Pre-attached Underlayment NRT 62 VB Environmental footprint

Amorim Cork Composites, S.A.

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Communication support slide deck

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Building a better working world

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Agenda

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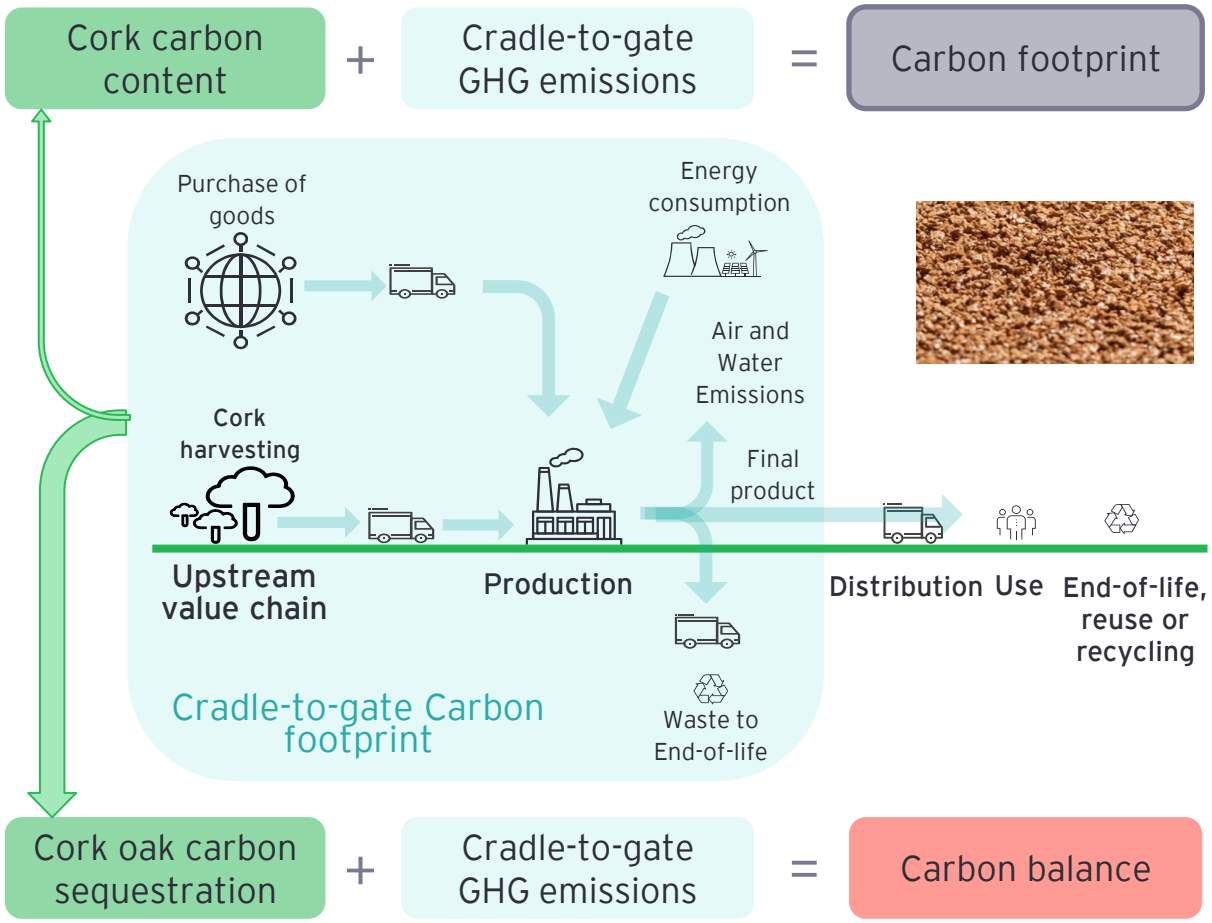
2. Carbon footprint
   Cradle-to-gate

3. Carbon balance

   Scenario analysis with carbon sequestration at the forest stage

4. LCA

   Lifecycle environmental impacts for cradle-to-gate scope for main impact categories



