



**CARBON FOOTPRINT ANALYSIS OF VINVENTIONS NOMACORC
GREEN LINE CLOSURES BASED ON A LIFE CYCLE ASSESSMENT**

SEPTEMBER 2023



VINVENTIONS



INTRODUCTION

- Vinventions is the world's most comprehensive provider of closures for wine, spirits and edible oil industries. Vinventions supplies closure solutions that maximize performance, design, and sustainability, and its wine closure solutions are specially designed to support the diverse needs of winemakers. Its portfolio includes Nomaticorc Green Line and Blue Line, SÜBR (micro-natural), Vintop (screwcaps) and Wine Quality Solutions which includes oenological devices, equipment and services that improve the wine quality and consistency through real-time quality control
- Sustainability is central to Vinventions' core beliefs and heavily influences its strategic decisions. Sustainable Development, which is based on verifiable facts, serves as a guiding principle within Vinventions, guaranteeing the group's environmental integrity and credibility in the wine closure market. **Vinventions commissioned RDC Environment to conduct a comprehensive carbon footprint study of their Nomaticorc Green Line product line and South Pole for the 3rd-party review & certification**



INTRODUCTION

- Following the launch of the **Nomacorc Green Line** in 2013, Vinventions became the first wine closure manufacturer to offer a certified Net Zero Carbon Footprint solution. Every co-extruded closure in the patented line (Smart Green, Classic Green, Select Green, and Reserva) are produced from sustainable and renewable raw materials, derived from sugarcane (as it grows, sugarcane naturally sequesters CO₂ and this biogenic carbon is transferred to its derived closure raw material)
- The product line, which was inspired by the company’s strong desire for innovation, sustainability, and continuous improvement, offers major advances in terms of performance, aesthetics, and sustainability of wine closures. Beyond being **Net Zero Carbon Footprint**, the Green Line also guarantees TCA-free wine closures, precise oxygen management, and perfect consistency, eliminating bottle-to-bottle variations

Nomacorc Green line

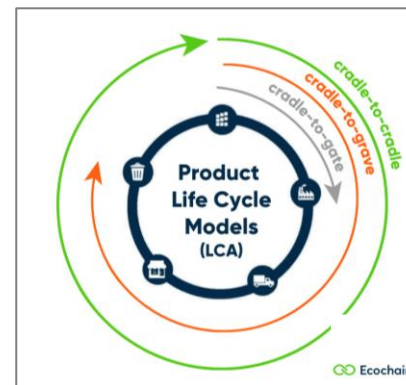


SMART GREEN CLASSIC GREEN SELECT GREEN 100 SELECT GREEN 300 SELECT GREEN 500 RESERVA

Closure Dimensions	(mm x mm)	23,0 x 42,0	23,0 x 43,0	24,0 x 44,0	24,0 x 44,0	24,0 x 44,0	24,0 x 44,0
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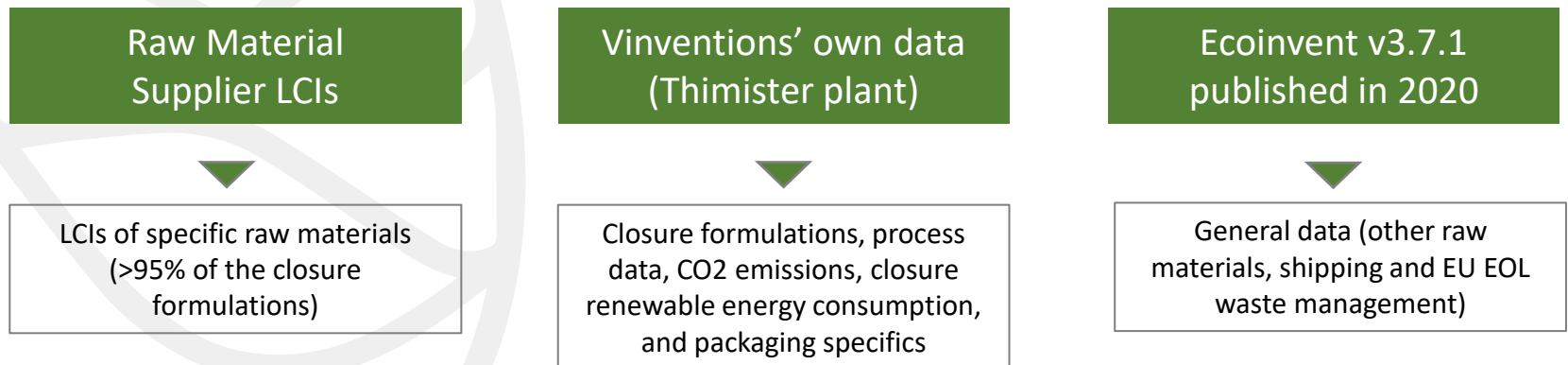
METHOD

