

Carbon Emissions Framework Methodology

This is how we calculate the carbon footprint of your business.

Approach

The framework used to calculate the carbon emissions of businesses has been designed by ecollective. The aim of the framework is to individually measure the footprint to a high degree of accuracy taking into account every element of the business, the quantity, 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 per customer (or a similar metric) for the business 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@ecollectivetravel.com

What's Included

This study measures the greenhouse gas emissions of the business. The areas in scope for this study include:

- Office emissions
- Staff business travel (including any accommodation used)
- The website
- Virtual events
- Hosted in-person events
- Staff commuting
- Consultants

Data

This study analyses primary data provided directly from suppliers, providers and the business through specific surveys relating to their business model. Where surveys are not fully completed by a supplier, relevant industry averages are provided by 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. As 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 a business could be a lifetime's work. With the climate crisis, we simply do not have the time. So we have made assumptions in order to measure the carbon footprint of everything that goes into a business 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 companies 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 below section is long, because of our level of accuracy. 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 even longer as arguably each bullet point could be expanded upon, we have kept it this way in order to make this document more digestible.

Office

- We have included an option to calculate all emissions from the office 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.
- Office emissions related to water consumption, gas, waste and food have all 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. These calculations can be updated as and when information on these items are known.
- Other scope 3 emissions such as transmission and distribution of electricity are assumed to be minimal and excluded from the scope.

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 and ferry taken by employees.
- We have also 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.
- We encourage businesses to list as much historical business travel as possible as well as to provide context for the said trip as well as cost in order to help strategize areas for reduction.

Transport

- Transfers will be calculated per vehicle unless the vehicle is used on a shared basis in which case the CO2e emissions will be calculated per seat.
- Some journeys will be one way but in reality, the vehicle will return to the point of origin after drop off. In these instances, we have included the total mileage of the vehicle and not the customer if this is known.
- Emissions will be calculated on distances travelled. These will be based on the 'fastest route' available as provided on [googlemaps.com](https://www.google.com/maps) unless stated otherwise.
- Emissions from car journeys will be calculated using the distance travelled, fuel type and type of vehicle used.
- If vehicle type is unknown it's assumed cars will be petrol 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. The exception being for any underground tube trips included in the calculations.
- 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.
- When private aviation is used the carbon footprint of this journey is calculated using the estimated burn rate of aviation fuel based on the type of aeroplane used. We then use the estimated distance travelled to calculate the number of carbon emissions of this journey.
- For private aviation, the total carbon footprint is based on the entire emissions of the aircraft rather than per seat as it is assumed to be for exclusive use. If it is known that the journey included an 'empty leg' then the emissions of this journey are included in the calculation. However, this is often unknown.
- For all aviation emissions, we include the indirect effects of non-CO2 emissions when reporting to capture the full climate impact of their 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 vapour, contrails, NOx) climate change effects).

Accommodation

All accommodation carbon scores are based on kilograms of CO₂e emitted per room per night.

- We have emailed all accommodation providers we have details for in order to ask them to complete our accommodation carbon footprint survey. This helps us to know their carbon footprint per room per night as opposed to using national averages.
- To calculate the carbon footprint per room per night we have included the following:
 - Hotel occupancy rates, hotels with relatively low or high occupancy rates during the time of the study will have a score that reflects an accurate per room carbon emission score. We know that a hotel with a 20% occupancy will have a lower energy requirement than the same hotel with 100% occupancy and have factored this into the calculation.
 - To calculate the emissions, we have asked for all fuel and energy usage at the property. This includes electricity, gas, oil, petrol, diesel, wood, kerosene, Burning Oil, LPG and a few more. These quantities are then converted into their estimated carbon emissions based on conversion factors provided by DEFRA, with the exception of electricity.
 - The carbon footprint of the electricity used at the accommodation is determined by the number of kWh used and the fuel mix of the energy provider. When the fuel mix of the energy provider is unknown, the national average fuel mix for that country is used.
 - If exact quantities of the electricity or fuel amounts are unknown we have applied average fuel and electricity rates for hotels within that country to calculate the total emissions per room.
 - We have assumed that energy requirements remain the same throughout the year and that the carbon emission per room in the summer is the same as in the winter. We have asked for annual energy usage when possible in order to average this out.
 - When primary data is half completed we have used a mixture of primary data and secondary data to calculate the total score. For example, if a supplier has provided us with electricity data but no gas data as it is unknown. We have calculated the emissions from their electricity and applied the industry average emissions from gas use based on their property type.
- For hotels that have not completed the survey, we applied a national average emission factor for this hotel until they complete the survey.
- If the quality of the hotel is unknown, we assume it is a 5-star hotel as these hotels tend to have a higher average carbon footprint per room per night than hotels of a lesser standard.
- The total calculation is based on the number of rooms used and the number of nights stayed at the property.

Virtual events

- For the purpose of the calculation, we have included the carbon emissions of virtual events (such as zoom). For virtual events hosted by the business, we have included the total emissions. For virtual events (such as webinars) attended by employees, we have excluded this from the study as the carbon footprint will be incredibly small.
- For virtual events, we calculate the carbon footprint by:
 - The amount of electricity used per viewer is based on including electricity consumed by data transmission, data centres 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 in. The carbon conversion factor of the electricity used is based on the latest figures published by 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.

