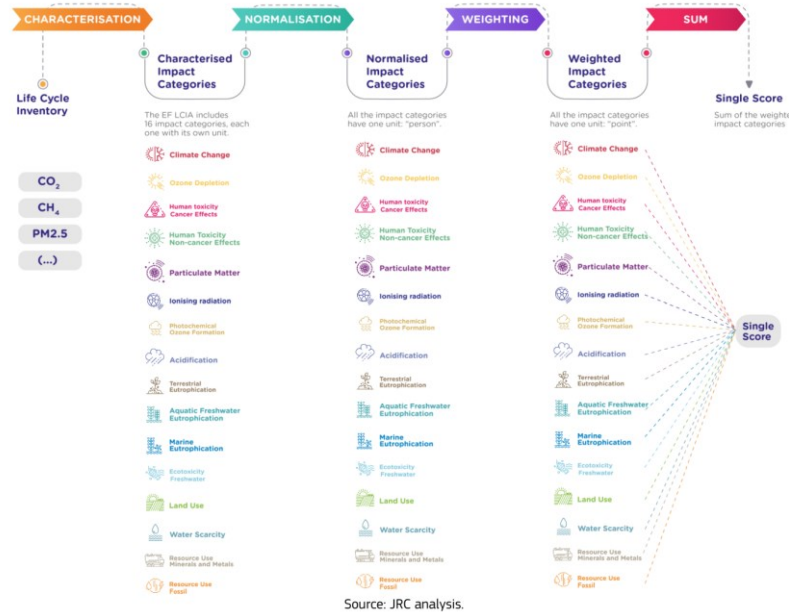
20th International Conference



Dr Ir Sylvie GROSLAMBERT
s.groslambert@uliege.be
<https://www.chemeng.uliege.be/>



Environmental Footprint 3.x



→ The environmental footprint specifies 16 impact categories to be assessed.

