

Spark Top One stopper carbon footprint

Amorim Cork, S.A.

Final results

March 2024

Disclaimer

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

Agenda

1. About the study

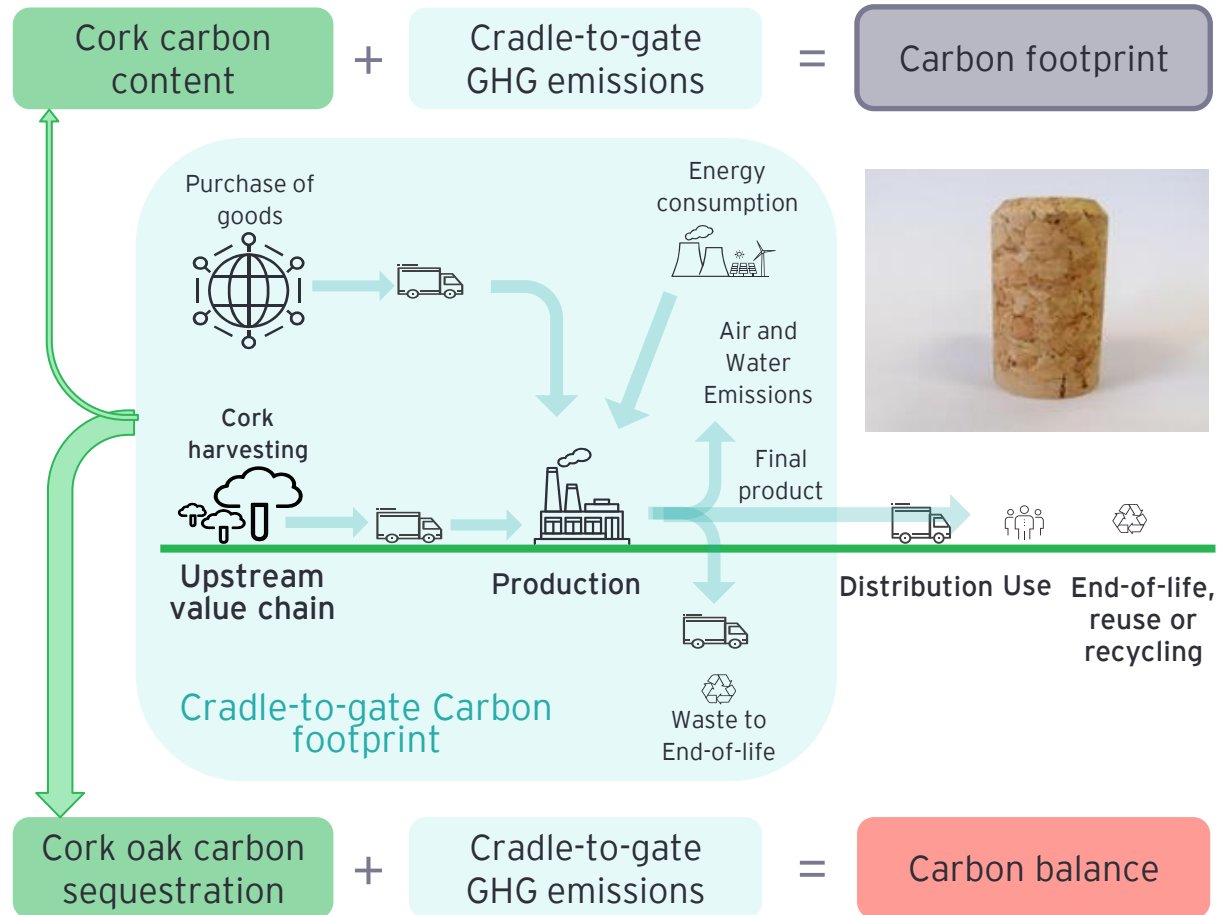
2. Carbon footprint

Cradle-to-gate
+
Expedition to UK

3. Carbon balance

Scenario analysis with carbon sequestration at the forest stage

4. Conclusions



1

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, the cork stoppers business unit of Corticeira Amorim, is the world leader in production and supply of cork stoppers with its own distribution network, which places the company in a position to provide stoppers for any wine segment, anywhere in the world.
- ▶ Amorim Cork can offer a large range of high-quality solutions for the wine industry, from natural cork stoppers, to technical cork stoppers and sparkling and spirits wines stoppers.
- ▶ The **main purpose** of this study is to quantify the potential greenhouse gas emissions generated by the Spark Top One stopper produced by Amorim Cork, through a life cycle approach.
- ▶ Amorim's Spark Top One is recommended for quality sparkling wines with ageing potential less than 18 months.

Characteristics	Spark Top One
Year of production assessed	2021
Specific mass (kg/m ³)	266 ± 7.48
Average product weight (g)	9 ± 0.28
Components (%)	84.4% cork 15.6% customization products



About the study

Methodology

- ▶ The study analyses the carbon footprint of the Spark Top One stopper, 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) + *expedition to UK*
- ▶ **Life cycle stages assessed:** forest management activities, cork preparation and disc manufacturing, cork granulate manufacture, including cork transport from the supplier, Spark Top One stopper production, finishing and packaging
