Confronting Climate Change

Benchmark Report 2025

1. Introduction

The 2025 CCC industry benchmark process builds on 2023 - 2024 datasets and provides a meaningful platform for the South African fruit and wine industries to improve their understanding of the use of fossil fuel-based resources and to reduce emissions over time.

Confronting Climate Change (CCC) is a carbon footprinting initiative, developed to support fruit and wine organisations through identifying and responding to the risks and opportunities associated with carbon emissions. The CCC online carbon calculator is constantly evolving to keep up with the ever-changing carbon context.

The thirteen years combined season data (2011 – 2024) for wine grapes were used for the assessment and analysed based on the following business boundaries: farm, winery and distribution. Distribution is not presented in this report.

2. About the Benchmark Data

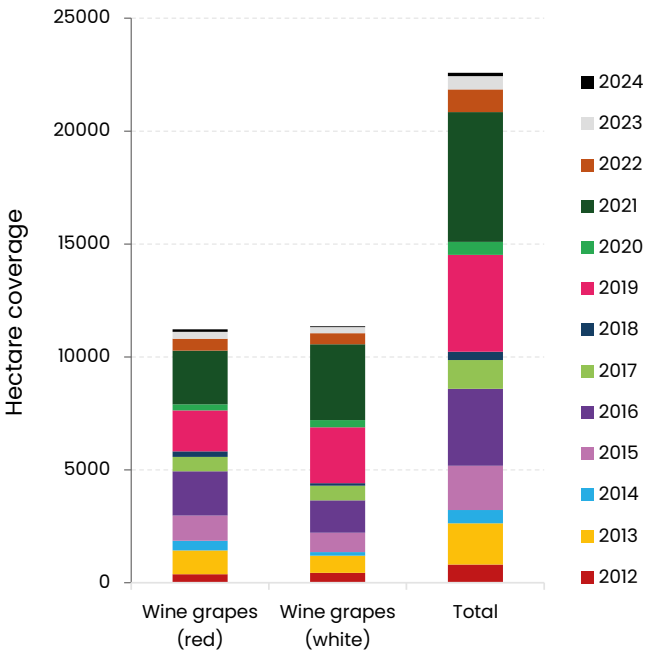
The CCC benchmark reports use combined season data from 2011 - 2024 to provide an industry-specific CO_2e benchmark. Users who calculate their carbon footprint using the CCC online carbon calculator have the option to submit their data for grading (reviewing). This grading is undertaken by the CCC technical team who work with the user to ensure that all data is correctly entered and accurately reflects the entity's operations. To ensure the quality and accuracy of the benchmark results, only graded datasets are included in the benchmark calculation.

The benchmark values are determined using the mean value of graded datasets in the CCC database. Values falling beyond 1.5 times the standard deviation of the mean of the normally distributed dataset are considered outliers and are excluded from the benchmark calculation.

Carbon dioxide equivalent (CO_2e) is a universal unit of measure used to express all the different types of greenhouse gases (GHGs) that form part of the calculations of a carbon footprint.

3. CCC Coverage

From 2011 to 2024 the CCC database (including graded/reviewed + ungraded data) has grown to cover 22 577 unique hectares of wine grape farms in South Africa. This represents 26% of the wine grape industry in the country.

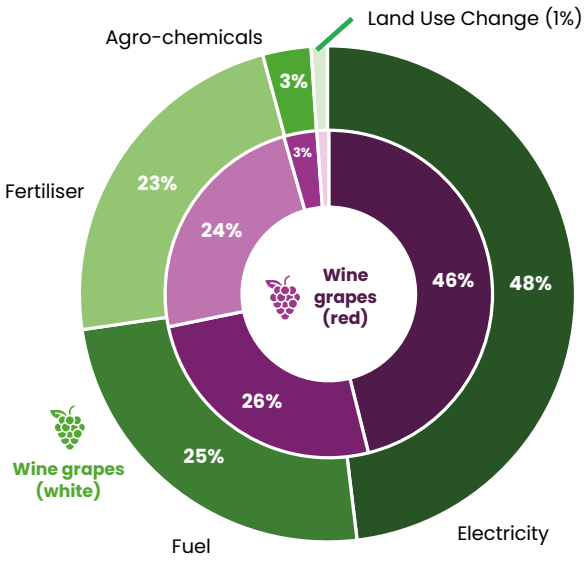


Region	Industra Ha	CCC Ha	% Covered by CCC
Northern Cape	2 405	113	5%
Olifants River	8 405	442	5%
Swartland	11 977	2 617	22%
Klein Karoo	1 968	842	42%
Paarl	14 211	2 007	14%
Robertson	12 744	5 291	42%
Stellenbosch	11 815	8 776	74%
Worcester	6 424	493	9%
Breedekloof	12 654	1 996	14%

Some regions saw a decline in CCC hectarage reported compared to last year; however, this does not necessarily indicate a real decrease in participating farms. Since the coverage annual figures are based on a combination of graded and ungraded data, and since ungraded datasets remain open to updates, fluctuations can occur as data is finalised. The CCC coverage should therefore be viewed as an indication rather than a precise or definitive figure.

