

# Carbon Analytics documentation for CLP Holdings carbon calculator

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## Overview

CLP Holdings has developed a calculator for individuals and businesses to compute the number of carbon credits required to offset various activities on its website.

Activities which can be offset include:

- Energy use (electricity and fuel);
- Travel (including air, private vehicles, public transport, and other);
- Events (including corporate or personal); and
- Personal Lifestyle (a higher level overall personal assessment)

The calculation methodology and supporting data are provided by Carbon Analytics via its Powered By Carbon Analytics offering.

The calculation methodology and factors used are based on a combination of the following sources.

**The United Kingdom Department of Business, Energy & Industrial Strategy's (UKBEIS, formerly DECC) annually updated Greenhouse Gas Reporting Conversion Factors**  
UKBEIS produces annual emissions conversion values for mandatory reporting of UK businesses – these values are widely used and, with some exceptions, are applicable for global applications as well.

### **The World Resources Institute's GHG Reporting Protocol**

The World Resource Institute's Greenhouse Gas Protocol is a widely used methodology for assessing, managing and reporting carbon emissions. Many mandatory and voluntary reporting requirements are based on this Protocol.

### **Other sources used for carbon emissions assessment and reporting**

The state of carbon assessment is ever-changing. As new factors are released and calculation methodologies change, Powered by Carbon Analytics is updated, keeping this calculator and your results up to date.

These sources have been selected to comply maximally with international standards and to best reflect the activities to be assessed in each tab.

The calculations in this tool provide a relatively conservative (lower) estimate of the number of carbon credits required to offset various activities for two reasons. First, the calculations produce an estimate for Scope 1 emissions impacts for each figure only and do not include supply chain or other Scope 2 / 3 impacts. Second, the calculations are not based on a lifecycle approach.

## Rounding Assumption

Although the calculations in this tool are relatively conservative, in order to simplify the purchase and checkout process, the calculator results indicate whole numbers of carbon credits only. Any fraction of a carbon credit resulting from this calculator is rounded up to the nearest whole number. For information on specific tabs, see below.

## Methodology by Tab

### Electricity Tab

#### **Grid**

Emissions from electricity you receive from the grid depend on the blend of fuels used to power the grid you're connected to. We ask you for the country where you use the electricity and then apply UKBEIS or Carbon Analytics' electricity factors for countries around the world. We've included the emissions from fuels such as coal and oil as well as emissions which occur as a result of transporting the electricity to you via the applicable transmission and distribution networks. Grids with a higher contribution from renewable energy will have lower emissions per unit of electricity output.

Our factors are updated regularly as additional information about global power intensity from World Bank and others is released. The calculator may include multiple sources for one country.

#### **Distributed renewables**

The "Distributed renewables" option allows you to enter the amount of electricity consumed from sources not connected to the grid. "Distributed renewables" is defined as zero carbon emitting distributed renewables such as rooftop solar. If you consume electricity from an on-site generator powered by fossil fuels such as propane, you can offset these carbon emissions by entering the amount of fuel consumed in the Fuel Tab.

### Fuel Tab

The Fuel tab is used to calculate the emissions primarily associated with onsite combustion for heating or backup power. We ask you to select the fuel and, if known, the appropriate units. The emissions are calculated using UKBEIS figures for fuel combustion via stationary sources.

If you select Biomass (wood) pellets as your fuel option, the calculator will compute the carbon emissions generated from the combustion of that fuel. If these emissions have already been offset – i.e. with equivalent biomass – simply do not enter any amount for this fuel type.

Where the amount of fuel is not known, you can simply enter your cost of fuel in the applicable currency and an estimate of your consumption will be made based on average natural gas prices. The price of fuel can vary for many reasons that the calculator will not capture so for the most accurate assessment, it's best to include the amount of fuel used in the appropriate units.

For more information on how the calculator manages currency conversion, refer to the "currencies" section at the end of this document.

### Flight Tab

Flight emissions are calculated by first determining the great circle distance between the two airports for each sector of the flight that you input. The type of flight (short or long), the class travelled, and the Radiative Forcing Index (RFI) are also considered.