 - ▶ For comparison with previous studies, the stage of expedition of the final product to a bottling site (assumed to be in UK, as a common destination) is also assessed, although not included under a cradle-to-gate approach and disclosed as additional information.
- ▶ **Functional unit:** 1000 stoppers
- ▶ **Modelling software and database:** SimaPro 9.5 with ecoinvent 3.5 database
- ▶ **Method:** Midpoint characterization factors recommended by the International Reference Life Cycle Data System (ILCD). The potential climate change impacts of each stage were estimated selecting the impact category Climate Change from the ILCD method

Impact category	Unit	Description	Reference
Climate Change (CC)	kg CO ₂ eq	Global Warming Potential (GWP) calculating the radiative forcing over a 100-year time.	Fourth Assessment Report of the Intergovernmental Panel for Climate Change (IPCC) 2007

About the study

Methodology (cont.)

▶ Data collection procedure



- ▶ Biogenic emissions and CO₂eq removals due carbon content in the reference flow are also considered, with the following assumptions:
- ▶ All cork raw materials that enter the system were considered to have a similar amount of carbon stored. The calculation of CO₂ uptake is based on the atomic weights of carbon (12) and carbon dioxide (44), as well as the carbon fraction (dry basis) of 55% and a moisture fraction of 6%¹.
 - ▶ Given the purpose of the assessment, emissions from biomass energy production are considered neutral, due to the assumption that the CO₂ that is being released in the incineration process (biogenic CO₂) was captured in the previous product stage 1 - forest management and cork harvesting (uptake), as so, it is no more than a short term delayed emission, resulting in a net neutral balance of CO₂ emissions ^{2,3}.

¹Dias, A.C., Arroja, L., 2014b. A model for estimating carbon accumulation in cork products. Forest Systems 2014 23(2): 236-246

