Amorim Cork Composites products LCA

Amorim Cork Composites

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Building a better working world

Disclaimer

EY LCA analysis follows a life-cycle approach based on ISO Standard 14040 and is based on Amorim Cork Composites data and business assumptions. The results presented are not third-party verified.

Agenda

1. About the study

2. Carbon footprint

Cradle-to-gate

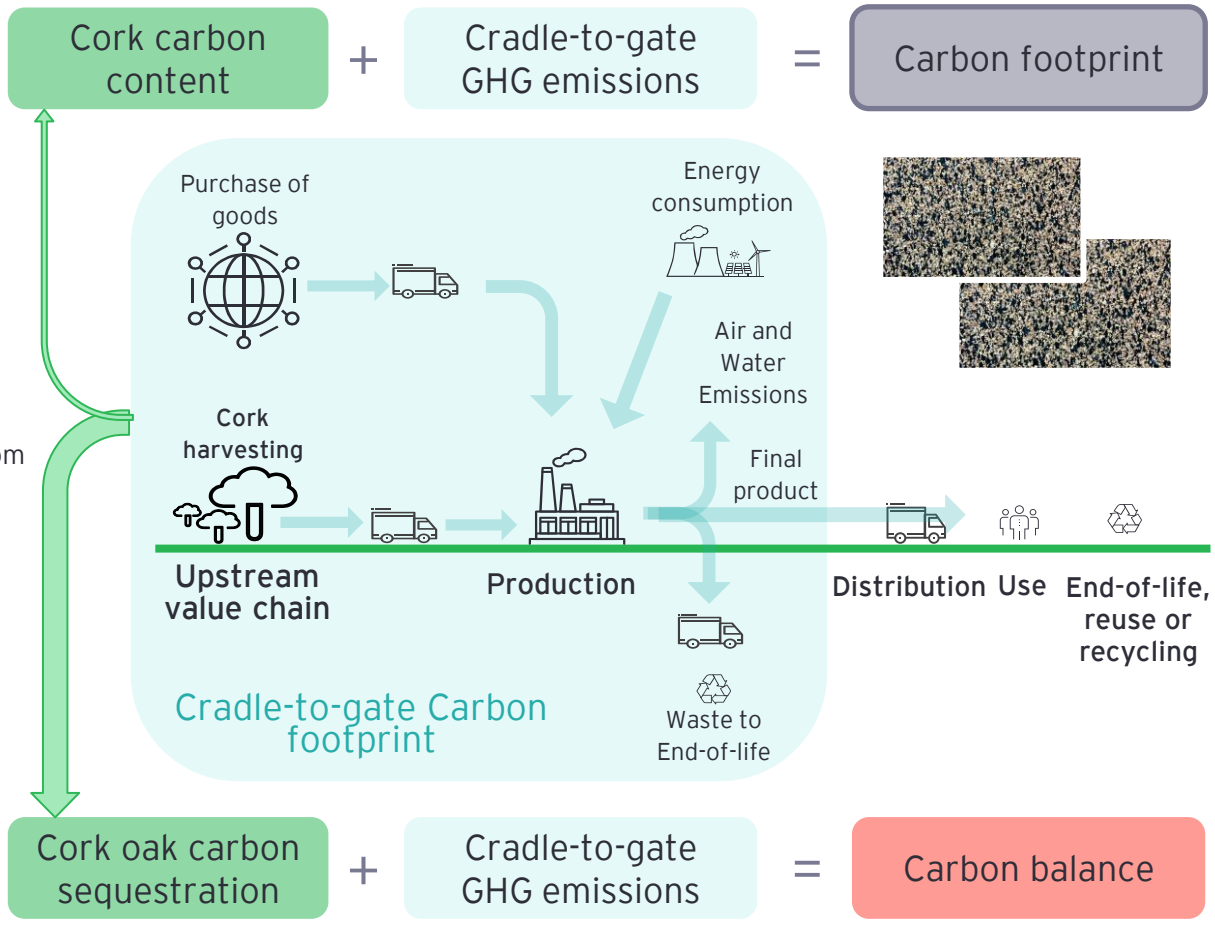
Climate Change impact category from ILCD method

3. Carbon balance

Scenario analysis with carbon sequestration at the forest stage

4. LCA results

Cradle-to-gate



1 About the study

About the study

Context

- The **main purpose** is to quantify the potential environmental impacts of the products Underlay Plus 5080 and Underlay Plus 5080 VB, through a life cycle approach.
- **Products :** Underlay Plus 5080 and Underlay Plus 5080 VB
- **Approach:** *cradle-to-gate* (from raw material extraction to the finished product at the factory gate)
- **Functional unit**: 1 m^2 of product
- **Modelling software and database** : SimaPro 9.1 with ecoinvent 3.5 database
- **Method** : Midpoint characterization factors recommended by the International Reference Life Cycle Data System (ILCD)
- **Products**