Since an airplane is least efficient during takeoff and landing, shorter flights have higher emissions per unit of distance than longer flights. The short haul factor is applied to flights with a distance between 0 and 3,700km. Anything above that distance incorporates the long haul factor.

Since a higher class ticket supports more of the flight's cost, the proportion of a flight's total carbon emissions is allocated accordingly based on an assumption about the cost differential.

UKBEIS does not publish a short haul emissions factor for premium economy or first class, so we apply the economy and business class factors, respectively.

RFI is a multiplier that takes account of the extra gases emitted to the atmosphere when you fly at altitude compared to burning fossil fuels at ground level. Scientists estimate the impact is between 1 and 4 times that of fuel consumption. It is considered best practice by UKBEIS to include a multiplier of 1.9 to take account of these impacts, which we use here.

### Private Vehicle Tab

Most of us do not keep records of how much fuel we have purchased and combusted over the year, so the easiest way to calculate emissions is based on the efficiency of your vehicle (which is measured in miles per gallon, litres per 100 km or grams of CO<sub>2</sub> per km) and the distance that you drive. From these inputs we calculate the amount of fuel you've used and then apply UKBEIS emission factors for the fuel type selected.

Where fuel economy is not known, you may select the size of vehicle and we will use average figures for this vehicle type to estimate vehicle emissions.

To calculate emissions from hybrids, which use technology to improve fuel efficiency, we take the same approach, namely multiplying the efficiency of a hybrid by the distance that you drive.

If you have a plug in hybrid, you'll also be using electricity each time you plug in. In order to accurately calculate the carbon footprint of an electric vehicle, you need to input electricity used for driving (kWh) into the energy tab on the calculator.

Information from the manufacturer should tell you how many kWh you're likely to use each time you charge the vehicle. Simply multiply the number of times you've charged the vehicle by the kWh used each time, and input that figure in the electricity tab.

Similarly, if you own an electric vehicle, simply include your vehicle's electricity consumption in the electricity tab. If you charge exclusively at home, this will already be included in your overall electricity bill.

All car calculations are based on a single passenger, assuming either the trip is for one person, or the car in fact only has one person in it. In cases where multiple passengers are sharing one vehicle and per user emissions are desired, simply divide the emissions by the number of people traveling.

### Public Transport Tab

This tab covers public transport. Select the type of travel, enter the distance and units and the calculator will assess the footprint based on the following factors:

**Bus** – Calculation is based on UKBEIS's per passenger km factor for Average Bus.

**Train** – Calculation is based on UKBEIS's per passenger km factor for the UK's national rail system.

**Taxi** – Calculation is based on UKBEIS's per taxi km factor for a 'regular taxi'. The assumption made is if you hail a taxi, you take responsibility for all emissions generated by the taxi during that journey. Unlike other modes of public transport, the taxi calculation is not limited to emissions generated on an individual passenger basis.

**Ferry** – Calculation is based on UKBEIS's per passenger km factor for an average ferry.

**Motorcycle** – Calculation is based on UKBEIS's per passenger km factor for an average motorcycle.

### Events Tab

The Events tab enables a user to calculate the carbon emissions from a wide variety of major corporate or personal events such as annual dinners, corporate retreats, weddings, family reunions, etc. The calculator contains sub-sections for entering the main elements that determine an event's carbon emissions, namely Meals, Transport and Accommodation.

The events tab also requests that you tell us the location of your event, so we can apply the appropriate electricity emissions factor to your Accommodation details.

## Travel to the event

If you haven't organised travel for the event, in order to complete this tab you'll need to ask attendees how they got to the event. We recommend doing this on arrival (if you contact us at [info@co2analytics.com](mailto:info@co2analytics.com), we would be happy to provide you with a simple sheet for guests to fill in on registration/arrival).

You can input people's travel details individually or as a group – for example, if you're in Hong Kong and 50 people travelled from greater Hong Kong by subway, you can assume each made an average 10 kilometre roundtrip on public transport and add this as one entry.