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About the study

About the study

Context

- Corticeira Amorim is the largest world producer of cork products, championing the sector since 1870. The company has a portfolio of products with applications in multiple industries, such as wine, construction, flooring, aeronautical, automobile, footwear, among others. The company has implemented an integrated production process that ensures that no cork is wasted.
- Cork is an ecological and sustainable material 100% natural, renewable, recyclable and reusable.
- Amorim Cork Composites, a subsidiary of Corticeira Amorim is focused in producing innovative solutions with combinations of cork and other materials, by recycling, reusing and reinventing natural and organic materials. The composite cork industry requires high levels of physical and chemical performance, providing adequate solutions to the needs of several industries such as the automotive, aerospace and aeronautical industries, the construction sector, as well as the shoe and interior design industries.
- The **main purpose** of this study is to quantify the potential environmental impacts generated by the production of Pre-attached Underlayment NRT 62 VB by Amorim Cork Composites, through a life cycle approach.
- NRT 62 VB is a pre-attached underlayment for thermal and acoustic insulation with a pre-attached vapour barrier for moisture protection, recommended for floating installations. It is produced from recycled and natural materials, such as cork, and covered with a polypropylene foil. This underlayment provides comfort, protection and longevity to resilient floors, further contributing to energy efficiency and acoustic insulation.

Product characteristics	Average dimensions
Product composition Confidential information	

About the study

Methodology

- The study analyses the environmental footprint of the Pre-attached Underlayment NRT 62 VB , through a life cycle analysis (LCA) approach.
- **Guidelines**: The study was based on ISO 14040/44 series of standards, complemented with the guidelines from the International Reference Life Cycle Data System (ILCD) Handbook - General guide for Life Cycle Assessment - Detailed guidance
- **Approach**: *cradle-to-gate (*from raw material extraction to the finished product at the factory gate)
- **Life cycle stages assessed**: forest management activities, grinding cork, drying, agglomeration, sanding, lamination, vapor barrier process and packaging, as well as transport of raw materials from suppliers
- **Functional unit***:* 1 m^2 of packed Pre-attached Underlayment NRT 62 VB
- **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). The potential climate change impacts (**carbon footprint**) of each stage were estimated selecting the impact category Climate Change from the ILCD method.
- Carbon stored in the final product is included.
- Additional scenario analysis of the potential carbon sequestration at the forest stage is also considered

