

Carbon Emissions Framework Methodology

This is how we calculate our carbon footprint.

Approach

The framework used to calculate the carbon emissions of organizations has been designed by ecollective. The aim of the framework is to measure the footprint to a high degree of accuracy taking into account every element of the organization, the quantities, the geographic location, etc.

Ecollective has worked with many businesses to help them measure their carbon footprint as well as get the process peer-reviewed by prominent members and experts in this space.

The aim is to calculate a highly accurate carbon footprint that can be tracked year on year as improvements are made.

As with any carbon calculation, it's not perfect, but we believe that this framework is currently one of the most thorough and therefore the most accurate methods in use in the industry. If you are familiar with carbon calculations, you will be pleased to know we follow GHG Protocol guidance.

We are always open to questions and feedback. If you would like to get in touch, please contact info@ecollectivecarbon.com

Scope

The areas in scope for this study include:

- The building
- Staff business travel. (including accommodation)
- The website
- Virtual events
- Hosted in-person events
- Working from home emissions
- Staff commuting
- Post/Mail
- Purchased Goods
- Well to tank emissions (WTT)
- Transport & Distribution (T&D)
- Leased assets

What's not Included

- Investments
- Anything not listed above

Data

This study analyses primary data provided directly from suppliers and the business operations of the company through specific data requests relating to the business operations. Where data has not

been fully completed, relevant industry averages are provided by the Department for Environment, Food & Rural Affairs (Gov.uk “DEFRA”) and other sources. Any assumptions that are required to fill data gaps, will be detailed against the specific category to which it relates.

The data is updated yearly as carbon conversion factors improve with accuracy. This is constantly being updated as new data becomes available, please contact ecollective for more details.

How we measure

Nearly everything has a carbon footprint, so measuring the exact carbon footprint of an organization could be a lifetime's work. Considering the state of the climate crisis, we simply do not have the time. We have made assumptions in order to measure the carbon footprint of everything that goes into an organization and the product it sells.

This is normal practice in the carbon calculating world, but at ecollective we go a step further than most. Many organizations make too simple assumptions or use unreliable data, resulting in scores that are not as accurate as they could be.

For Scope 2 emissions we have followed the market-based method. When information or good quality data has not been available we have used location-based information as a proxy for the market-based method.

The devil is in the details

The following methodology is longer than most, mainly due to the level of accuracy we go to on our measurements. However, for us, this is so important as often the details are where we find the best next steps in order to reduce that carbon footprint. (The below section could be far longer as each bullet point could be expanded upon, we have kept it this way in order to make this document more digestible.)

The Buiding

- We have included all emissions from the building and any working from home-related emissions.
- Working from home emissions are based on estimated hours of work, estimated additional heating requirements due to working from home and the energy provider used. If the energy provider is unknown we will use a national average carbon intensity of electricity in said country in order to calculate.
- Electricity-related emissions either in the office or at home are based on the number of kWh used over a period of time and the energy provider used. If the energy provider is unknown we use the national average carbon intensity of electricity in said country in order to calculate.
- Electricity-related emissions are accounted for by calculating the total amount of electricity used over the reporting period as well as the electricity supplier. If the office is shared, a percentage of the emissions from the office and communal space is assigned to the business.
- Office emissions related to gas consumption has been taken into account. If the exact qualities of these are unknown we have used national averages so that they can be included in the calculation.
- The carbon footprint of water is typically split into two sections, water supply, and water treatment.
- Supply refers to the quantity of water taken by the operation.

- Water treatment refers to the carbon emissions associated with all the used water returned to the sewage system.
- The carbon footprint is calculated based on the quantity which is multiplied by a relevant conversion factor.
- Waste created on site is included in the carbon footprint calculations.
- These are split into different categories to identify the type of waste it is as well as the next destination of that waste. For example, waste is split into food waste, paper, general waste, and electronic waste to name a few.
- We then collect data on the waste stream for each kilogram of waste is sent. For example, this could be sent to landfill, recycling, combustion, or even composting for food waste.
- The total quantity of waste is then multiplied by the conversion factor for that type of waste going into that waste stream.