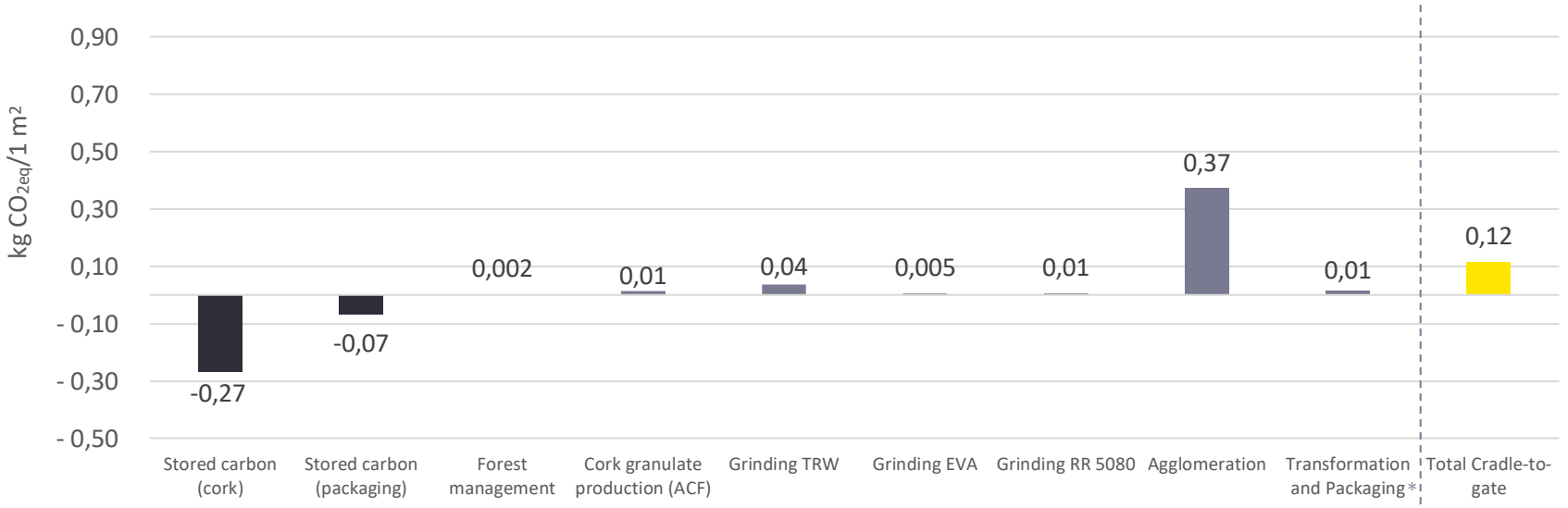
Product characteristics	Underlay Plus 5080	Underlay Plus 5080 VB
Size (mm x mm x mm)	1 000 mm x 1 000 mm x 2 mm	1 000 mm x 1 000 mm x 2 mm
Weight (kg) - packed	0,68	0,68
Weight (kg) - unpacked	0,64	0,59
Components (%) – packed product	21% cork 61% recycled materials 12% customization products **6% packaging material**	19% cork 56% recycled materials 11% customization products **14% packaging materials**

- **Accounting for the use of recycled/reused raw materials :** these materials enter the product system as having zero burdens and benefits. Only the transport of these materials is accounted in the study.

2

Carbon footprint

Carbon footprint: Underlay Plus 5080

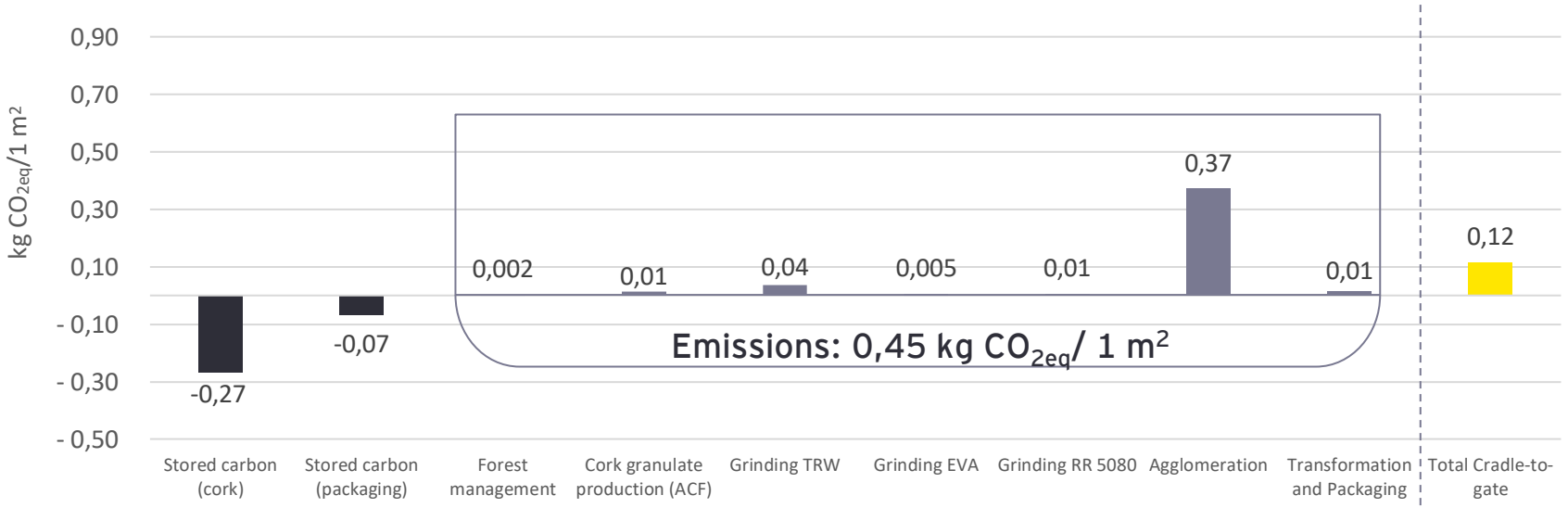


Underlay Plus 5080 carbon footprint:

- Carbon stored in cork : **-0,27** kg CO_2 /1 m²
- Cradle-to-gate: **0,12** kg CO_{2eq} /1 m²

*Packaging stage only includes the packaging materials consumption impact, since electricity data obtained from stages transformation and packaging together cannot be separated. For the final results both stages may be presented together.

