

Summary of the Life Cycle of a Bio'teille vs. a glass bottle

Study carried out by the Pôle Eco-conception
August 2021

Validated by the CCI's critical review



Why a LCA* ?

Objectives of the LCA study

- Identification of environmental issues in the creation of a new container: the Bio'teille
- Comparison of its impact with a standard glass bottle
- Scientific evidence
- Understanding by the general public

Why the Pôle éco-conception ?

- National Centre on Eco-design and Life Cycle Performance
- Founder of the European network of eco-design centres and operates at national level in close collaboration with Ademe.
- Compliance with the recommendations of ISO 14040 and 14044

* : Life Cycle Analysis

Description of the products modelled



Bio'teille

- Moulded fibre wine bottle containing a flexible single material plastic bag
- Decomposable and suitable for the plastic and paper/cardboard recycling industry in France
- Market in France
- Total weight: 53 g

COMPONENT	MATERIAL	MASS
Shell	Recycled moulded fibre	35g
Plastic pouch	PE + EVOH	11g
Cap	PE HD	6g
Label	Coated paper	1g
Glue	Acrylic glue	/



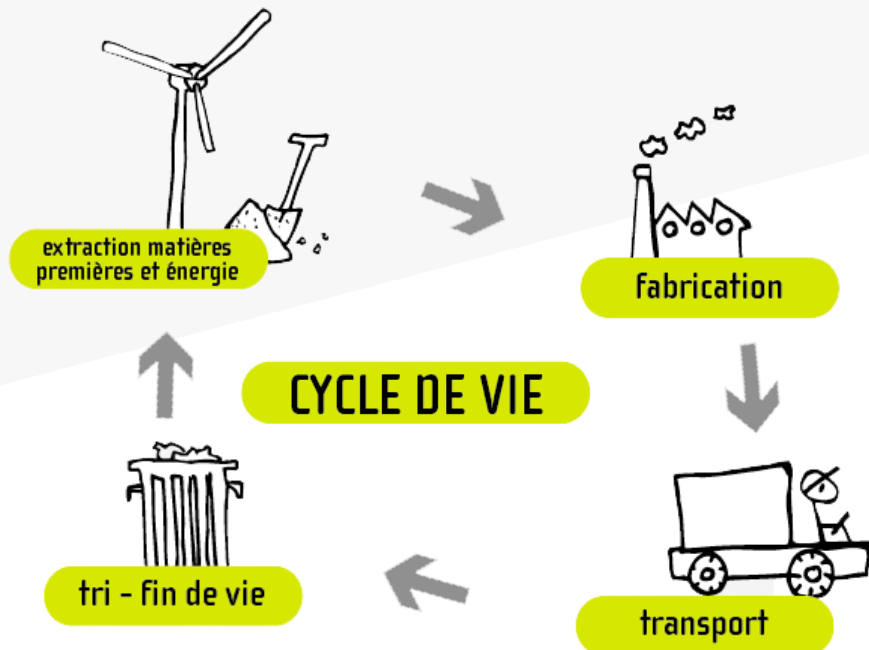
Glass Bottle

- Glass wine bottle
- Recyclable in the glass industry
- Market in France
- Total weight: 442 g

COMPONENT	MATERIAL	MASS
Glass bottle	83,5% of recycled glass & 16,5% of virgin glass	430g
Cap	Liege	10g
Label	Coated paper	2g
Glue	Acrylic glue	/

Methodology of the analysis

Life cycle assessment aims to evaluate the environmental impacts of a product at all stages of its life cycle



In this study, the results of the analysis are presented by distinguishing four life cycle stages:

- ✓ Raw materials for the manufacture of materials
- ✓ Manufacturing processes
- ✓ Transport & supply
- ✓ End of life (from consumer to waste treatment)

Methodology of the analysis

The 5 environmental impact indicators to measure environmental performance in each life cycle stage

Climate change (kg éq. CO₂) : **Greenhouse effect** is a natural phenomenon that **maintains a temperature on Earth** that is conducive to the development of life. **Human activities are amplifying this phenomenon** too quickly for most species to adapt to rising temperatures.

Acidification (kg mol H⁺ éq) : Increase in **acidifying substances** (sulphuric acid, hydrochloric acid, etc.) in the soil, **in a watercourse or in the air** from sulphur dioxide and nitrogen oxides (emitted during the combustion of coal and oil), which cause **damage to vegetation** and threaten the **balance of biodiversity**.

Aquatic eutrophication (kg P éq) : "**Asphyxiation**" of waters by the accumulation of nutrients (nitrates, phosphates, etc.) from domestic and industrial wastewater, agriculture and intensive livestock farming, causing a **proliferation of algae** which **consume the oxygen** present in the water and endanger the fauna and flora.

