



## Carbon Responsible API

### Overview

#### Introduction

The Carbon Responsible API for carbon emissions measurement is designed for larger data users. It supports internal reporting and data warehousing, bespoke calculator products and data intermediaries. First launched in 2007, the API has recently been upgraded to enable greater ease of use and an increased range of factors. It enables the conversion of fuel, energy, travel, freight, water and paper use into carbon emissions from usage data held by companies in their finance or operational datasets. It uses DEFRA conversion factors and methodology to deliver the conversion of activity data into carbon emissions for reporting or voluntary management and reduction programmes.

#### Format

The API is a JSON, the format for calls, returns and set up can all be found on swagger at <https://carbon-api.red-river.app/swagger/index.html>. Below is a summary of key calls and returns and available categories of emission source.

#### API returns

All the API returns are metric tons of CO<sub>2</sub>e or parts thereof. For UK rail and all air travel the API returns distances as well as CO<sub>2</sub>e, based upon from and to railway stations or airports.

For all journeys that are less than 500kms for rail or air journeys the API returns comparative values for different road use options. See below for London Heathrow to Edinburgh flight return.

```
{ "vias": [{"journey": "LHR-EDI",  
  "distance": 533.693535828247,  
  "defra": 0.071958, "ghg": 0}], "cars": {"petrol": {"defra": 0.096513, "ghg": 0}, "hybrid": {"defra": 0.061231, "ghg": 0}, "diesel": {"defra": 0.092521, "ghg": 0}}, "distance": 533.693535828247, "airplaneCarbon": {"defra": 0.071958, "ghg": 0}, "automobileCarbon": {"defra": 0.094517, "ghg": 0}, "railCarbon": {"defra": 0.021961, "ghg": 0}, "motorCycleCarbon": {"defra": 0.061647, "ghg": 0}, "error": 0, "calculationType": "DEFRA", "radiativeForce": 0.136054 }
```

#### Radiative Forcing

The air returns include two values for total journey emissions. These are without and with radiative Forcing, an optional reporting element for businesses. The Radiative Forcing is the value estimated for the effect of emissions at altitude which is greater than surface emissions. The science behind this contains some uncertainty.

## **Fuel**

The API returns values for 17 types of fuel which are the main emitting gas/solid fuels and biofuels. The API receives data as litres or cubic metres. Where fuel is used in vehicles and the amount of fuel is not known, fuel consumption and resulting emissions can be generated by using the vehicle type and distance inputs.

## **Electricity**

For UK electricity the input is kwh and the return contains both emissions from actual generation and also emissions derived from transmission and distribution. These are delivered in the same return but are reported as Scope 2 and Scope 3 respectively.

## **Vehicles**

The API returns values for 85 different vehicle types. These include cars, motorbikes, vans, HGVs, buses and taxis. All call values are in either kilometres or miles. Vehicle values are for average laden lorries and for road vehicles the DEFRA standards assume average passenger occupancy in cars.

## **Air Travel**

Air travel is segmented by domestic UK, short haul flights ex UK, long haul flights ex UK and flights that originate and end in countries outside the UK. The air travel returns are based upon call options which include, full name or IATA three letter codes for airport locations. From To and Intermediate Destinations, Class of Travel, Number of Passengers. The call format allows for PNR references to be inserted or a travel reference to match end user record keeping.

## **Rail Travel**

Rail travel for the UK is generated from station names or station numeric codes for From, To and Via stations and number of passengers. There is no class distinction available for rail travel.

## **Water**

The API returns values for both water supply and the corresponding value for water treatment. All calls are in litres.

## **Freight**

The API returns values for vehicle goods carrying vehicles, rail and airfreight. The input for air and rail is by distance per kg.

## **Hotels**

Hotel stays per night and number of rooms are returned for over 45 countries that have values available and includes both UK Regional and London and a generic world value for non-specified countries.

## **Unknown Variables**

For vehicles and air travel, specific inputs are required for type of vehicle/flight. Where vehicle size is not known, average or unknown can be selected to deliver an average for the type of vehicle and fuel type entered. For air travel the omission of class of travel will default to an average for the journey selected.

## Vehicle Size Guide

Type	Size	Engine Capacity
Diesel Car	Small	0-1.699 litres
	Medium	1.7-1.99 litres
	Large	2.0 litres and above
Petrol cars	Small	0-1.399 litres
	Medium	1.4-1.99 litres
	Large	2.0 litres and above
Hybrid Cars	Small	0-1.399 litres
	Medium	1.4-1.99 litres
	Large	2.0 litres and above
Motorbikes	Small	0-125cc
	Medium	125-499cc
	Large	500cc+
Vans	Small	Class 1 -0-1.305 tons
	Medium	Class 2 - 1.306-1.74 tons
	Large	Class 3 - 1.75-3.5 tons
Lorries		Rigid 3.5-7.5 tons
		Rigid 7.6- 17 tons
		Rigid more than 17 tons
		Articulated 3.5-33 tons
		Articulated more than 33 tons
		<i>HGV and HGV Refrigerated are equal weight ranges.</i>