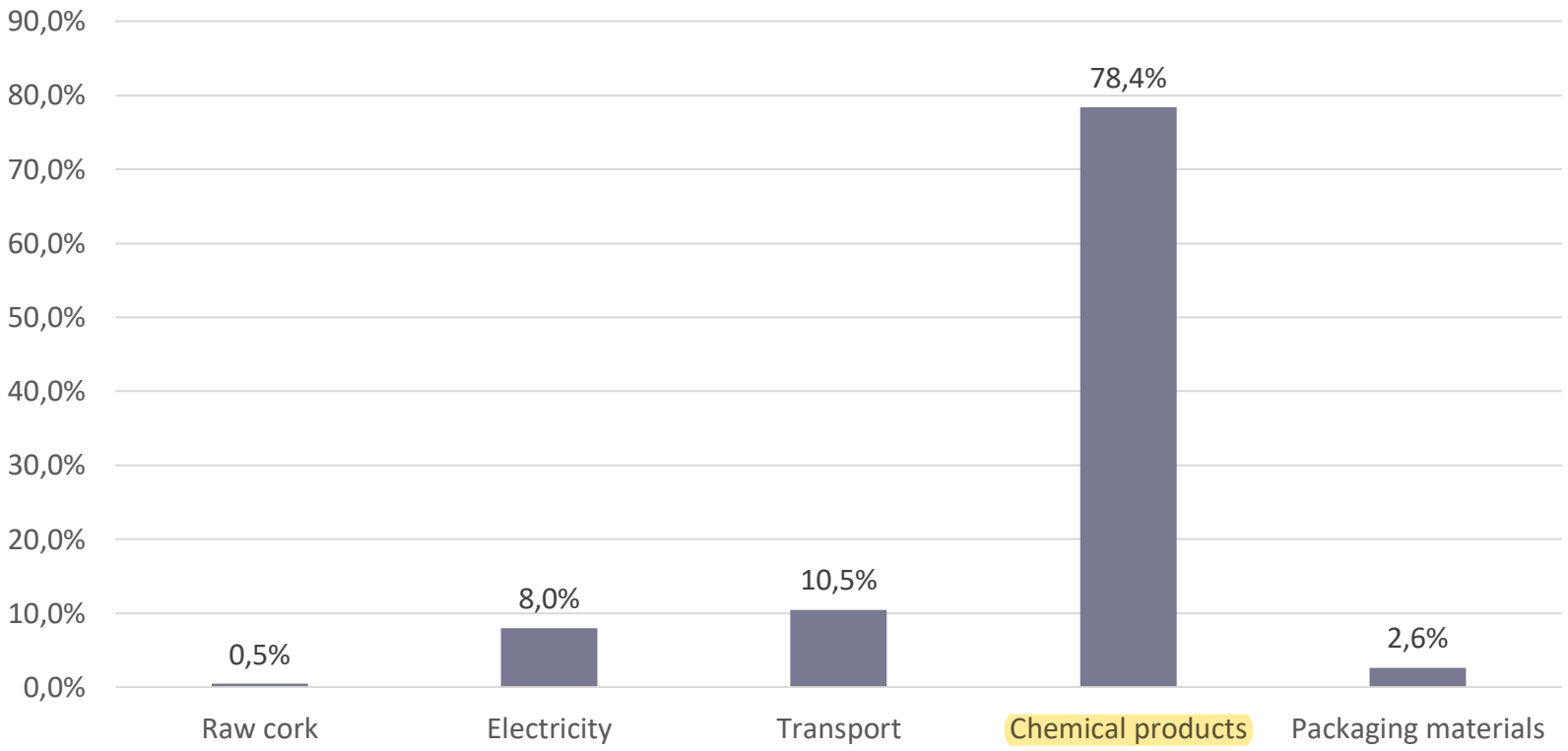
Carbon footprint: Underlay Plus 5080 results



82% emissions associated with agglomeration process and 8% associated with grinding TRW process

- Most upstream value chain activities carbon impacts (e.g. production and purchase of chemical products as well as transport of raw and recycled materials) are reflected in these stages

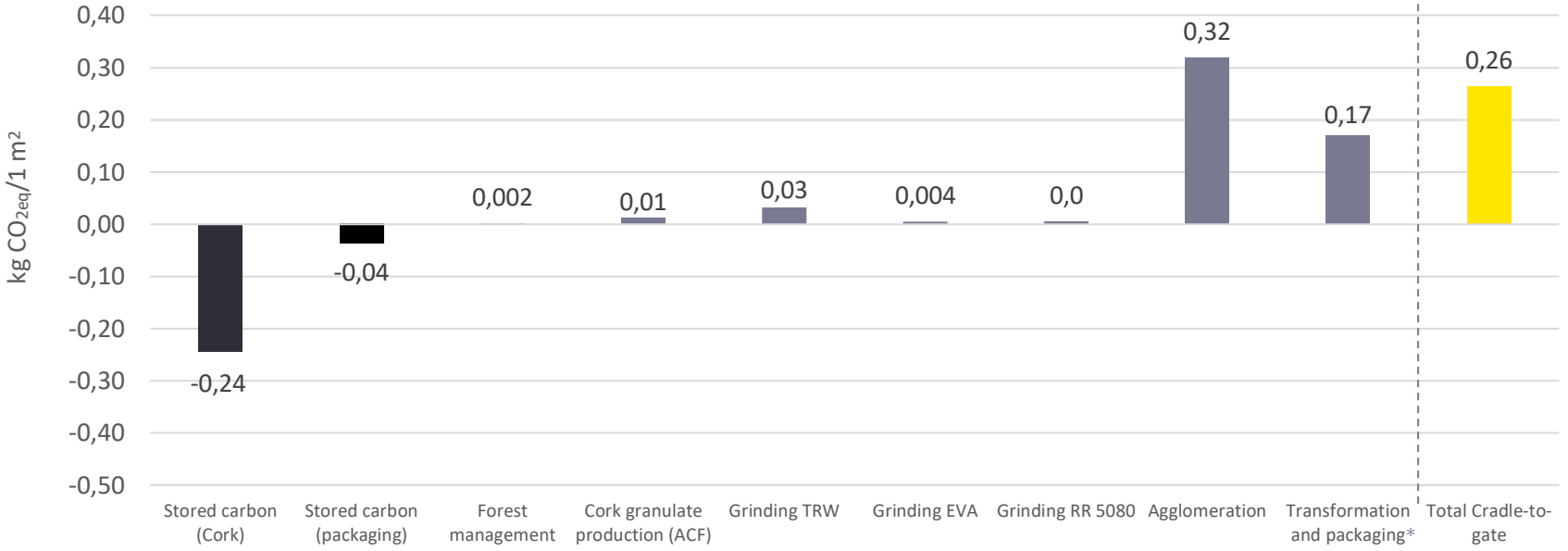
Underlay Plus 5080: key emission sources



GHG emissions most relevant flows are associated with

- Consumption of chemical products (e.g. agglomeration binders)
- Transport of recycled materials (steering wheels waste) from distant locations (e.g. Mexico and Marroco), both by truck and ship

