2025 Emissions calculation methodologies

Givaudan

Human by nature

Emissions calculation methodologies

Scope 3 model enhancement

The modelling of scope 3 GHG emissions is an iterative process based on science that is still evolving. We continue working on enhancements with a continuous improvement mindset to ensure that our scope 3 model becomes increasingly accurate and robust over the years. We started our efforts in 2017 with our first full scope 3 inventory based on financial activity data (input/output model) using the so-called ESHER model, which has since gone through several evolutionary steps. For raw materials, which represent the biggest category of our scope 3 emissions, we began modelling with a process-based approach that applies the best available proxy data from verified generic databases. Our focus has now been on replacing proxy data with primary vendor material-specific data, and an important acceleration in this direction has taken place in the last few years.

We also reviewed and updated the emission factors for the categories *Indirect material and services*, *Capital goods*, *Fuel- and energy-related activities* (not included in scope 1 or 2), *Upstream and downstream transportation and distribution*, and *Waste generated in operations*. All emissions calculations have been rebaselined accordingly.

The raw material model remains the focal point of our improvement efforts because this category represents the majority of our scope 3 emissions. The portfolio of ingredients that we purchase is extremely diverse, and we need to understand not only the GHG emissions of our direct suppliers but also all upstream emissions in the value chain. This data is not always readily available in generic databases such as EcoInvent or the WFLDB, and furthermore, these databases remain generic and thus contain an inherent uncertainty that extends into our corporate footprint. Although the use of these databases remains the standard across the industry, we work year on year to improve the quality and representativeness of our datasets.

This qualitative improvement is important because it is not possible to reflect the impact of our reduction projects through purely generic data. In 2024, we made important improvements by creating robust datasets to model certain key raw materials with better granularity. We also started a PCF collection campaign with our suppliers, leveraging SiGreen (see scope 3 story). In 2024, we began tracking FLAG and non-FLAG emissions separately for the first time. This gives us better visibility of different GHG contributors in our supply chain and allows us to target relevant reduction levers for each. We actively advocate for more transparency and alignment in this area by participating in several relevant initiatives.

We also participated in an IOFI project to define standardised emission factors for the industry and improve other scope 3 categories. All modifications allow for a considerable decrease in the uncertainty of the model, but they also imply a potential increase or decrease in the results of our scope 3 emissions. This is a necessary part of the journey, and we will recalculate our baseline accordingly, as required by the GHG Protocol, to ensure progress is diligently reported.

Purchased goods and services

Raw materials (RM)

The scope 3.1 RM model computes the overall emissions of our purchased portfolio using the RM PCF (Product Carbon Footprint) of each purchased material and the corresponding weight (kg) purchased during the reporting period. This calculation is done for the current year (2025), 2024, and our 2020 baseline, which allows us to compute current performance.

For natural and synthetic raw materials, RM PCFs are estimated according to process-based modelling using individual datasets per material purchased; as explained above, these figures come from verified generic databases, from self-built datasets, or from primary vendor data. Each model simulates the production process of the material from cradle to our gate and includes all physical inputs (energy, fertilisers, commodities, etc.) that result in GHG emissions.

Mapping of an RM PCF to each raw material purchased is done manually and reviewed through a continuous improvement process with our internal experts. The accuracy of the mapping is qualified by a Matching Grade (MG), which gives internal visibility of the match. Proxies initially assigned to a material can be improved with vendor data or self-built datasets, resulting in an improved matching grade. These improvements are duly rebaselined when needed.

Through vendor data collection and internal data quality improvement campaigns, we prioritise the highest-volume purchases for RM PCF improvement. Given the diversity of raw materials we purchase, however, many still remain mapped with proxies.

Indirect material and services

The figures are calculated using a new model implemented in 2023 and updated this year for both the current year (2025) and the retrospective calculation for 2024 and 2020. The model incorporates emission factors per sector from the EPA's US Environmentally-Extended Input–Output (USEEIO) model.

Additionally, various impacts stemming from inflation (U.S. Bureau of Labor Statistics), technological improvements (ICOS Integrated Carbon Observation System), the efficiency gap between the USA and Switzerland (*Our World in Data* and OECD), and currency exchange rates are factored in to achieve a more precise analysis over time. To address entities for which we did not have data in our ERP system, we employed a production tonnage proxy to extrapolate their impacts.

Packaging

Packaging-related GHG emissions are calculated based on a new model introduced in 2025. Within this model, we calculate emission factors for each packaging material based on its weight and composition. This allows us to move away from generic emission factors to single, packaging-material-specific emission factors.

With the help of this new model, we were also able to calculate FLAG and energy-related/industry-related emissions. To address entities for which we did not have data in our ERP system, we employed a production tonnage proxy to extrapolate their impacts. The calculation is done for 2025, 2024, and 2020.

Capital goods

The figures are calculated using a new model implemented in 2023 for both the current year (2025) and for the recalculation of 2024 and 2020. The model incorporates emission factors per sector from the EPA's US Environmentally-Extended Input–Output (USEEIO) model.

Additionally, various impacts stemming from inflation (U.S. Bureau of Labor Statistics), technological improvements (ICOS Integrated Carbon Observation System), the efficiency gap between the USA and Switzerland (*Our World in Data* and OECD), and currency exchange rates are factored in to achieve a more precise analysis over time. To address entities for which we did not have data in our ERP system, we employed a production tonnage proxy to extrapolate their impacts.