Business travel

- Business Travel has been taken into account and included. This covers all trips taken for work purposes.
- We have included the following transport types: plane, car, bus, train, ferry and other transport methods taken by employees.
- We have included the carbon emissions related to accommodation used during a work trip.
- We have used emission factors provided by DEFRA to calculate the total emissions related to business travel on these transport types. Unless the exact car model is known or private jets have been used, in which case we have used data from elsewhere in order to improve the accuracy of the calculations.
- For distances covered by transport, we have assumed the employee has taken the shortest possible route unless specified.
- Emissions from car journeys were calculated using the distance travelled, fuel type and type of vehicle used.
- Emissions are calculated on the distances travelled. For land-based trips, these will be based on the 'fastest route' available as provided on [googlemaps.com](https://www.google.com/maps) unless stated otherwise.
- If vehicle type is unknown it's assumed cars will be gas-powered medium-sized (Audi A4, Volkswagen Passat, etc) cars (roughly 2.0 ltr engine) unless otherwise specified.
- Calculations can be updated as transport methods change towards greater use of low-carbon vehicles.
- For train transfers, we have calculated emissions per seat based on the kilometres travelled for that route. All train journeys have been assigned the same emissions factor provided by DEFRA.
- For flights, we have assumed all flights are taken in economy unless otherwise stated. If the exact class of travel is known, calculations are updated accordingly.
- All flights have been assumed to be direct unless otherwise stated. However, all commercial flights include a distance uplift of 8% to compensate for planes not flying, using the most direct route (such as flying around international airspace and stacking).
- All flight emissions include radiative forcing and the emission factors are based on those released by DEFRA.
- For all aviation emissions, we include the indirect effects of non-CO2 emissions in order to capture the full climate impact of the flight. However, it should be noted that there is significant scientific uncertainty around the magnitude of the indirect effect of non-CO2 aviation emissions and it is an active area of research. (Emissions from aviation have both direct (CO2, CH4 and N2O) and indirect (non-CO2 emissions e.g. water vapor, contrails, NOx) effects on the climate).

- For hotel stays, the calculation is based on the number of rooms used and the number of nights stayed at the property.
- The carbon footprint of a hotel room is based on the country it is located in using the national average carbon footprints for hotels in that area.

In-person events

- Events hosted during the reporting period (the year) are included. This will typically include energy, food and waste. However, this would unlikely cover the travel of people attending the event in most cases.
- For events held on-site, the emissions for the venue are covered by Scope 1 & 2 emissions and meal emissions are added to the calculations.
- For future events, that might be held off-site, calculations will be based on the size of floor space needed number of meals provided, hotel rooms provided and any staff travel.
 - For transparency, this particular project did not have any significant off-site events so these were not included as the emissions will be minimal.

Virtual events

- For virtual events, we calculate the carbon footprint by:
 - The amount of electricity used per viewer includes electricity consumed by data transmission, data centers and the device itself that it is being viewed on.
 - For the purposes of the calculation, we assume that all viewers are watching on a laptop. It is worth noting that the score accuracy can be improved if a clear breakdown of devices used is known. For example, watching on a phone would require less electricity and a large TV would require more.
 - The carbon footprint of the electricity used is then based on the average electricity mix of the countries in which the event is being watched. The carbon conversion factor of the electricity used is based on the latest figures published by the International Energy Agency (“IEA”).
 - The number of viewers and the average duration of the transmission are then combined to give a total carbon footprint of the virtual event.

The website

- Whilst a website will have a fairly small carbon footprint, it is something nearly every organization has and something that can go unnoticed. However, having a more efficient website not only has a smaller carbon footprint but will also perform better. So whilst it isn't normal to include a website in this kind of work, we do.
- To calculate the entire carbon footprint of a website we take the site traffic over the course of the reporting period, and multiply this by the size of the website. The geographic location of visitors and whether their web host uses renewable energy is also taken into account to create a total carbon footprint.
- When the average page size of a website is unknown we take the page size of the homepage. To avoid this confusion, when we say ‘page size’ we mean “the data transferred over the wire when a web page is loaded”.
- If the host is unknown we assume the website host does not use renewable energy.
- If the geographic location of the website visitors is unknown, ecollective assumes it is international or the home country of the business at hand. This helps us to calculate the

carbon intensity of the electricity used.