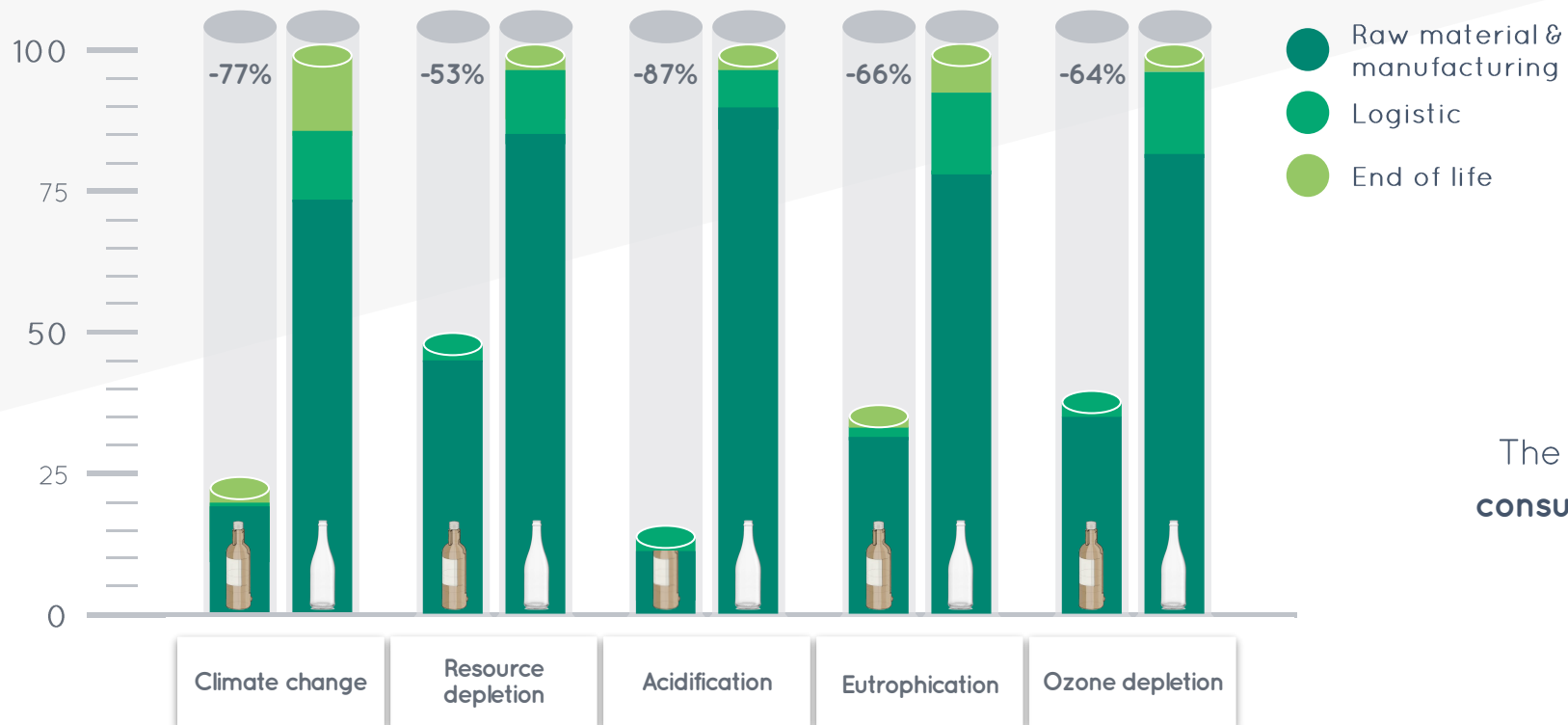
Resource depletion (kg Sb éq) : Represents the **extraction of non-renewable minerals and fossil fuels** (oil, copper, gold, lithium, etc.) based on available reserves and current consumption.

Depletion of the ozone layer (kg CFC-11 éq) : Represents the **emissions into the air of gases** that contribute to the destruction of the ozone layer. The ozone layer blocks part of the sun's ultraviolet rays. Its destruction **increases the risk of cancer** (skin, etc.).