4. Farm CO_2e Benchmark

In farm emissions, electricity still surpasses all other contributors, with fuel and synthetic nitrogen (N) fertiliser following closely behind.



Land use change in CCC refers to emissions associated with converting natural land to agricultural land.

Consumption (usage) benchmarks

Examining the average electricity and nitrogen usage over the years is valuable. Focusing on usage efficiency is key, as it can greatly influence the product carbon footprint (PCF).

Electricity: kWh/bearing ha
Wine grapes (red): 1 546
Wine grapes (white): 1 788

Diesel: L/bearing ha
Wine grapes (red): 214
Wine grapes (white): 224

N fertiliser: kg/bearing ha
Wine grapes (red): 46
Wine grapes (white): 44

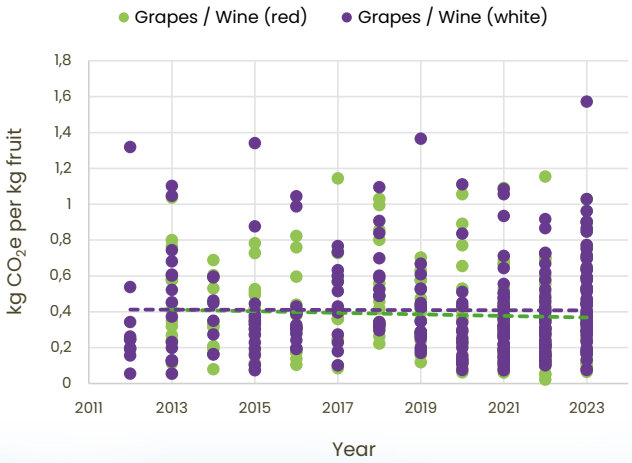
Average **farm PCF** from cumulative data over 13 years:

Wine grapes (white): 0.37 kg CO_2e/kg fruit

Wine grapes (red): 0.40 kg CO_2e/kg fruit

Emissions from **N fertiliser** result from both the energy used in its production and its application on the farm, with the latter being the largest source of emissions. When applied, N fertiliser releases **nitrous oxide**, a highly potent greenhouse gas (GHG).

CCC calculates the PCF, which is the total GHG emissions directly related to that product, in this case: wine grapes. The PCF values for farms over years will typically be very **variable,** because it is influenced by the yield of fruit, which in turn is influenced by climatic factors.
The inputs used to produce that fruit will also vary per season and among farms, due to operational circumstances, different management practices, etc.
The more participants and datasets in CCC, the more these differences can be accounted for, and the more representative the overall PCF for the wine grape industry in South Africa will be.



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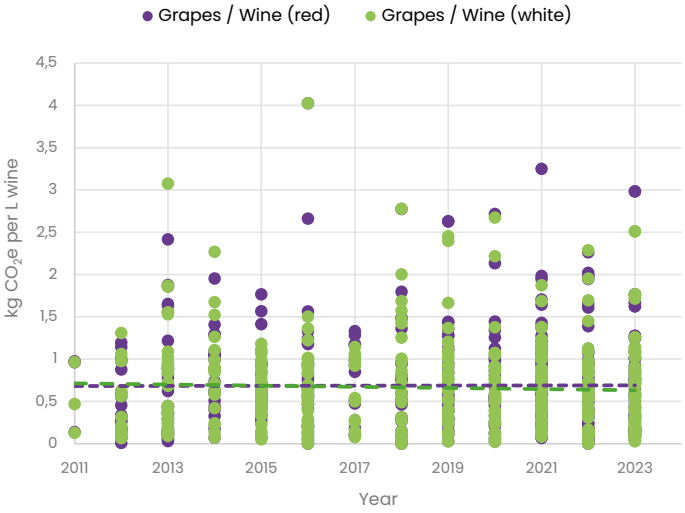
5. Winery CO_2e Benchmark

From 2011 to 2024 the CCC database (incl. graded + ungraded data) has grown to cover an estimate of 374 wineries. This represents 72% of the wine cellars in the country (this number is derived from all datasets submitted to CCC, including **both reviewed and unreviewed data**. As the information may not have undergone sense-checking for validity within CCC, it should be treated as an approximation).