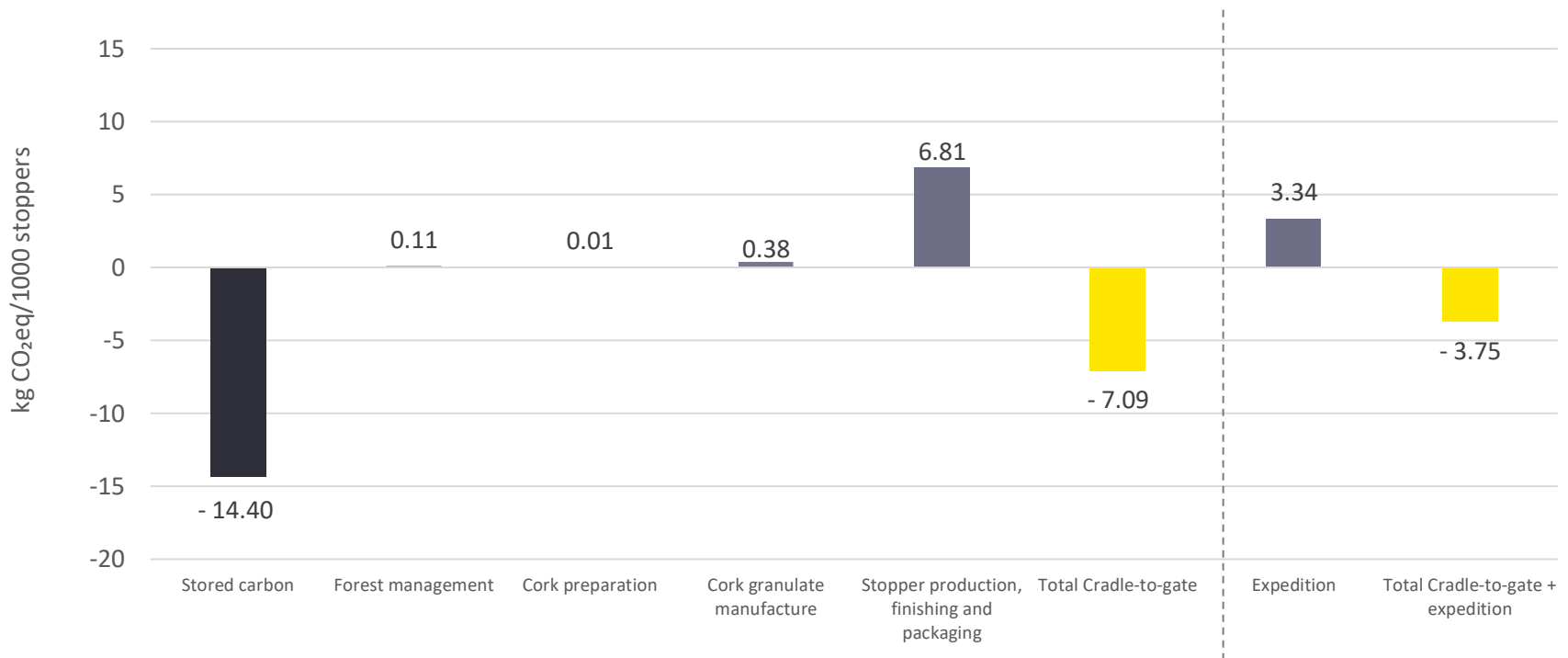
²Demertzi, M., Paulo, J.A., Arroja, L., Dias, A.C., 2016. A carbon footprint simulation model for the cork oak sector. Science of the Total Environment 566-567 (2016) 499-511

³Rives, J., Fernandez-Rodriguez, I., Rieradevall, J., Gabarrel, X, 2013. Integrated environmental analysis of the main cork products in southern Europe (Catalonia - Spain). Journal of Cleaner Production 51 (2013) 289-298

