



POCKET GUIDE
KLABIN
DECARBONIZATION

OVERVIEW

Paris Agreement and the NDCs

With the main objectives of curbing global warming and expanding global efforts to limit the rise in temperature to 1.5°C and prevent it from exceeding 2°C by the end of the century, the Paris Agreement is a voluntary commitment, in which each country defines its Nationally Determined Contribution (NDC) with the domestic targets it will follow to reduce greenhouse gas emissions and strategies for its achievement.



In Brazil, the NDC objectives are as follows:

- Achieving indicative climate neutrality (zero net emissions) in 2050.
- Implement mitigation actions and adaptation to climate change.
- Reduce methane emissions by 50% by 2030.
- 37% reduction in emissions by 2025 (base year: 2005).
- 50% reduction in emissions by 2030 (base year: 2005).

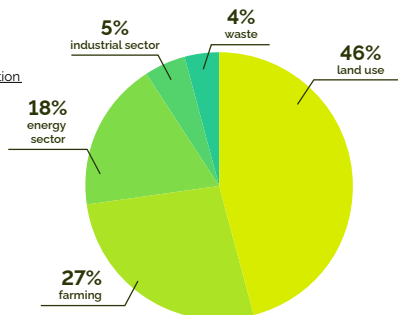
GHG emissions in Brazil – 2020

2.16 billion tons of CO₂ equivalent (GtCO₂eq).¹

Brazil is the 5th largest emitter, accounting for for 3.2% of global emissions.

¹ Source: Climate Observatory Greenhouse Gas Emission Estimation System

Profile of emissions in Brazil



Climate benefits of the pulp and paper sector: potential compared to other sectors



2.6 billion tons of CO₂eq in preserved forests.



The country's 9.55 million hectares of forest planting area are projected to account for pooling almost 1.9 billion tons of CO₂eq.²

² Source: Iba Annual Report 2021

- Carbon removal by preserved and planted forests.
- Carbon pool in preserved and planted forests.
- Emissions avoided by the use of renewable sources such as biomass.
- Carbon pool in forest products.

AT KLABIN

Climate-related KODS targets

- Reduce GHG emissions (Scope 1+2) by 25% per ton of pulp, paper and packaging by 2025, from 2019 base year.
- Reduce GHG emissions (Scope 1+2) by 49% per ton of pulp, paper and packaging by 2035, from base year 2019.
- Capture 45 million tons of CO₂eq from the atmosphere by 2030.

Scopes

Since 2003, Klabin has accounted for its inventory of greenhouse gas emissions according to the specifications of the Brazilian GHG Protocol Program, considering all direct and indirect emissions from industrial and forestry operations in Brazil, based on scopes 1, 2 and 3.

Regarding Scope 3 emissions, Klabin has been working on expanding the measurement of emissions from the processing categories of products sold (category 10), end-of-life treatment of products sold (category 12), and continuing to expand the accounting of emissions of goods and services provided (category 1).

Scope 1	Scope 2	Scope 3
Direct GHG emissions from sources that belong to or are controlled by the organization.	Indirect GHG emissions, by the acquisition of electricity consumed by the company. Since 2019, Klabin considers the methodology based on the choice of purchase in its results.	All other indirect GHG emissions, which are a consequence of the company's activities, but occur in sources that do not belong or are not controlled by the Company.

From 2003 to 2021, there was a 66.5% reduction in specific scope 1+2 GHG emissions.

Distribution of Klabin's GHG emissions:

Scope 1	Scope 2	Scope 3
783,792 tCO ₂ eq 60%	19,904 tCO ₂ eq 2%	493,933 tCO ₂ eq 38%

Scope 1 categories:

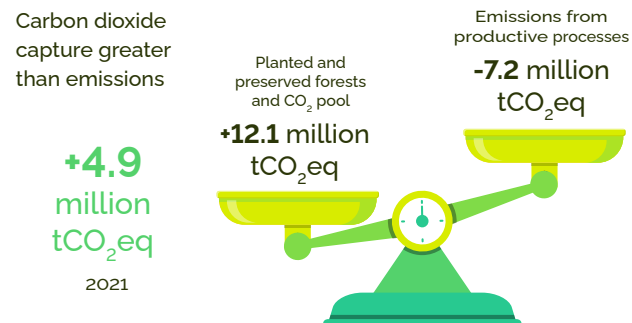
- Stationary combustion (74.6%)
- Mobile combustion (23.9%)
- Fugitive emissions (0.6%)
- Industrial processes (0.0%)
- Agricultural activities (0.9%)

Scope 3 categories:

- Goods and services purchased (22.9%)
- Fuel- and energy-related activities not included in Scopes 1 and 2 (0.5%)
- Transportation and distribution – upstream (75.8%)
- Waste generated in operations (0.1%)
- Business travel (0.1%)
- Employee commute (0.6%)

Carbon balance

Klabin's positive carbon balance



Learn more: www.klabin.com.br

Emission reduction commitments



SBTi – Science Based Targets initiative

Commitment to reduction goals led Klabin to be the only Brazilian company invited to join the COP26 Business Leaders Group.



Business Ambition for 1.5°C

Campaign led by United Nations (UN) agencies and SBTi.