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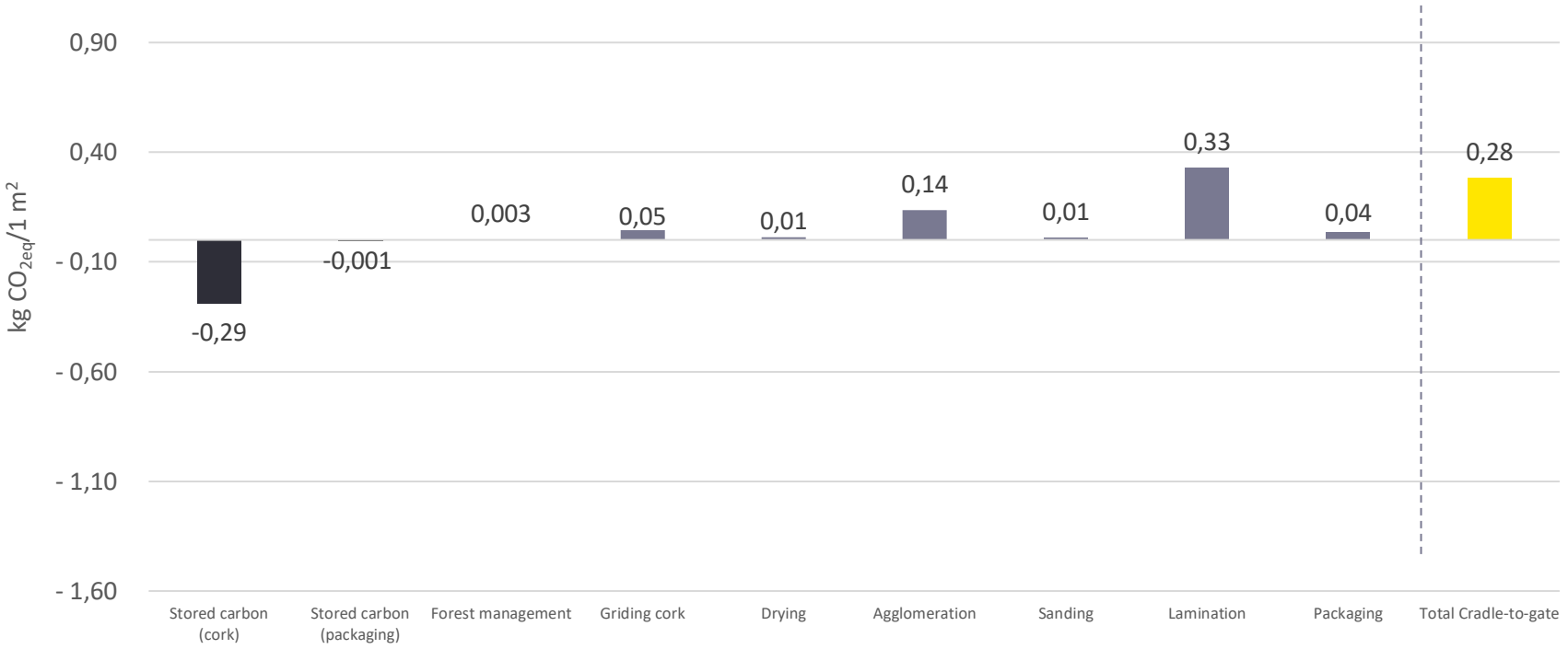
Carbon footprint