Carbon footprint: Underlay Plus 5080 VB

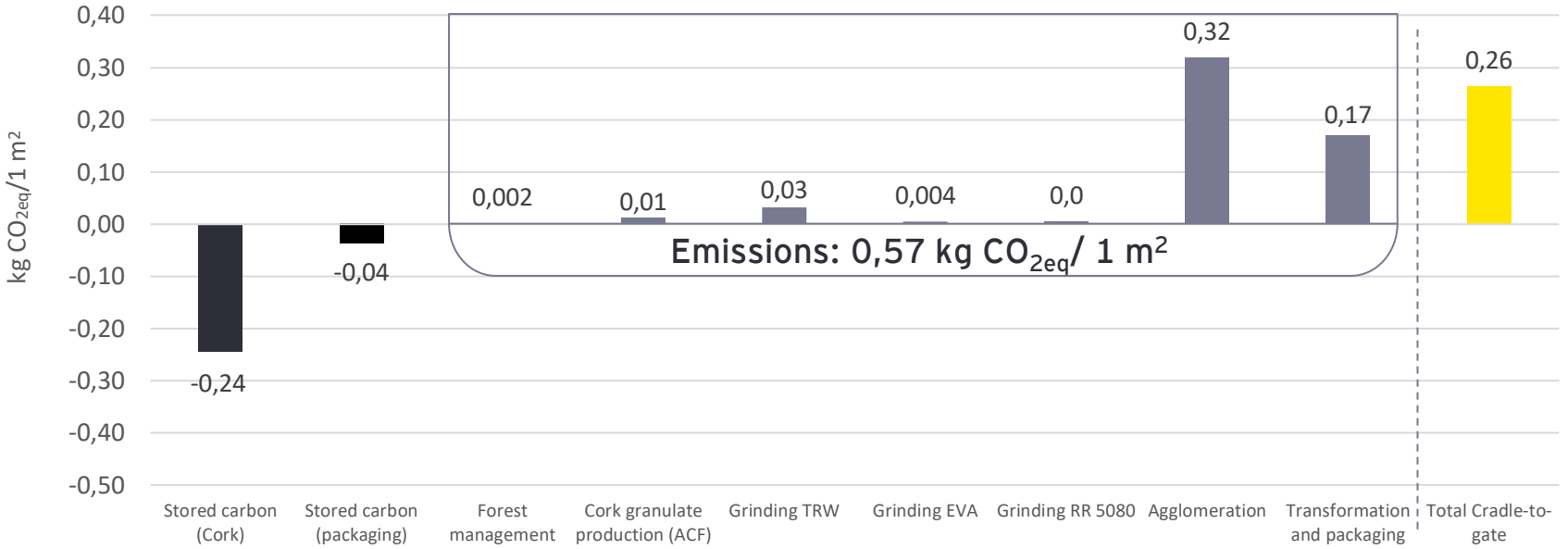


Underlay Plus 5080 VB carbon footprint:

- Carbon stored in cork : **-0,24** kg CO_2 /1 m²
- Cradle-to-gate: **0,26** kg CO_{2eq} /1 m²

*Packaging stage only includes the packaging materials consumption impact, since electricity data obtained from stages transformation and packaging together cannot be separated. For the final results both stages may be presented together.

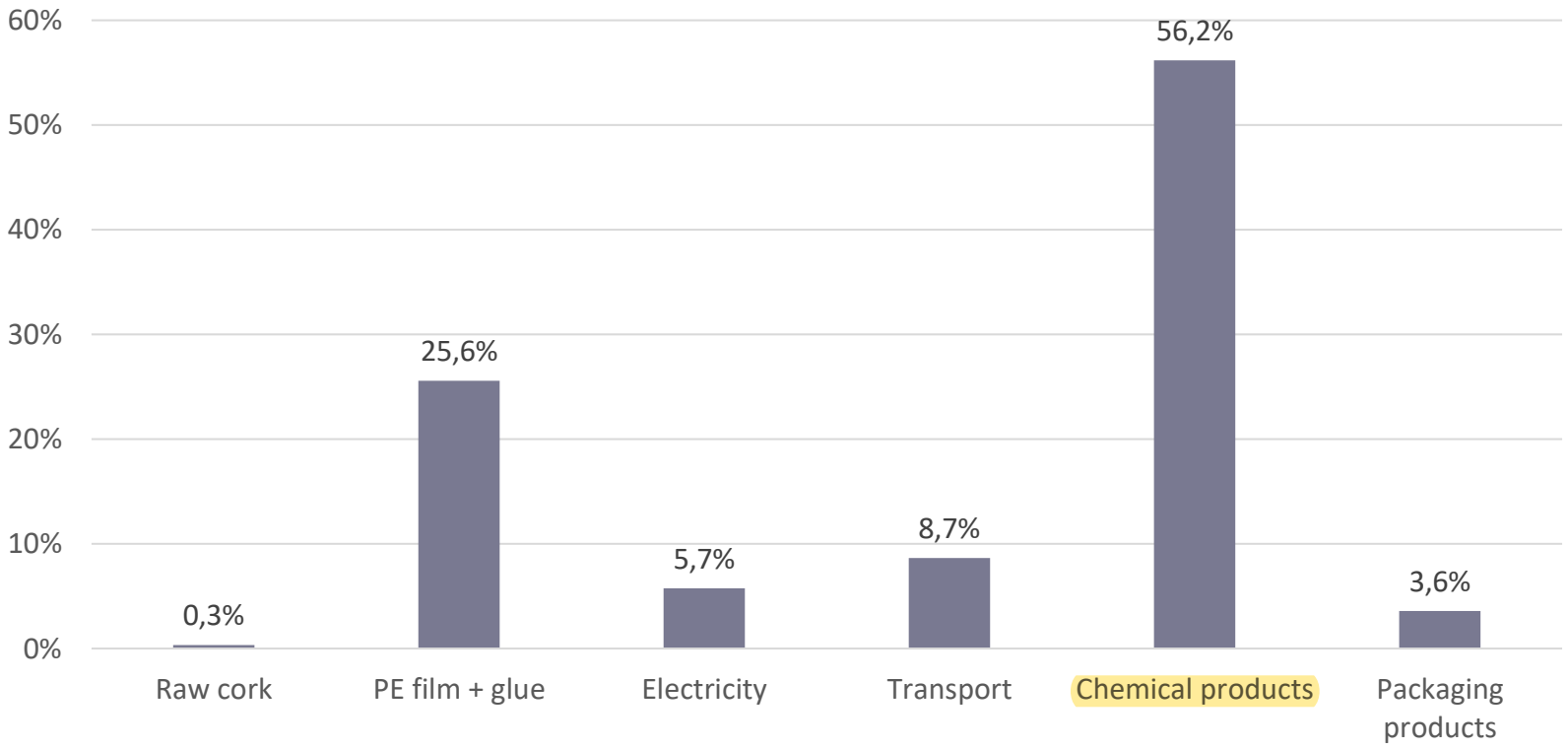
Carbon footprint: Underlay Plus 5080 VB results



56% emissions associated with agglomeration process, 34% emissions associated with transformation and 6% emissions associated with grinding TRW process.