2

Carbon footprint

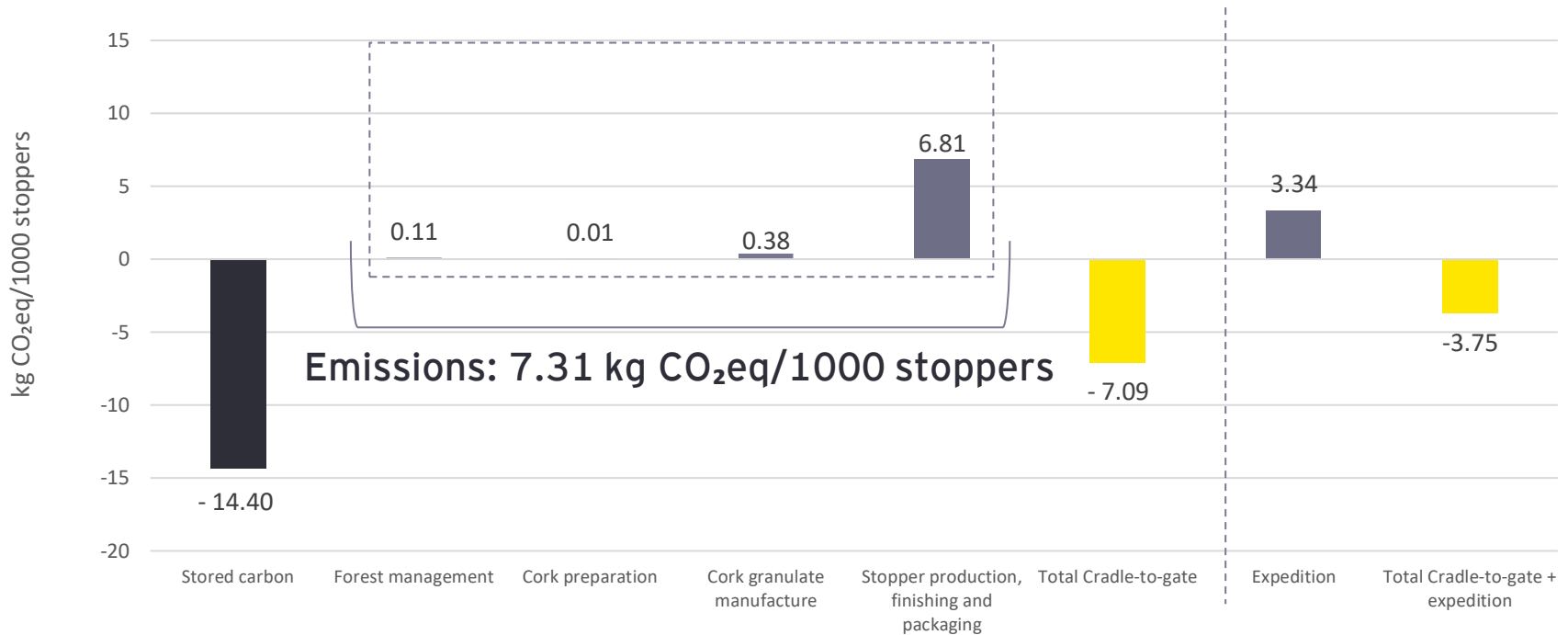
Carbon footprint: results



Spark Top One stopper carbon footprint:

- ▶ Cradle-to-gate: **-7.09** kg CO₂eq/1000 stoppers
- ▶ Cradle-to-gate with expedition to UK: **-3.75** kg CO₂eq/1000 stoppers

Carbon footprint: results



93% emissions associated with processes occurring in the stopper production, finishing and packaging stage

- ▶ Most upstream value chain activities carbon impacts (e.g. production, purchase of customization products and energy consumption) are reflected in this stage
- ▶ Indirect emissions from materials and by-products transport



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 uptake up to:

- 572

kg CO₂/1000 stoppers

Therefore, the carbon balance reaches up to

- 564

kg CO₂eq/1000 stoppers



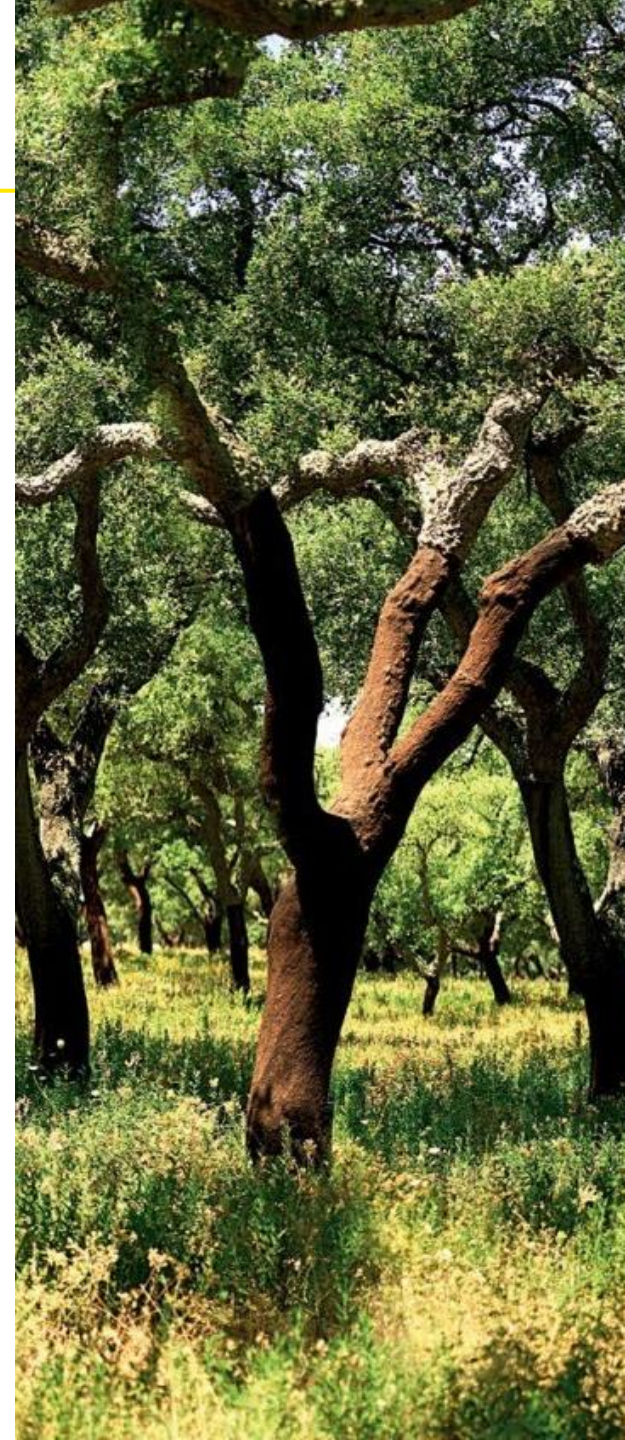
scenario analysis based on well-managed cork oak montado

- 73 t CO₂/t cork

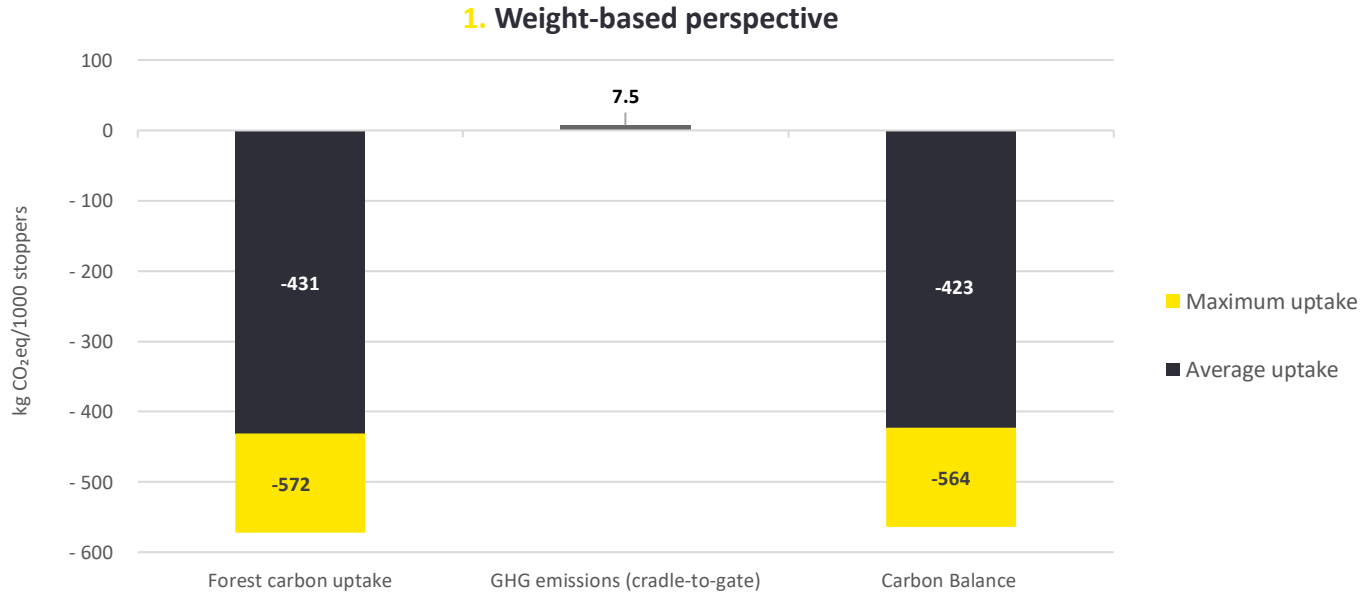
Maximum ecosystem CO₂ uptake registered (14.7 tCO₂/ha) (Costa-e-Silva et al., 2015), with the average ecosystem CO₂ uptake being - 55 t CO₂/t cork, considering wet and dry years in well managed forests (11 t CO₂/ha).¹