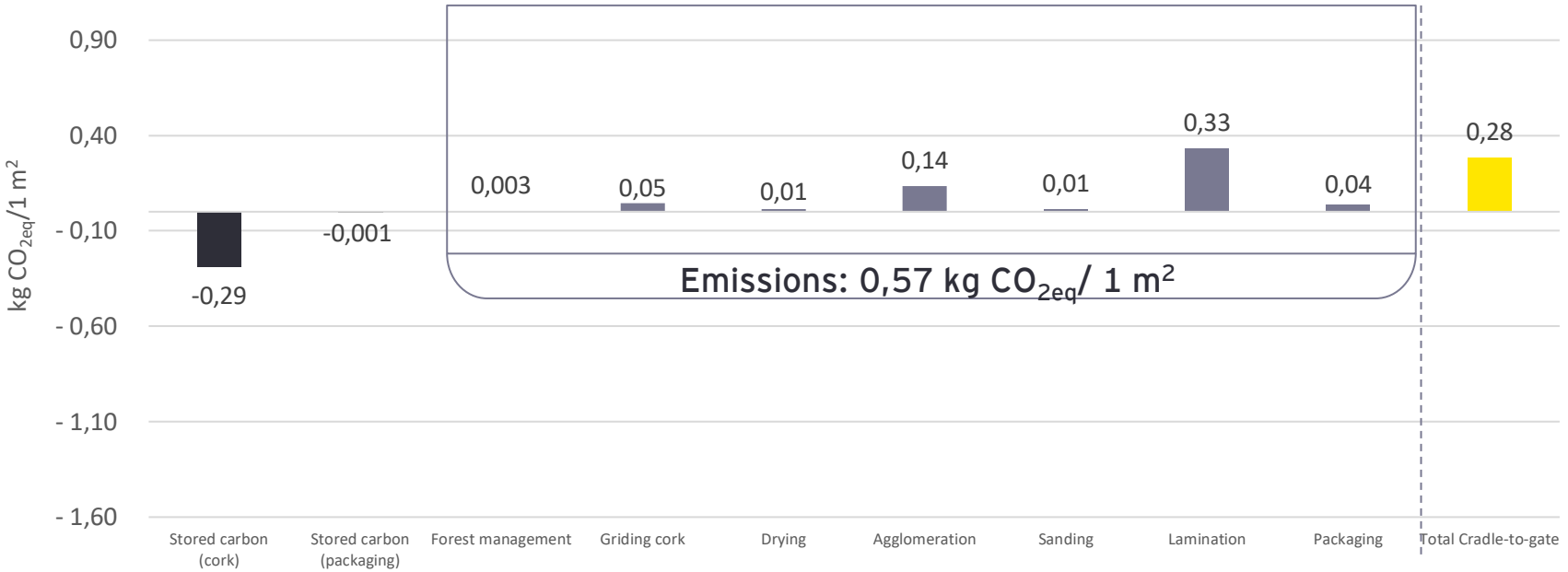
Carbon footprint: results



Corkeen carbon footprint:

- Carbon stored in cork : **-0,29** kg CO_2 /1 m^2
- Cradle-to-gate : **0,28** kg CO_{2eq} /1 m^2

Carbon footprint: results



58% emissions associated with lamination process, 24% emissions associated with agglomeration process

- Most upstream value chain activities carbon impacts (e.g. customization products as well as energy use, use of auxiliary materials and associated transport) are reflected in these stages

3

Carbon balance

Carbon balance: results

Scenario analysis with carbon sequestration in the cork oak montado

For the average weight Pre-attached Underlayment NRT 62 VB when considering carbon sequestration in the cork oak* montado:

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

- 11,1

kg CO_2/1 m^2

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

- 10,5

kg CO_{2eq}/1 m^2

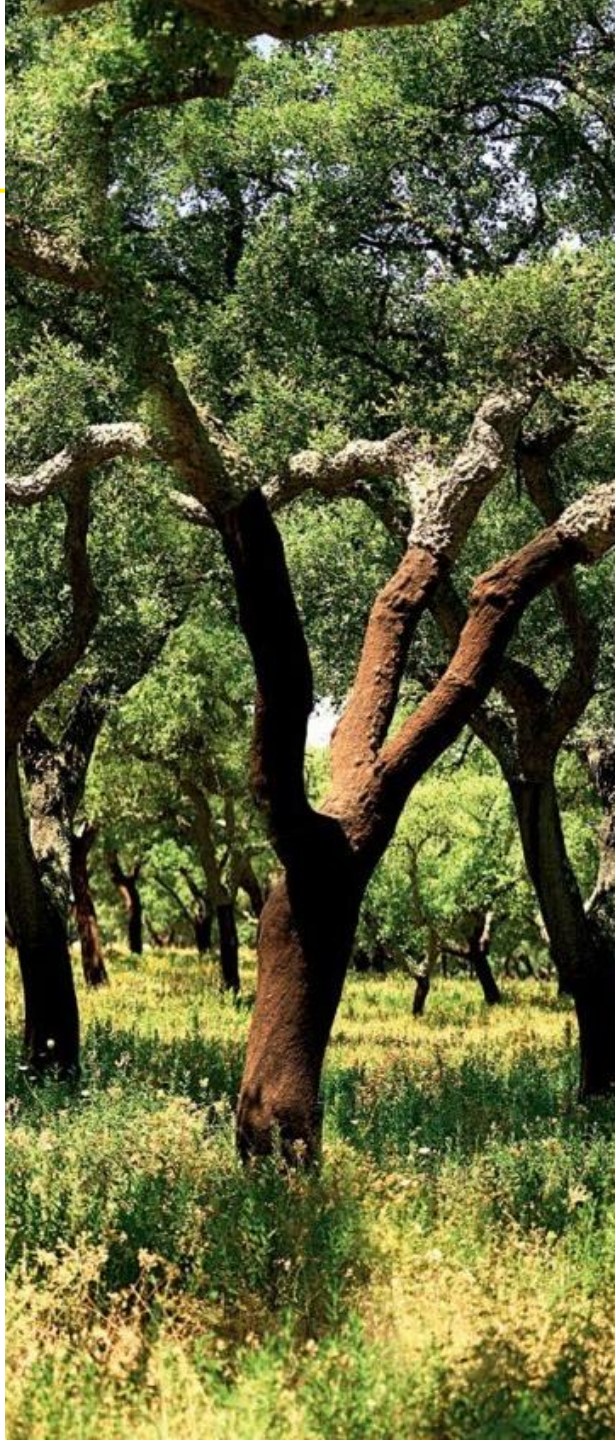
* scenario analysis based on well-managed cork oak montado