- To measure the energy intensity of the web data an average value is used. Energy is used at the data center, on telecoms networks and by the end user's computer or mobile device so it can be very hard to include the measurement.

Working From Home

- We have included working from home-related emissions.
- Working from home emissions are based on estimated hours of work, estimated additional heating requirements due to working from home as well as estimated additional electricity consumed.
- Electricity-related emissions at home are based on the number of kWh used over a period of time and the energy provider used. If the energy provider is unknown we use the national average carbon intensity of electricity in said country in order to calculate.
- Electricity use and heating requirements are based on a typical employee working a full day at home on a laptop and having heating switched on for 25% of the time. Heating is assumed to be powered by natural gas unless the geographic location makes this unlikely.
- Other scope 3 emissions such as transmission and distribution of electricity are assumed to be minimal and excluded from the working from home calculations.

Staff commuting

- Staff commuting, whilst typically minimal and not included by most organizations, has been included in this study.
- Each employee's carbon footprint is calculated based on the estimated mode of transport, distance traveled and the frequency of the journey. If the mode of transport is unknown we take a small sample of employees to use as an average across the business.
- For car journeys, we also detail the car size and the fuel type (gas, diesel, electric or hybrid). If the exact model is known we can use figures relating to this vehicle in order to improve the accuracy of the calculations.
- The carbon factors assigned to each mode of transport are based on those listed by DEFRA.
- For people who walk or bike, we assign a zero carbon footprint for their commute.

Mail

- Mail whilst it can seem minimal and is not included by most organizations has been included in this study.
- Mail can include information or packages to customers on products they have bought or marketing materials to encourage future purchases.
- The quantity of mail is normally calculated in weight, if this is unknown we used total expenditure as a gauge of annual quantity.
- The full carbon footprint of mail is typically calculated by four different sections, material, printing, delivery and decomposition. For our calculations, we only include the carbon associated with the delivery due to a lack of information.

Purchased Goods

- Items purchased over the reporting period by the business are included in the calculation. This information is typically provided by the finance team as an overview.

- Items that have already been calculated such as facilities and other items are excluded from the calculations to avoid double counting.
- The remaining items are then calculated based on the spend-based method.
- This is done by taking the total value of each item and multiplying it by the relevant EEIO data that we have. Over time we encourage companies to a supplier-specific method for calculating.

Food

- The lifecycle of producing a meal involves a complex supply chain with various different and disparate processes, manufacturers and suppliers, and involves a number of major steps before the food enters the premises where the meal is made. These steps include land use, farming, animal feed, processing, waste disposal, transport, packaging and retail. There is also a high level of variability in the dietary choices of consumers and the data available is not yet sophisticated enough to go to this level of granularity.
- We have therefore categorized meals into 10+ categories such as high meat, medium meat, low meat, vegetarian and vegan with a carbon footprint attached to each.
- Where data on the meal or food provided is unknown, we have applied the highest-scoring emissions (high-meat meal) factor for food.
- If the quantity of meals is unknown we calculate the emissions based on total revenue of the restaurant.
- If the business does not own the restaurant, emissions are calculated based on the proportion invested or owned by the business. For example, if the business owns 10% of the restaurant, 10% of the emissions is included in their scope 3 emissions.

Well to tank emissions (WTT)

- This category includes emissions related to the production of fuels and energy purchased and consumed by the reporting organization in the reporting year that is not included in scope 1 or scope 2
- Where electricity and fuel are purchased directly, we have included these emissions based on the average conversion factor for the country the building is located in.
- For the avoidance of doubt, WTT emissions for leased assets are not included.

Transport & Distribution (T&D)

- This activity includes the lifecycle emissions of electricity, steam, heating, and cooling that is consumed (i.e., lost) in a transmission and distribution (T&D) system.
- Where electricity and steam are purchased directly, we have included these emissions based on the average loss rate for the country the building is located in. This is typically around a 5% loss rate.
- T&D emissions for leased assets are not included.

Leased Assets

- Emissions from the operation of assets that are owned by the reporting organization (acting as lessor) and leased to other entities in the reporting year have all been included in scope 1 or scope 2 emissions.