Average **winery processing and bottling PCF** from cumulative data over 13 years:

Wine grapes (white):

Processing: 0.49 kg CO_2e/L wine
Bottling: 0.84 kg CO_2e/L wine

Wine grapes (red):

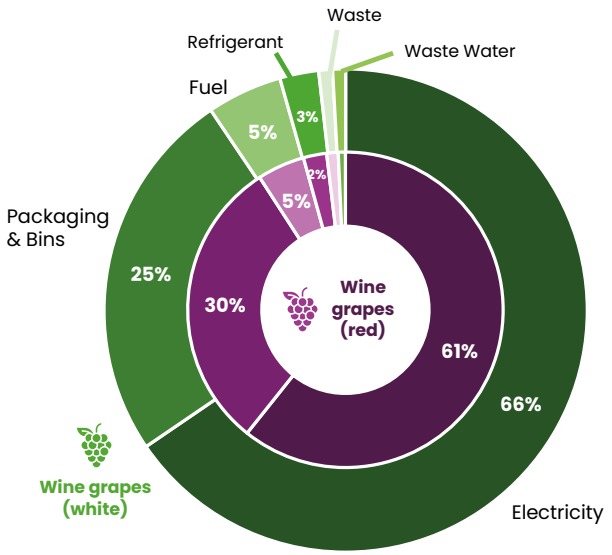
Processing: 0.48 kg CO_2e/L wine
Bottling: 0.93 kg CO_2e/L wine

Consumption (usage) benchmarks

Electricity: Bottling
Wine grapes (red): 222 kWh/ kL wine
Wine grapes (white): 229 kWh/ kL wine

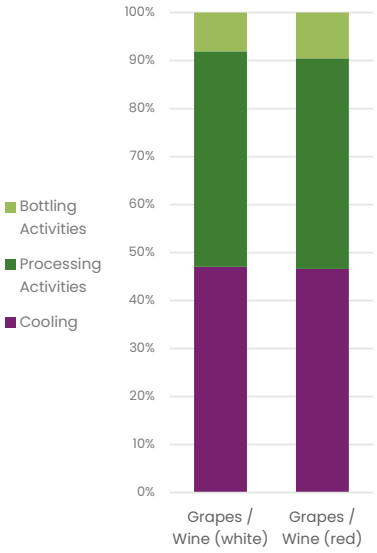
Electricity: Cooling
Wine grapes (red): 201 kWh/ton grapes processed
Wine grapes (white): 232 kWh/ton grapes processed

Electricity: Processing
Wine grapes (red): 174 kWh/ton grapes processed
Wine grapes (white): 180 kWh/ton grapes processed

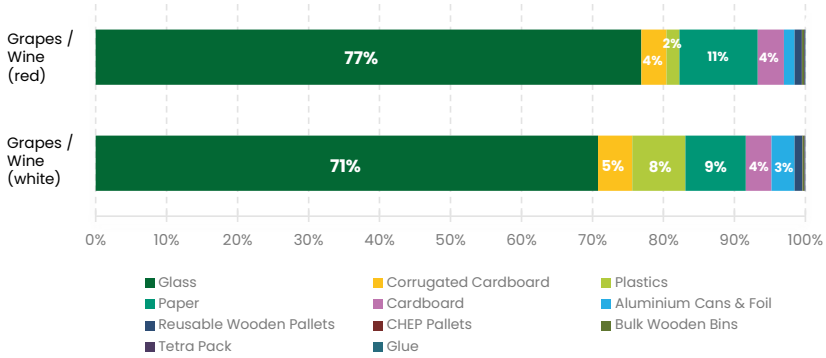


Electricity is the highest contributor to winery CO_2e emissions, followed by packaging.

Where do the Electricity CO_2e emissions come from?



Where do the Packaging CO_2e emissions come from?



Packaging: Glass

Wine grapes (red): 0.70 kg/ L wine

Wine grapes (white): 0.58 kg/ L wine

6. Benefits of joinining CCC

The annual CCC licence fee includes all services as listed below:

Data **review/ sense checking**

Ensuring results are **credible and useful**

Monthly **workshops**

Detailed carbon footprint report including benchmarks

Certificate demonstrating commitment

Updating of emission factors for results to align to latest available information

IT maintenance keeping your data safe

Main-streaming CCC in industry (SIZA, IPW, FFF etc.)