Results: Environmental impacts

Comparison of environmental impact indicators integrating the life cycle

Percentages

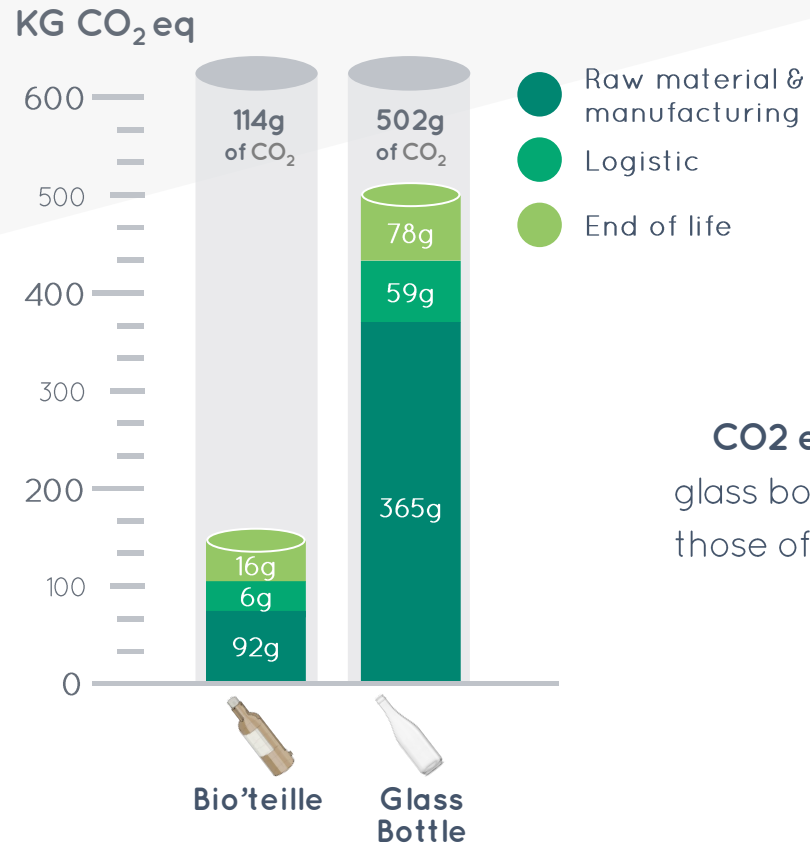
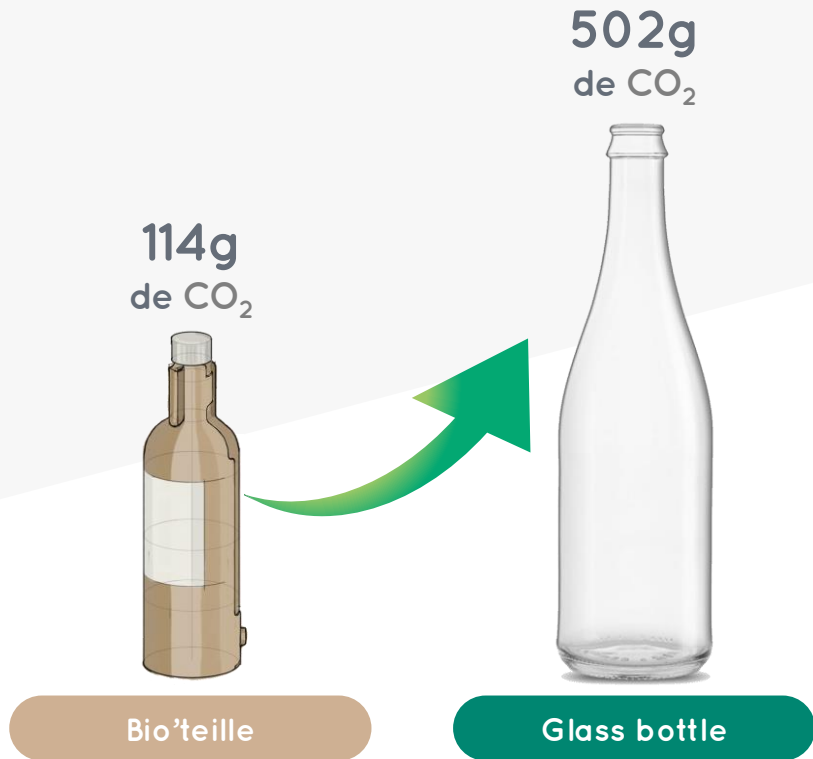


3 X

The Bio'teille is **3 times less energy consuming** than the glass bottle over its entire life cycle.

Results: Focus on CO2 emissions

Comparison of greenhouse gas emissions (in grams per litre)



5 X

CO₂ emissions generated by a glass bottle are **5 times higher** than those of the Bio'teille in its life cycle.

Scope of the study

Taking into account the specificities of the French waste management context



Bio'teille

End of life scenario	Recycling rate (%)	Incineration rate (%)	Landfill rate (%)
Shell	64,9	22,5	12,6
Plastic pouch	10	57,6	32,4
Cap	10	57,6	32,4
Label	64,9	22,5	12,6



Glass bottle

End of life scenario	Recycling rate (%)	Incineration rate (%)	Landfill rate (%)
Glass bottle	70,7	18,8	10,5
Cap	0	64	36
Label	0	64	36

Waste management in France - ADEME & CITEO 2020 data

Conclusion and openings

- The **ecological footprint** of a packaging is mainly due to the **resource used** for its material from the beginning.
- Known for its **high recyclability (70%)**, **glass** nevertheless has a **high environmental impact** in its life cycle, on all impact indicators.
- **The greenhouse gas emissions** produced by a glass bottle are **3 to 5 times higher** than those of brick and plastic bottles.
- Single-material plastic packaging is now a **sustainable alternative** for food packaging thanks to its integration into the sorting system since the extension of sorting instructions in France.

See the full study 