- 73 t CO_2/t cork

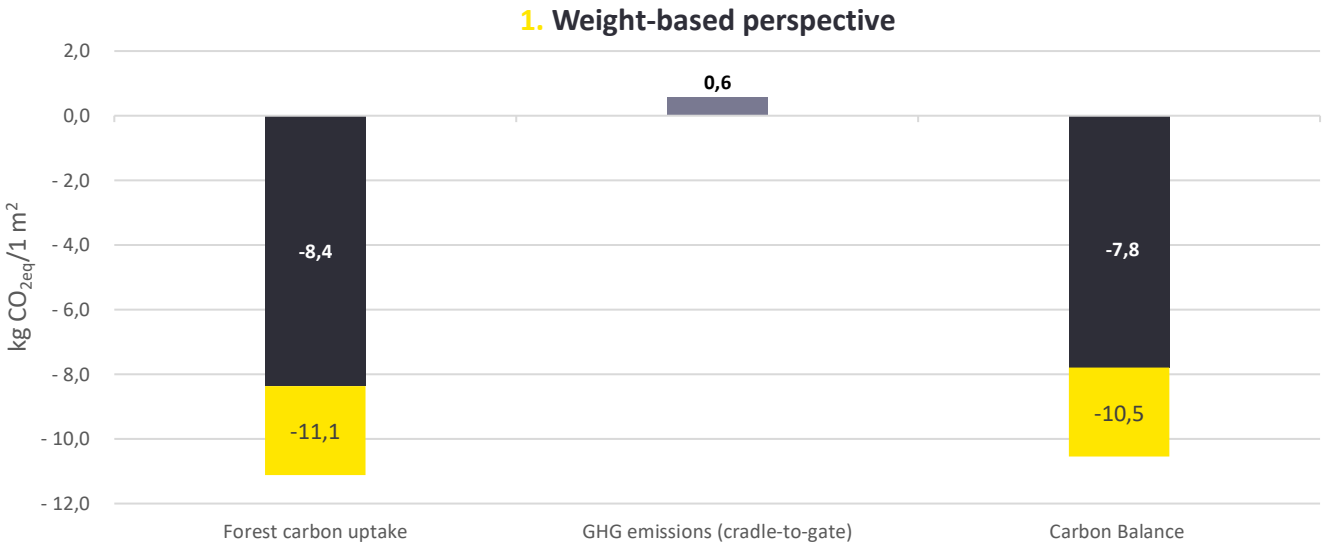
Maximum ecosystem CO_2 uptake registered (14,7 tCO_2/ha) (Costa-e-Silva et al., 2015).

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).[9]

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



Carbon balance: weight-based perspective



Pre-attached Underlayment NRT 62 VB **carbon balance** reaches up to:

-10,5 kg CO_{2eq}/1 m^2

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

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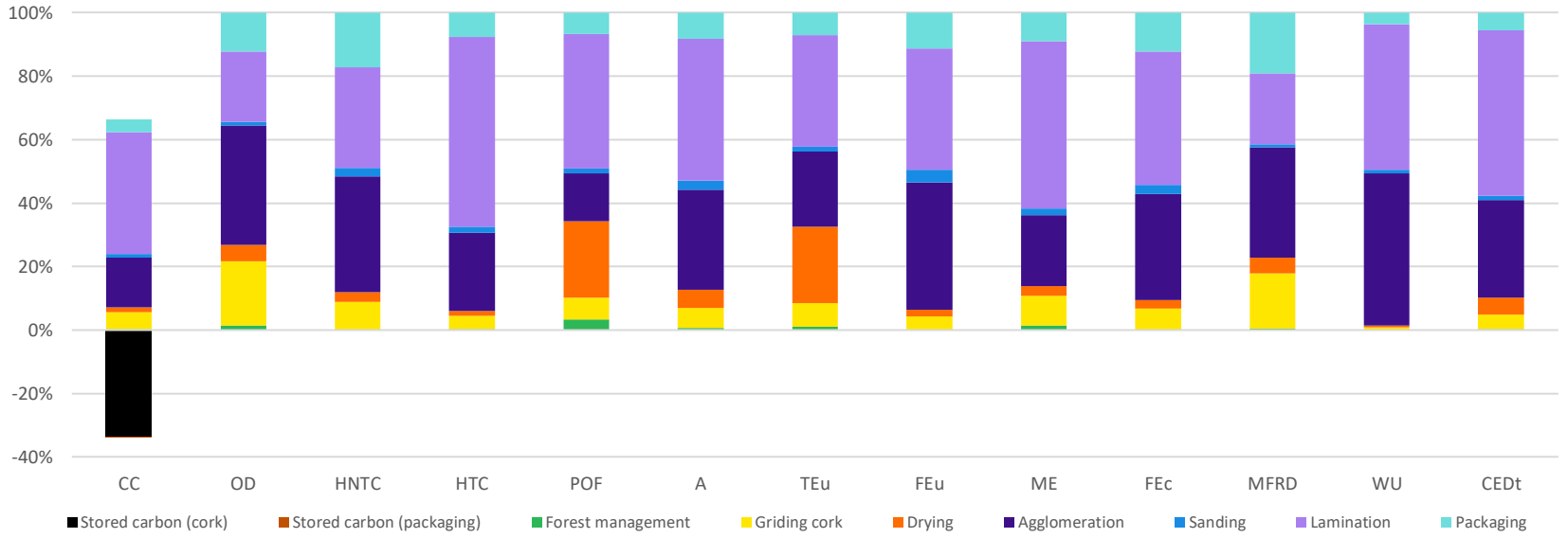
LCA environmental footprint

LCA results: 1m^2 of Pre-attached Underlayment NRT 62 VB

Carbon footprint for 1 m^2 of Pre-attached Underlayment NRT 62 VB



Stages with higher environmental impacts

- The **lamination** stage is the most impactful across impact categories, due to the components of customization products (lamination glue and plastic film PP), auxiliary materials and associated transport
- The **agglomeration process** is the second most impactful stage, due to the customization products used as well as the energy used

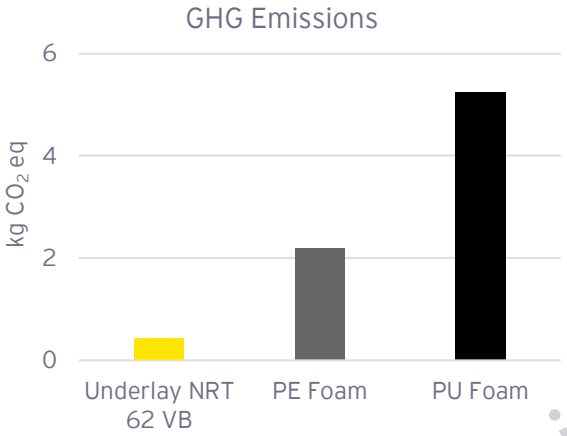
Cumulative Energy Demand indicator presents a different pattern of impact across stages

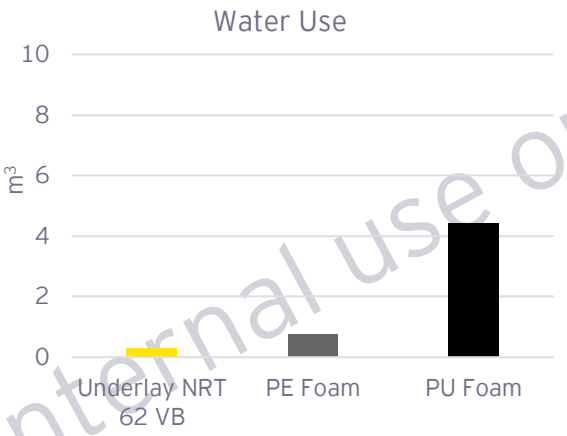
- **Grinding cork, drying** and **sanding stages** solely account for 11% of the direct and indirect use of energy across the products' lifecycle
- **Lamination (52%)** and **agglomeration (31%)** stages represent **83%** of **CED**