The PEFCR for the wine sector states that carbon stored at cork oak trees shall be included in the analysis as additional environmental information, if carbon storage goes beyond 100 years, which is the case for cork.

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



Carbon balance: maximum weight stopper



Spark Top One stopper carbon balance reaches up to:

-564 kg CO₂eq/1000 stoppers

considering maximum ecosystem CO₂ uptake registered in a well managed cork oak montado **-73 t CO₂/t cork**

4

Conclusions

Conclusions

Carbon footprint

- ▶ Overall results for year 2021 show that, under a cradle-to-gate approach, the highest climate change impacts are associated with the processes stages where the consumption of electricity and the use of customization products is higher, as a result, the impact of Spark Top One stopper production stage accounts for 93% of total cradle-to-gate GHG emissions.
- ▶ Relevant sources of overall impacts are related to electricity consumption (57% of total GHG emissions) and manufacture of purchased customization products (32% of total GHG emissions), such as binding agents, used in the agglomeration of granulated cork and disc assembly processes, occurring in all the system's stages.
- ▶ Total emissions account for an overall climate change impact of 7.3 kg CO₂eq per 1000 stoppers. Considering the carbon stored in Spark Top One stopper (14.4 kg CO₂eq /1000 stoppers), the carbon footprint of the product is - 7.1 kg CO₂eq per 1000 stoppers, under a cradle-to-gate approach.

Carbon sequestration of the cork oak forest

- ▶ Considering a scenario analysis, where the carbon sequestration of the cork oak forest can indirectly be attributed to cork products, based on well-managed cork oak forests, a forest carbon uptake up to -572 kg CO₂ per 1000 stoppers can be observed.
- ▶ Considering both the forest carbon uptake and the GHG emissions of maximum weight Spark Top One stopper production (7.5 kg CO₂eq/1000 stoppers), there is a carbon balance up to -564 kg CO₂eq per 1000 stoppers. This balance illustrates the differentiating factor between cork and other products.
- ▶ As the cork oak tree retains carbon for over 100 years, regardless of cork harvesting, cork exploitation supports the maintenance of the ecosystem, thus having a positive contribution to global climate regulation.

About EY

EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit [ey.com](https://www.ey.com).

About EY's Climate Change and Sustainability Services

Governments and organizations around the world are increasingly focusing on the environmental, social and economic impacts of climate change and the drive for sustainability.

Your business may face new regulatory requirements and rising stakeholder concerns. There may be opportunities for cost reduction and revenue generation. Embedding a sustainable approach into core business activities could be a complex transformation to create long-term shareholder value.

The industry and countries in which you operate as well as your extended business relationships introduce specific challenges, responsibilities and opportunities.

Our global, multidisciplinary team combines our experience in assurance, tax, transactions and advisory services with climate change and sustainability knowledge and experience in your industry. You'll receive tailored service supported by global methodologies to address issues relating to your specific needs. Wherever you are in the world, EY can provide the right professionals to support you in reaching your sustainability goals.

<https://www.ey.com/sustainability>

© 2024 Ernst & Young, Audit & Asociados - SROC, SA
All Rights Reserved.