- RDC Environment conducted a product life cycle assessment study to report the carbon footprint of 6 wine closures of the Nomacorc Green line (Smart Green, Classic Green, Select Green, and Reserva)
- **The cradle-to-grave** carbon footprint of the product is calculated accordingly to **the ISO 14067:2018 Standard**. Its value is the sum of all biogenic and fossil CO₂ emissions and based on a life cycle assessment of the climate change impact category, captures the whole life cycle of the product from cradle to grave
- **The analysis follows** principles, requirements and guidelines for the quantification and reporting of the carbon footprint of a product, in a manner consistent with the **International Standards on Life Cycle Assessment (LCA): ISO 14040 and ISO 14044, and the review and certification process follows ISO 14071**



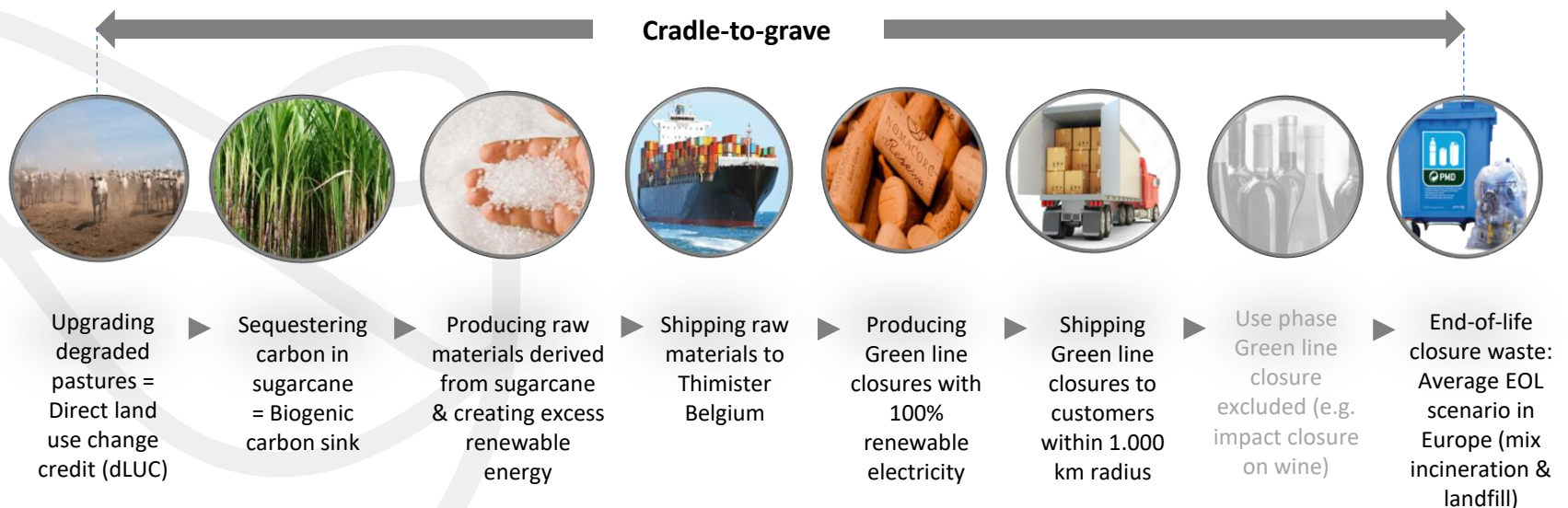
METHOD

- CO₂ emissions & removals are attested by proof of:** (i) direct land use change (dLUC) credits when going in Brazil from degraded pastures to sugarcane plantations (leading to a higher carbon content of the soil), (ii) sustainable sugarcane agriculture, (iii) additionality of creating a carbon sink by sugarcane conversion to materials vs conversion to biofuel in Brazil, and (iv) additionality of consumed renewable power during raw material and closure productions
- Software & data collection:** The **RangeLCA software**, developed by RDC Environment was used. The inventory database used is **Ecoinvent v3.7.1**, published in 2020. The system model used is “allocation, cut-off by classification”. In addition to ecoinvent, road