NETZERO

Net Zero

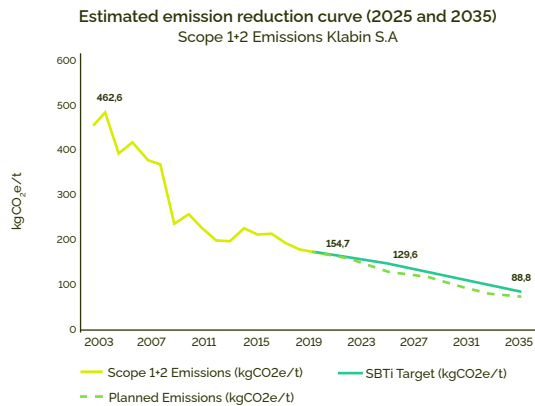
Targets set by organizations aligned with SBTi's Net Zero Standard, committed to producing emissions close to zero by 2050.

ImPACT NETZERO

NetZero Impact

Klabin's campaign to raise awareness among the private sector and society about climate change mitigation, in partnership with the Brazil Network of the UN Global Compact.

Klabin's GHG emission reduction targets were approved by SBTi in May 2021.



TCFD

In 2020, Klabin became a TCFD Supporter with the goal of improving the management of climate-related strategies and cooperating with the construction of a more transparent and resilient market.

What is TCFD?

It is a global institution with 31 members of the G20³, which brings together central bank presidents and ministers of the economy of the member countries.

Why?

More effective disclosures promote more informed and sustainable investment decisions.

Objective

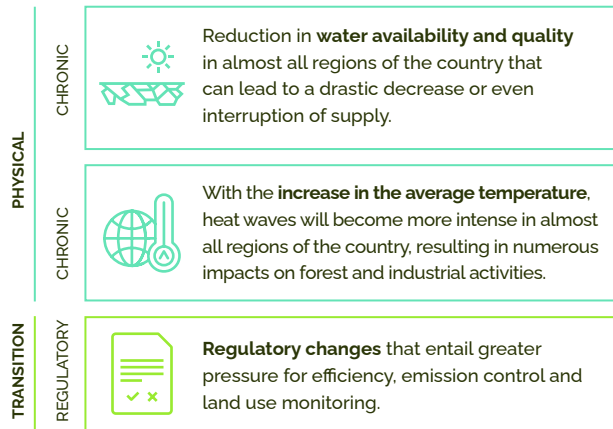
Develop recommendations for more effective and standardized disclosures related to climate risks and opportunities.

How?

Through recommendations structured around four thematic areas: climate governance, climate strategy, risk management and metrics and goals.

3. The G20 is a group of ministers of the economy and central bank presidents of the 19 countries of the world's most developed economies, plus the European Union. The G20 is a kind of forum for cooperation and consultation on international financial affairs.

Based on pre-established selection criteria, in 2021, five risk factors were considered relevant for Klabin, three of which were prioritized in a first phase.

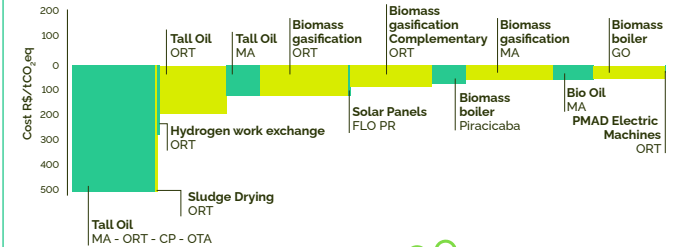


The other two relevant risk factors will be prioritized in the next step: **increase in the intensity of storms and other extreme events** as warming increases; and **stakeholder pressure**, change in consumption pattern and perception of the sustainability of the forestry and pulp and paper sector, or individual companies.

Internal carbon pricing

In the Marginal Abatement Cost Curve (MACC), Klabin identifies, in a practical way, the technological options available to the Company, their costs and potential for mitigating GHG emissions.

Marginal Abatement Cost Curve (MACC Curve)



Carbon footprint



Every human attitude has some impact on the planet, no matter how small. The carbon footprint calculates CO₂ emissions during all stages of the product lifecycle. In addition, it helps identify the greatest opportunities to reduce our emissions, thus contributing to a product with lower climate impact.

Klabin analyzes the carbon footprint of its products, quantifying CO₂ emissions from their conception (considering land use, inputs, and materials) to their production, distribution, end of life, and final disposal.

DECARBONIZATION PLAN

Energy efficiency

- Increased productivity.
- Increased recycling.
- Optimization of plant performance.
- Improvement in emission measurement and accounting.

Deep decarbonization

- Removal of carbon dioxide from the atmosphere.
- Measurement of carbon pooled in soil/below ground.
- Use of clean energy (hydroelectric, solar or wind).
- Use of green fuels (hydrogen and biomethane).

Fuel change

- Replacement of non-renewable fuel consumption in stationary emission sources.
- Replacement of diesel in own and third-party road transport.
- Electrification of vehicles and machinery.
- Replacement of diesel in rail transport.
- Replacement of diesel in maritime transport.
- Improvement in the carbon footprint of purchased raw materials.