In-person events

Events hosted by the business during the reporting period are included in the calculations. In the calculations, we have included emissions related to all paid expenses by the business. This normally relates to the venue, accommodation, employee travel and meals. It is likely that emissions related to other people attending the event will be included.

- When feasible we have emailed all venues we have details for in order to ask them to complete our venue carbon footprint survey. This helps us to know their carbon footprint per day.
- To calculate the carbon footprint per venue per day we have included the following:
 - The size of the venue being used for the event. (As well as space that can no longer be used due to the event being hosted).
 - To calculate the emissions, we have asked for all fuel and energy usage at the property. This includes electricity, gas, oil, petrol, diesel, wood, kerosene, Burning Oil, LPG and a few more. These quantities are then converted into their estimated carbon emissions based on conversion factors provided by DEFRA, with the exception of electricity.
 - The carbon footprint of the electricity used at the venue is determined by the number of kWh used and the fuel mix of the energy provider. When the fuel mix of the energy provider is unknown, the national average fuel mix for that country is used.
 - If exact quantities of the electricity or fuel amounts are unknown we have applied average fuel and electricity rates for venues to calculate the total emissions.
 - When primary data is half completed we have used a mixture of primary data and secondary data to calculate the total score. For example, if a supplier has provided us with electricity data but gas data as it is unknown. We have calculated the emissions from their electricity and applied the industry average emissions from gas use based on their property type.
 - For any meals included we have based on the carbon emissions per meal multiplied by the number of meals provided to attendees. The carbon emissions per meal will depend on the number of vegan, vegetarian and meat meals provided.
- For venues that have not completed the survey, we applied a global average emission factor for this venue until they complete the survey. This estimate is based on the country it is located in and the size of the venue and the duration of the event.
- Other scope 3 emissions such as transmission and distribution of electricity are assumed to be minimal and excluded from the scope.

Guest speakers and employees

- Everyone paid by the business to attend an event has their emissions taken into account including any international flights needed as well as accommodation.
- Unless specified, we have included 1 private room per person in the same location.
- Visitors to the event who are not paid by the company to attend do not have their travel-related carbon emissions taken into account.

The website

Whilst a website will have a fairly small carbon footprint it is something nearly every business 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 for your business. So whilst it isn't normal to include a website in this kind of work, we nearly always 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 average size of the company 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 assume it is either international or UK based depending on 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 centre, telecoms networks and by the end user's computer or mobile device so it can be very hard to include the measurement.

Staff commuting

- Staff commuting whilst minimal and not included by most businesses have been included in this study.
- To avoid adding hours of admin for an item that will have a tiny carbon footprint. We have asked each employee to provide a summary of their yearly commute.
- Each employee's carbon footprint is then calculated based on the mode of transport, distance travelled and the frequency of the journey.
- We take into account the following types of transport, bus, coach, London Underground, motorbike or car.
- For car journeys, we also detail the car size and the fuel type (petrol, 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 is based on those listed by DEFRA.
- For people who walk or bike, we assign them a zero carbon footprint for their commute.

Consultants

- Whilst the carbon footprint of consultants hired by a business are not normally included in calculations, they still do have a small impact. They become more important to include if either your main intensity target is based on 'carbon footprint per full-time employee' or if more than 20% of your yearly costs go towards consultants.
- To calculate the carbon footprint of a consultant, we calculated the number of days worked over a reporting period. We then multiplied this with the estimated electricity use per day and the carbon footprint of the electricity in their country.
- Due to a lack of data, the calculations are based on the assumption of 1 consultant working

10 hours on a typical PC as 1 day of work and typical electricity consumption. As a typical consultant will likely work fewer hours on a laptop, this number is like to be an overestimate.

- The primary geographic location of the consultant decided the conversion factor based on the national average carbon intensity of electricity of that country.
- If the consultant is required to travel to complete the work, this should be considered to be included in the calculation.

Reporting Period

The reporting period is from September to August of each year.

The study was conducted in 2021 but has been designed to improve year on year with an improvement in 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 the accurate tracking of improvements year on 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 to not only reduce the carbon footprint of companies but improve the quality of the measurement process allowing companies to make smarter decisions when it comes to redesigning emissions out of their business.

This means that 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 we 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 give an accurate picture of the carbon emissions per customer. However, it is agreed and understood that emissions will not be 100% accurate due to time constraints and the lack of data on suppliers. What is exciting about this approach is that it is well-received by suppliers and gives us the opportunity to increase the accuracy of the carbon footprint.

The aim of any business 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 will make a tangible difference. The below is a snapshot of some we are actively working on at the moment.

Some areas for improvement in future calculations:

- Increase the accuracy of event space used for in-person events by calculating into the

measurement the carbon intensity of the electricity provided at the venue.

- For website measurements, we can include the average amount of data transferred by each page of the website, alongside the exact number of views for each page.
- Increase the accuracy of data available on food provided at in-person events.
- Link office carbon calculations to installed smart meters to get more accurate findings on electricity and other fuel use.
- Increase the percentage of primary data over secondary data. This means using the exact carbon footprint of suppliers rather than national averages.

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@ecollectivetravel.com