- Most upstream value chain activities carbon impacts (e.g. production and purchase of chemical products as well as transport of raw and recycled materials) are reflected in these stages

Underlay Plus 5080 VB: key emission sources



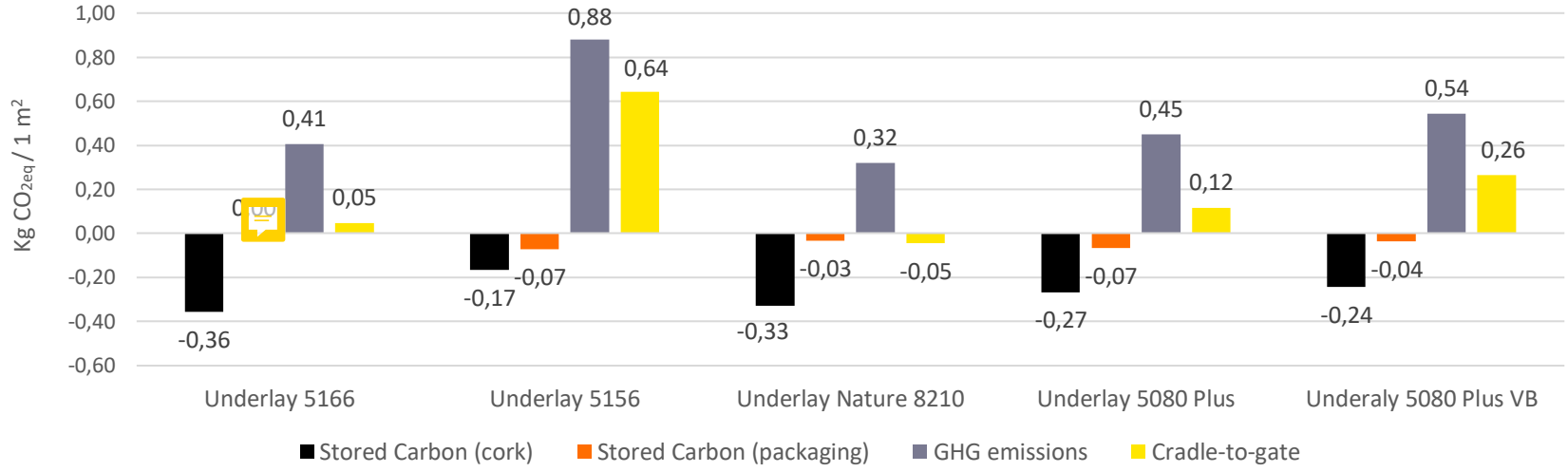
GHG emissions most relevant flows are associated with

- Consumption of chemical products (e.g. agglomeration binders)
- Consumption of PE film and binder (vapour barrier)
- Transport of recycled materials (steering wheels waste) from distant locations (e.g. Mexico and Marroco), both by truck and ship

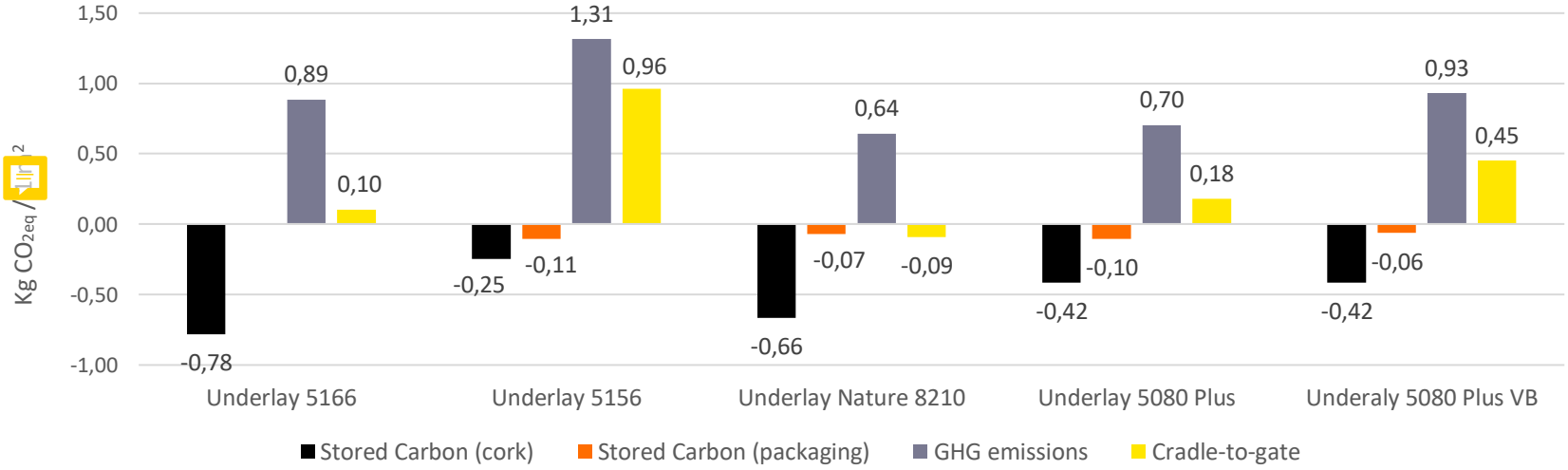
Comparison

1. Carbon footprint: benchmark

Carbon footprint for 1 m^2



Carbon footprint for 1kg



3

Carbon balance

Carbon balance: results

Scenario analysis with carbon sequestration in the cork oak montado

For the average stopper when considering carbon sequestration in the cork oak* montado:

There is a **forest storage up to**:

- 10,3
kg CO_2/1 m^2 Underlay Plus 5080

- 9,4
kg CO_2/1 m^2 Underlay Plus 5080 VB

Therefore, the **carbon balance reaches up to:**

- 9,9
kg CO_{2eq}/1 m^2 Underlay Plus 5080

- 8,9
kg CO_{2eq}/1 m^2 Underlay Plus 5080 VB

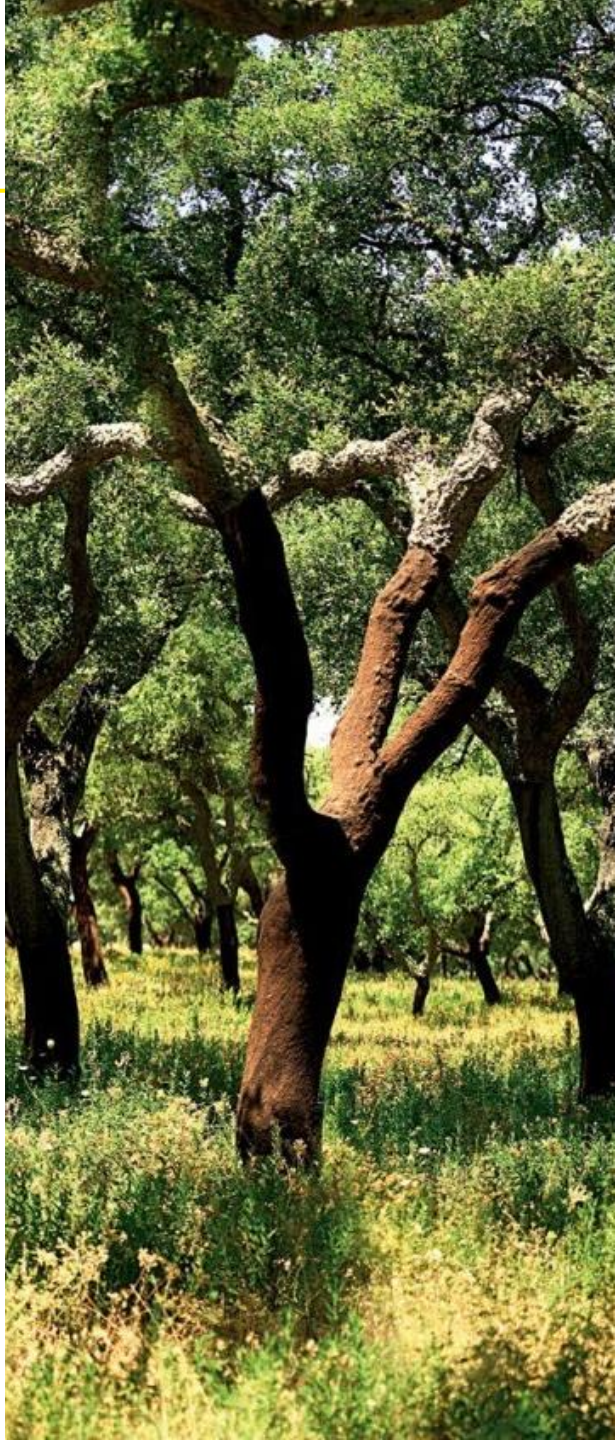
* scenario analysis based on well-managed cork oak montado

- 73 t CO_2/t cork

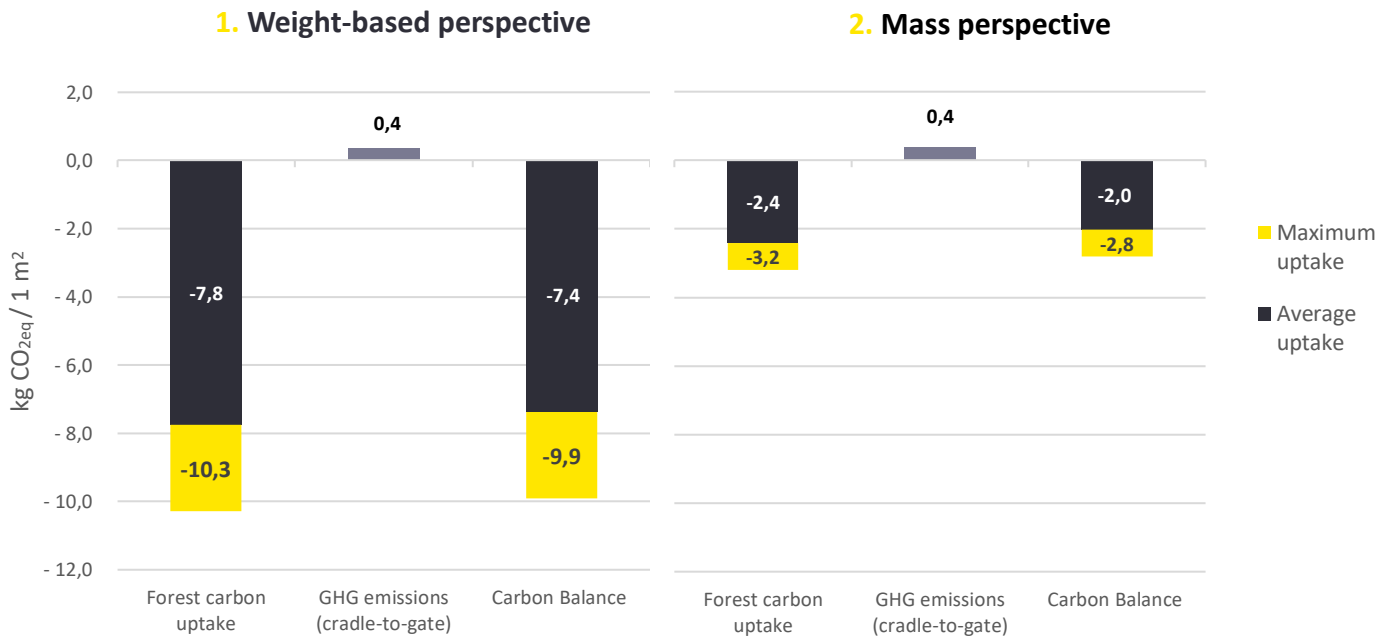
Maximum ecosystem CO_2 uptake registered (14,7 tCO_2/ha) (Costa-e-Silva et al., 2015).

with the average ecosystem CO_2 uptake being - 55 t CO_2/t cork, considering wet and dry years in well managed forests (11 t CO_2/ha).[1]