transport is modelled using the COPERT 5 tool. Raw materials Life Cycle Inventory (LCI) files from suppliers were used when available. Their LCI results were given in **ILCD EF 3.0 format** in an XML dataset archive which has been imported into the RDC-Environment software. The results were directly **expressed in PEF categories** and with Climate Change including the biogenic CO₂ (emissions and removals).



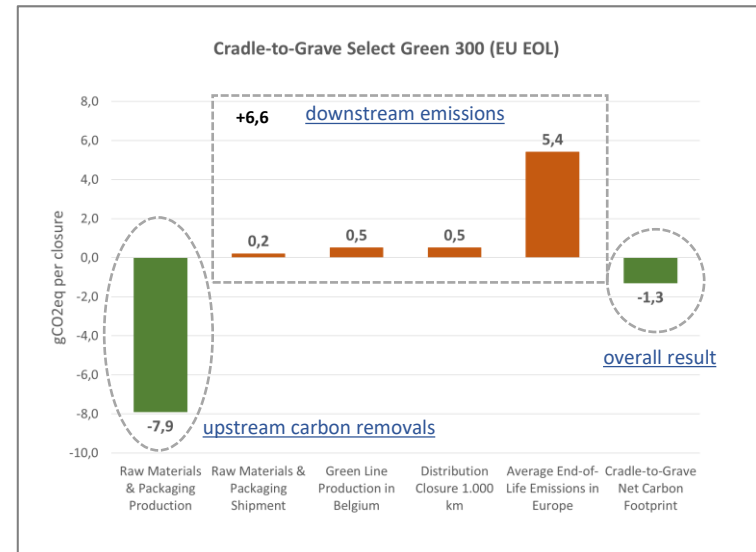
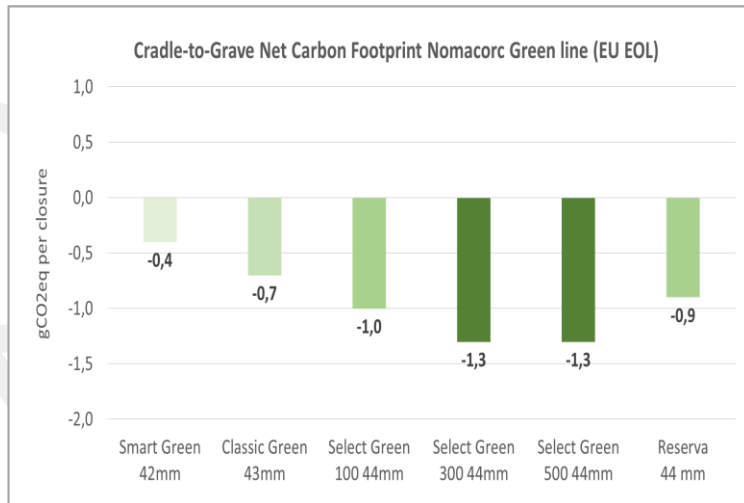
FUNCTIONAL UNIT, SCOPE & INTENDED USE

- **Functional unit:** One Nomacorc Green line closure (Smart Green, Classic Green, Select Green, or Reserva) to seal a glass bottle of wine & allowing the requested conservation period
- **Scope:** To evaluate the carbon footprint of each closure throughout the entire life cycle (raw material and packaging production, closure manufacturing, distribution and end-of-life phases = **cradle-to-grave**) of 6 different closures from the Vinventions Nomacorc Green Line manufactured in Thimister (Belgium). It includes closure distribution to customers in Europe at 1.000 km (e.g. Bordeaux), and the impact of an average EU closure waste handling (mix of incineration & landfill). Use phase (e.g. bottling, bottled wine storage, logistics from the winery, and wine spoilage through closure impact) is excluded.
- **Intended Uses:** *Internal:* To identify the hotspots contributing to the overall environmental impacts to direct future improvements (ecodesign). *External:* To demonstrate and communicate the environmental performance of the Nomacorc Green Line closures to professional customers