Updating of calculations for results to align to current global demands in terms of reporting requirements

Carbon Heroes platform at no additional cost

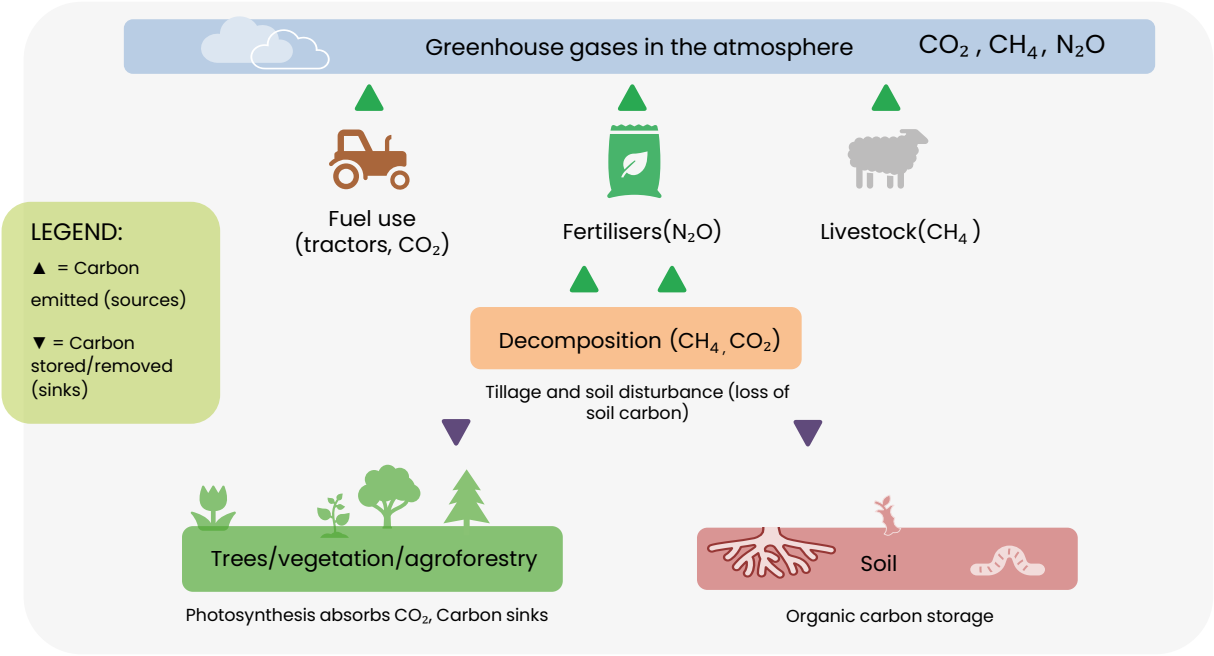
Marketing & recognition to a **global audience**

Remote support desk

Experienced **sustainability consultant** at your disposal

7. Carbon sources & sinks in agriculture

Measuring carbon emissions and removals in agriculture is becoming essential, particularly for farms supplying to retailers with net-zero commitments. Tracking emissions helps meet evolving UK and EU regulatory demands, improve operational efficiency, and unlock sustainability incentives like certifications and carbon market access. At the same time, measuring carbon removals—such as carbon stored in soil and trees—is gaining importance. Preparing for future mandatory disclosures ensures farms stay ahead of regulations. For more details, see Blue North's **Carbon Removals FAQ Guide**.



8. Industry partners

All results are shown in the internationally accepted format of kilograms of carbon dioxide equivalent per unit (kg CO_2e/kg fruit or kg CO_2e/L wine). Please note that the carbon footprint between various fruit types or commodities should not be compared. Different commodities are functionally different and require different inputs. For example, more water might be needed by one commodity than another and therefore more electricity will be needed for the pumping of water. For more information, please contact the CCC Initiative.

www.climatefruitandwine.co.za support@bluenorth.co.za 063 688 5593

Disclaimer: The results shown in this report represent the approved data points of the CCC wine grape sample group representing combined data from the thirteen-year seasonal period of 2011-2024. In line with the leading international carbon footprinting protocol of PAS 2050-1:2012, a three-year period is required to reflect seasonal and production variances. The data range covers the required three-year period, and therefore accounts for seasonal and production variances. However, the data range of the sample is not yet representative of the industry at large. Due to this consideration, the results should NOT be distributed on behalf of or representing the South African wine grape industry. It is aimed to be used as an internal evaluation exercise for those South African producers and exporters wanting to compare their carbon footprint results with the CCC regional sample group averages. This report has been compiled by Blue North Sustainability (Pty) Ltd.