- Emissions from the operation of assets that are leased by the reporting organization in the reporting year and not already included in the reporting organization's scope 1 or scope 2 inventories have been included in scope 3 emissions.
- These are also known as upstream leased assets.
- If the organisation who have leased the space is small or are unable to provide the information, an average data method was used to calculate the emissions.
- The calculations are based on floor space and the building type leased. For example, if it is an office, retail store or warehouse. If additional information is known, such as whether the warehouse is refrigerated or the electricity provider is known then this is included in the study.
- It is assumed all spaces leased rely on natural gas and electricity.
- For future calculations, the amount of energy consumed per square foot will be taken into account for each leased asset as well as the source of electricity.

What is not included:

Investments

- The carbon footprint associated with any investments in the reporting year has not been included.
- At the time of typing, the current GHG Protocol, states certain types of investments or sponsorships should be calculated in different methods with different priority levels. Emissions from investments should be allocated to the reporting based on the reporting organization's proportional share of investment in the investee. For example, if you own 20+% of another company, this would be a high priority for inclusion.
- Given that all investments by this business fall within the 'optional' area of GHG investment reporting, the decision was made to not include them at this time.

Everything Else

- Supply chain (Scope 3) emissions are difficult to quantify, as there is mathematically no limit to the number of pathways that can contribute to total green house gas (GHG) emissions. Increased complexity as the supply chain grows leads to a level of uncertainty associated with emissions metrics, which has been used as justification by many organizations to pay little attention or ignore supply chain emissions. Achieving 'good enough' and incorporating sufficiently meaningful information into emissions calculations is essential for effective and targeted emissions management.
- The aim of this methodology is to look at what we can influence and improve year over year. At the end of the day, we want to spend our time perfecting our reduction strategies rather than our measurements.

Why do we use the carbon footprint per square metre?

We believe in the positive benefits of our work. We would like as many people as possible to experience the services offered by the business. Critical to this goal is ensuring that we facilitate such experiences with the lowest possible carbon impact.

Using 'average carbon footprint per square metre' as a key metric, focuses us on what we need to do to have a lower carbon footprint. We believe this measure will allow other cultural organizations to benchmark their own progress against ours.

Reporting Period

The reporting period is from 1st April - 31st March of each year.

The study was started in 2022 but has been designed to improve year over year with a goal to improve the quality and quantity of data. Both primary and secondary data will be collected on an ongoing basis to improve the quality of the results.

The carbon calculating tool is easy to update with changes. This results in accurate tracking of improvements year over year based on the same metrics.

The conversion factors and other industry data are updated annually by ecollective to improve the accuracy of the calculations.

The long-term aim for ecollective projects is not only to reduce the carbon footprint of organizations, but to improve the quality of the measurement process by allowing organizations to make smarter decisions when it comes to redesigning emissions out of their business.

This methodology will likely change over time as better quality measurements and data become available. Please bear this in mind as calculations may be improved before this document is updated. This methodology is more of a guide to how we have calculated, rather than the exact detail of the formula used on every single item included in the project. If we did that, this document would likely be longer than Apple's T&Cs.

Recommendations and Limitations

The aim of this work is to provide as accurate as possible a picture of the carbon emissions. However, it is agreed and understood that emissions will not be 100% accurate due to time constraints and the lack of data from suppliers. We have the opportunity to increase the accuracy of the carbon footprint as we continue our annual measurements.

The aim of any organization should be to reduce its carbon footprint per employee (or another similar metric) as well as increase the quality of the data it has on its operations and suppliers.

If we are being realistic, there is no shortage of areas to improve the score but they all come with a balance of finding improvements that are time-sensitive, based on good data, and what will make a tangible difference. Below is a snapshot of some we are actively working on at the moment.

Some areas for improvement in future calculations:

- More accurate information on materials purchased each year.
- More detailed information on water use.
- More detailed information on the biggest sources of energy within the building.
- Measuring the carbon footprint of each individual meal sold on site.
- Track air conditioning leaks more accurately even if minimal.

Feedback

A review process has been put in place to make sure that improvements can be made to the framework based on new research and user feedback. If improvements can be made to increase the accuracy as well as the user process, these changes will be actioned. For feedback on the framework or to share ideas, please contact info@ecollectivecarbon.com