RESULTS

- Each closure from the **Green Line** is different, generating different results. However, **all the analyzed closures** from this product line **have a Net Negative Carbon Footprint (cradle-to-grave analysis)** ranging from -0.4 g CO₂eq per Smart Green closure to -1.3 g CO₂eq per Select Green 300 & 500 closures
- A net negative value is obtained because the **upstream carbon removals** at raw material & packaging production, which include the biogenic carbon sequestration, excess renewable energy production, and the dLUC credit, **offset all downstream carbon emissions** of logistics, closure manufacturing, packaging and the average European end-of-life waste disposal



CONCLUSIONS

- **Vinventions commissioned RDC Environment** to conduct a comprehensive cradle-to-grave carbon footprint study on 6 of the Nomacorc Green Line closures, **and South Pole for the 3rd-party review & certification**
- The study is carried out **in accordance with the ISO standard 14067:2018** as requested by the most recent environmental legislation on anti-greenwashing behaviors in advertising, and the **review & certification is in accordance with ISO 14071**
- The **cradle-to-grave analysis** includes raw material production, logistics of materials and closures, manufacturing of closures, packaging, an average EU EOL waste handling, and it excludes the use phase of the closure (because all **Nomacorc closures** behave the same: **preventing wine spoilage** through closure impact (e.g. cork taint) **avoiding extra environmental impact**)
- **Each closure from the Nomacorc Green Line** is different, generating different results. However, all analyzed closures from this product line **have a net negative carbon footprint** ranging from $-0.4 \text{ CO}_2\text{eq g}$ (for Smart Green closures) to $-1.3 \text{ CO}_2\text{eq g}$ (for Select Green 300 closures)
- The main reasons and conditions for this performance are (i) the **increase of carbon soil** when going from degraded pastures to sugarcane plantations, (ii) the **carbon sink in sugarcane-derived raw materials**, (iii) the **excess renewable energy production** during sugarcane processing, (iv) **the use of 100% renewable energy in our production** in Thimister, Belgium, and (v) having a **2022 average European plastic waste management** scenario being a mix of incineration and landfill
- The carbon footprint analysis demonstrates that, to our knowledge, **Nomacorc Smart Green, Classic Green, Select Green 100, 300 & 500, and Reserva** stand out as **the only wine closures currently on the market with a Net Zero Carbon Footprint complying to the ISO standard 14067:2018**

REFERENCES

- ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification; ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework; ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines; ISO/TS 14071:2014 Environmental management — Life cycle assessment — Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006
- Decree No. 2022-539 of April 13, 2022 (French legislation) on carbon offsetting and carbon neutrality claims in advertising (<https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000045570611>) as part of Article 12 of the law n° 2021-1104 of August 22, 2021, fighting against climate change and reinforcing resilience to its effects
- Database ecoinvent v3.7.1, published in 2020 with system model “Allocation, cut-off by classification”. COPERT 5 (Computer Program to Calculate Emissions from Road Transport, 2020): software tool used world-wide to calculate air pollutant and greenhouse gas emissions from road transport (<https://www.emisia.com/utilities/copert/>). The development of COPERT (reference database for Europe for modelling road transport air emission) is coordinated by the European Environment Agency (EEA)
- Joint Research Center (JRC) technical report - European Commission - Product Environmental Footprint (PEF) method, Zampori L, Pant R 2019 (EF package 3.0, 2019) + European Commission, PEF methodology “Annex_C_V2.1_May2020”
- “Life Cycle Assessment on Green HDPE and Fossil HDPE - April 2017” performed by “ACV Brasil” consulting company in compliance with ISO 14040:2006 and ISO14044:2006 ; reviewed in compliance with ISO 14071 by Dr. Andreas Detzel, ifeu, Heidelberg, Germany (chair), by Mirjam Busch, ifeu, Heidelberg, Germany and by Professor Ramani Narayan, Michigan State University, United States of America)