For flights, the emissions factor depends on the fare class (there are business class and economy class options) and the distance (short haul – up to 3,699km, or long haul – over 3,700km). After the distance is inputted, we then apply the appropriate UKBEIS factors. For more information on our flight calculations, please refer to the description under "Flight Tab".

## Accommodation

We've used data which provides the average amount of electricity and gas (kWh) used per night for luxury and standard hotels. We've then used the natural gas factor and electricity factor based on the country where you're holding the event.

## Personal Tab

The Personal Tab provides the option of doing a higher level assessment to estimate the carbon footprint of your overall lifestyle. In this tab you provide summary information about your home energy use, travel, transportation, diet and overall consumption of goods and services.

For several categories, we have provided the option to use standardized assumptions if the specific data we are requesting is unknown or unavailable. These tabs use global average statistics as inputs and then apply the carbon calculations used in the previous tabs.

The energy use, travel and transportation categories use the same factors and methodologies as the previous tabs. In addition, there are two more categories:

## Diet

The consumption of meat has been associated with a higher total climate impact than a largely vegetarian diet. This field captures the distinction based on averages derived from an Oxford University study 'Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK', 2013 by Peter Scarborough & Paul N. Appleby & Anja Mizdrak et al. <http://link.springer.com/article/10.1007/s10584-014-1169-1>

## Consumption

When you purchase a good or service, the money you spend activates the economy, supporting the movement and transformation of raw materials and energy from around the world into the places and products that you travel to or consume. We ask for your monthly spending amount so we can compare it against our input output models of the global economy and the spending habits of average individuals to estimate the activation and thus emissions your spending produces.

Where you make any inputs into the other categories in the Personal Lifestyle tab, the number of carbon credits generated from these inputs is automatically deducted from the total number of carbon credits generated from the consumption category to avoid double counting. The individual components from each category are then recombined into a total annual climate impact measurement, expressed in number of carbon credits.

However if you make any inputs into other tabs in the calculator (i.e. electricity, fuel, flight, etc.) the number of carbon credits generated from these inputs is NOT automatically deducted in the consumption section, so there would be double counting.

These figures are based on Carbon Analytics databases, more information can be found at: [www.co2analytics.com](http://www.co2analytics.com)

## Currencies

Carbon Analytics' systems are based on USD factors and prices. In all cases where currencies are entered, they are converted to USD using Fixer.io, a free, open-source foreign exchange rate and currency conversion JSON API published by the European Central Bank. It returns data that is updated daily.

## TO LEARN MORE

If you'd like to learn more about the equations and assumptions behind these calculations or are generally curious about carbon emissions, we'd love to hear from you: [info@co2analytics.com](mailto:info@co2analytics.com)

For more information about the underlying data, please see the UKBEIS Conversion Factors: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2016>

## About Carbon Analytics

Carbon Analytics provides carbon assessment technology and services for global businesses, helping organizations measure and report their impact on the climate.

Carbon Analytics Insight platform is environmental performance software built with small businesses in mind. We make environmental reporting and management accessible to small and medium-sized businesses through accounting platforms Xero and Quickbooks, and help large enterprises to assess and work with their distributed base of small and medium-sized suppliers to build a greener, more robust supply chain.

Our company, a UK B Corporation, was founded in the belief that it should be easy for companies of all sizes to reap the rewards of managing their environmental impact. We are committed to removing the barriers to environmental management, and to guide as many companies as possible on their journey to building great, sustainable businesses.

Learn more about Carbon Analytics at: <http://www.co2analytics.com/about>

## About CLP

CLP was founded in Hong Kong in 1901, at a time when electricity was still a novelty worldwide. Today we power millions of homes and businesses across the Asia Pacific regions. In Hong Kong, we operate a vertically-integrated electricity supply business providing a highly-reliable supply of electricity to 80% of the city's population. Outside Hong Kong, we invest in the energy sector in Mainland China, India, Southeast Asia, Taiwan and Australia. Our business includes power generation, transmission and distribution, and electricity and gas retail activities. Our goal is to meet Asia-Pacific's energy challenge in a sustainable manner from one generation to the next.

Learn more about CLP at: <http://www.clpgroup.com>