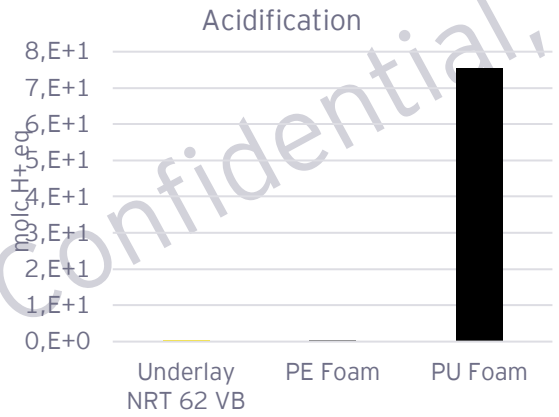
LCA Indicators : CC=Climate Change; OD=Ozone Depletion; HTCN = Human Toxicity: Non-Cancer Effects; HTC=Human Toxicity: Cancer Effects; POF= Photochemical Ozone Formation; A=Acidification; TEu=Terrestrial Eutrophication; FEu=Freshwater Eutrophication; ME=Marine Eutrophication; FEc=Freshwater Ecotoxicity;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

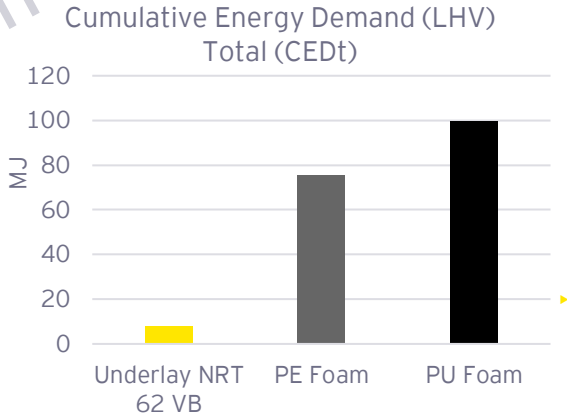
LCA results: Benchmark

- For 1 m^2 of product with 1,0 mm thickness









Highlights:

- Has **up to 16 times less** environmental impacts than average PE foam materials in typical impact categories and **up to 15 times less** environmental impacts than average PU foam materials in typical impact categories.
- Generates **over 5 times less** GHG emissions than average PE foam materials and **over 12 times less** GHG emissions than average PU foam materials.
- Consumes **over 9 times less** energy than average PE foam materials and **almost 12 times less** energy than average PET foam materials.

Note: Benchmark uses standard market activities datasets for each product assuming same product area and thickness (volume), products density was provided by ACC. Assessed impacts are based on ecoinvent Version 3.5 database (2018). Comparison is not ISO 14044 compliant and results are not third-party verified.

Key takeaways

Key takeaways

Product specific

- Pre-attached Underlayment NRT 62 VB has a carbon footprint of **0,28 kg CO_{2eq}/m^2**.
- Pre-attached Underlayment NRT 62 VB has **-0,29** kg of CO_2 **stored** per 1 **m^2**.
- Pre-attached Underlayment NRT 62 VB is associated with a forest carbon sequestration of up to **-11,1 kg CO_{2eq}/m^2.**
- Pre-attached Underlayment NRT 62 VB carbon balance can reach **-10,5 kg CO_{2eq}/m^2**.

General

- Using cork contributes to **enable cork oak forests** and its **associated ecosystem services**, such as carbon sequestration.
- By using a **combination of recycled materials and natural materials**, ACC products are able to use resources more efficiently and reduce its impacts on Climate Change and other impact categories.
- **Circular economy materials** contribute to lower resource consumption, increase resource efficiency and lower carbon and environmental footprint of products.

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