[1] figures used in "The value of cork oak montado ecosystem services, EY 2019"



Carbon balance: Underlay Plus 5080

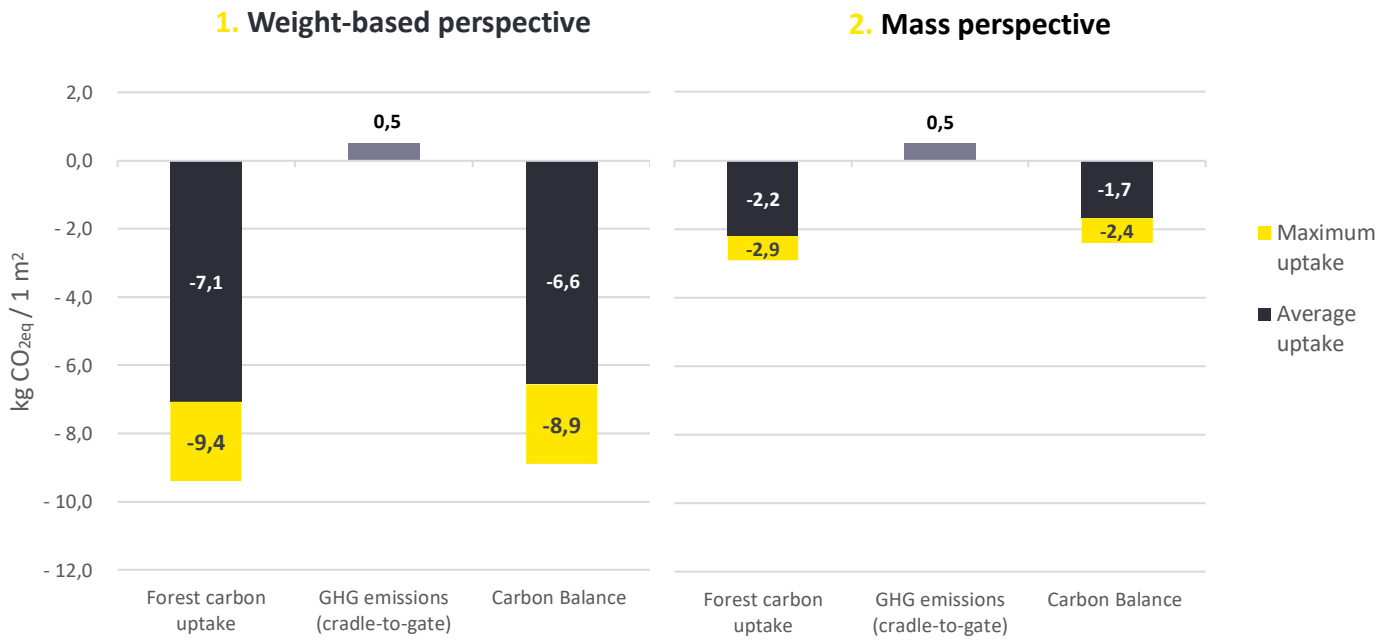


Carbon balance reaches up to:

-9,9 kg CO_{2eq} / 1 m²

considering maximum ecosystem CO_2 uptake registered in a well managed cork oak montado **-73 t CO_2/t cork**

Carbon balance: Underlay Plus 5080 VB



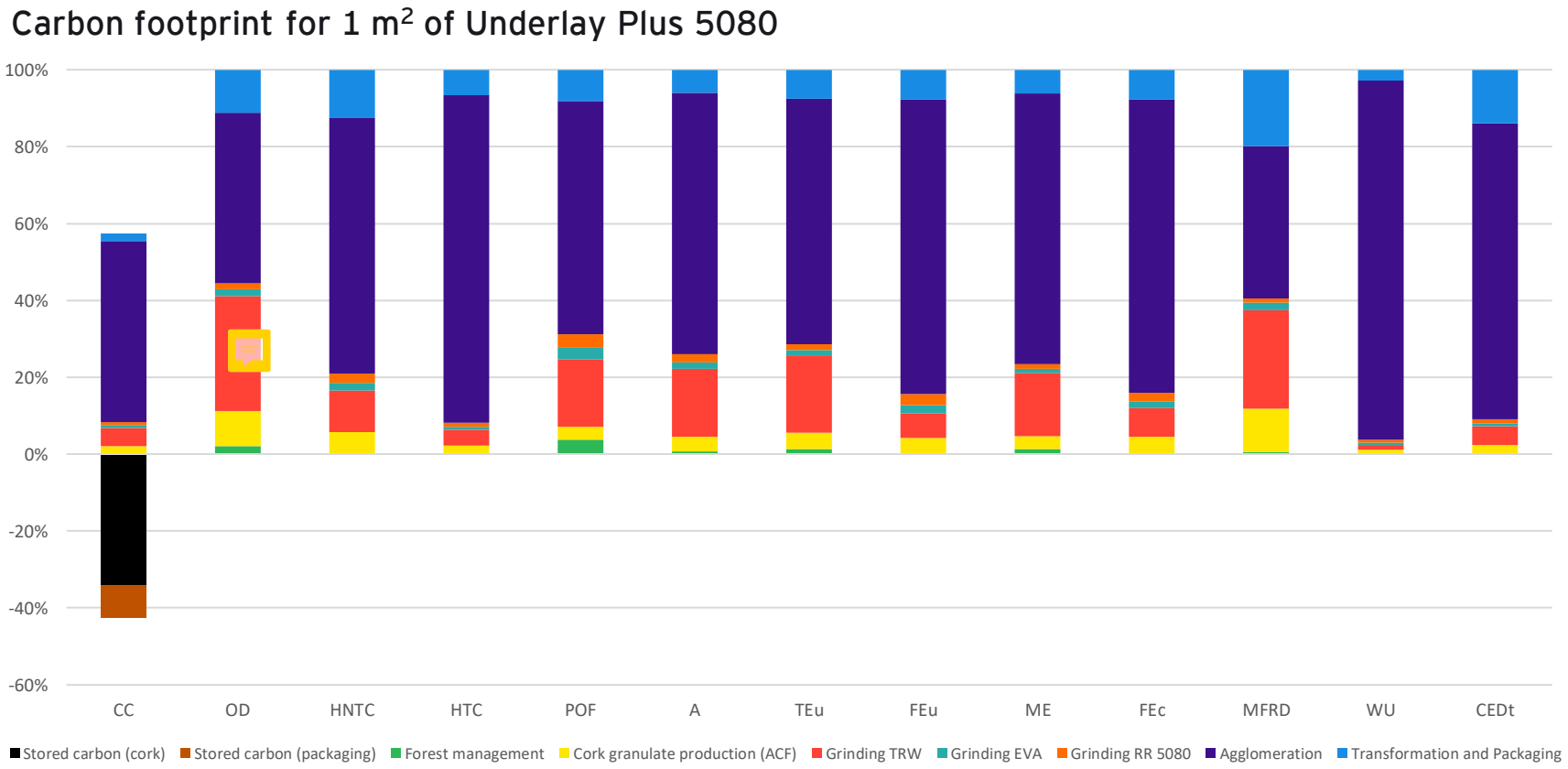
Carbon balance reaches up to:

-8,9 kg CO_{2eq} / 1 m²

considering maximum ecosystem CO_2 uptake registered in a well managed cork oak montado **-73 t CO_2/t cork**

LCA results

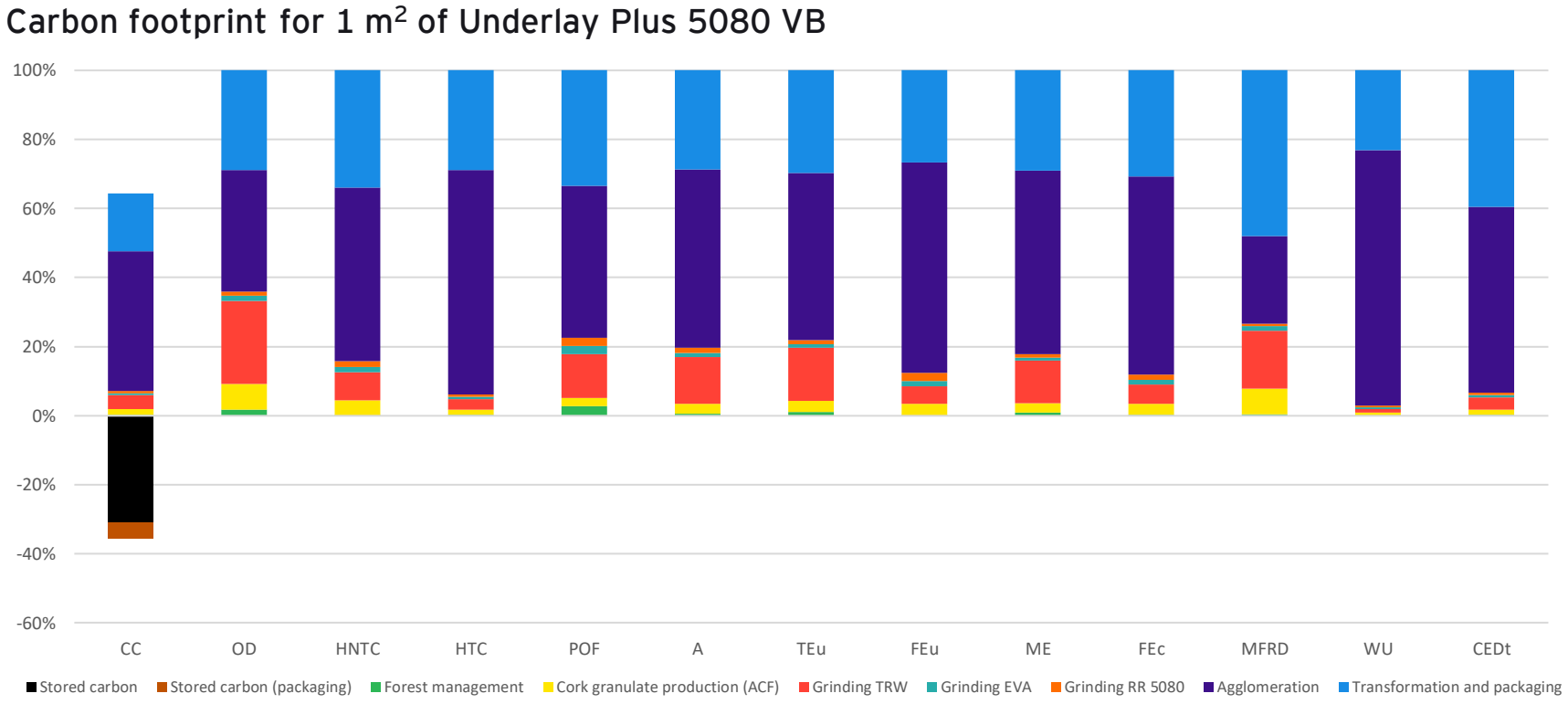
LCA results: Underlay Plus 5080



- The agglomeration binder components (polyol and isocyanates) present the highest impacts across impact categories;

LCA Indicators : CC=Climate Change; OD=Ozone Depletion; HTCN = Human Toxicity: Non-Cancer Effects; HTC=Human Toxicity: Cancer Effects; POF= Photochemical Ozone Formation; A=Acidification; TEu=Terrestrial Eutrophication; FEu=Freshwater Eutrophication; ME=Marine Eutrophication; FEc=Freshwater Ecotoxicity; MFRD=Mineral and Fossil Resource Depletion; WU=Water use; CEDt=Cumulative Energy Demand - Total

LCA results: Underlay Plus 5080 VB



- The agglomeration binder components (polyol and isocyanates) and the PE film present the highest impacts across impact categories;
- The PE film, binder and energy consumption account for the most relevant impacts od transformation stage

LCA Indicators : CC=Climate Change; OD=Ozone Depletion; HTCN = Human Toxicity: Non-Cancer Effects; HTC=Human Toxicity: Cancer Effects; POF= Photochemical Ozone Formation; A=Acidification; TEu=Terrestrial Eutrophication; FEu=Freshwater Eutrophication; ME=Marine Eutrophication; FEc=Freshwater Ecotoxicity; MFRD=Mineral and Fossil Resource Depletion; WU=Water use; CEDt=Cumulative Energy Demand - Total

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