Fuel- and energy-related activities (not included in scope 1 or 2)

The calculation considered the primary energy carriers for the production of heat, electricity, and steam, as well as the technology standards in the countries of the respective sites for the purchased electricity. For this latter category, emissions related to the delivery of electricity (including infrastructure, grid losses, and direct emissions) have also been accounted for.

The data basis for the life cycle inventory of this category is the Ecoinvent database version 3.10. The calculation is done for 2025, 2024, and 2020.

Upstream and downstream transportation and distribution

We monitor the environmental impact of transportation (air, ship, road, and train) by calculating the associated GHG emissions. In 2025, we added train as a fourth mode of transportation. Besides this change, we recalculated all routes to better capture pre- and post-leg distances and to identify seaports and airports.

We do this through a model that tracks all transport movements via our ERP system (by mode of transport), from delivery to receipt locations of raw materials. To calculate the GHG footprint, we use emission factors for each transport mode from the DEFRA database, allowing us to apply year-specific emission factors.

To address entities for which we did not have data in our ERP system, we employed a production tonnage proxy to extrapolate their impacts. The calculation is done for 2025, 2024, and 2020.

Waste generated in operations

Emission factors on a per-tonne waste basis (sourced from Ecoinvent database version 3.10 and as per GHG Protocol convention) have been multiplied by the total weight of waste generated at our manufacturing locations.

The scope of the calculation covers both waste to disposal (landfill and incineration) and waste to recovery (recycling). To address entities for which we did not have data in our reporting system, we employed a production tonnage proxy to extrapolate their impacts. The calculation is done for 2025, 2024, and 2020.

Business travel

Data on distances travelled are collected through our global and local travel agencies. To calculate the GHG footprint, emission factors per haul and class are based on the 2025, 2024, and 2020 Department for Environment, Food and Rural Affairs (DEFRA, UK) guidance. We use year-specific emission factors, including the RF effect.

To address entities for which we did not have data in our travel agencies' databases, we employed employee number proxies to extrapolate emissions within this category. The calculation is done for 2025, 2024, and 2020.

Employee commuting

The reported 2025 figure is based on our latest 2024 employee commuting survey. The survey was sent to all of our sites, with a total of almost 7,000 valid responses – equivalent to 41% of the company's employees.

For the years when we did not run an employee survey, we used the closest available data and applied that year's specific DEFRA emission factors and FTE data. To calculate the GHG footprint, emission factors per means of commuting are used according to the 2025, 2024, and 2020 Department for Environment, Food and Rural Affairs (DEFRA, UK) guidance.

To address entities for which we did not have full data from our internal survey, we employed employee number proxies to extrapolate the emissions within this category. The calculation is done for 2025, 2024, and 2020.

Deforestation and Conversion Free (DCF)

Deforestation and Conversion Free (DCF) means that the in-scope commodity was produced on land that was not subject to deforestation or conversion (according to the Accountability Framework Initiative definitions of natural ecosystems and natural forests) since the commodity sectoral applicable cut-off date (where such dates exist), and in all cases no later than 31 December 2020.

The basis for the DCF indicator calculation is the volume of in-scope commodities assessed as Deforestation and Conversion Free, divided by the total volume of commodities in scope, multiplied by 100.

The in-scope commodity DCF status is assessed through one or more of the following control mechanisms:

- Third-party certification with chain of custody
- Traceable to an area assessed as negligible risk
- Traceable to a production unit assessed as DCF remotely
- Traceable to a production unit assessed as DCF on the field
- Sourced from a supply chain with one or more of the above control mechanisms.

Restatements of information

During the course of each reporting year, we may face changes in data or calculation methods that impact data that have already been published. We therefore restate the data to provide a meaningful comparison between years for environmental performance and to monitor key performance indicators.

Baseline recalculation

To enable a meaningful comparison of environmental performance over time, Givaudan has established a standard process, based on the GHG Protocol, to recalculate its baseline indicators in case of structural changes such as acquisitions, changes in calculation methodology, or inventory boundaries. This allows comparisons of performance on a like-for-like basis over time.

The process includes definitions of recalculation triggers and the process of reporting the information. Thanks to this guidance, Givaudan is able to track its environmental performance transparently and with confidence that the data are accurate despite any changes related to business growth.

Baseline years

In this report, we use two baseline years to show our performance indicators: 2015 and 2020. The science-based targets for scope 1 and 2 GHG emissions were set against a 2015 baseline, while the targets for scope 3 GHG emissions, water, and waste use a 2020 baseline.

In this report, the baseline recalculation is done for all environmental metrics as per the specific baseline year. In addition to the baseline recalculation, the values for past years between the baseline year in question and the current year are also recalculated accordingly if a baseline-year recalculation is performed.

Reasons for change

The majority of changes in operations-related data are due to the integration of information from recently acquired companies – DDW The Color House, Albert Vieille, Golden Frog, and Ungerer – into our baseline and past-year data. We also restate data in cases of portfolio divestments (for example, the sale of the pectin business to the H&F group) and when we identify corrections that must be reflected in past performance or when we use a new calculation or measurement methodology for certain indicators.

This is done with the aim of keeping the data consistent and comparable over time. In 2025, for Business Travel, Employee Commuting, and Upstream and Downstream Transportation, we started using the DEFRA EF database to capture the related emissions. This ensures like-for-like analysis and proper comparison between 2015, 2020, 2024, and 2025.