Climate Toolkit for Business

Carbon Calculator

- Users will enter their metrics in the appropriate input boxes in the calculator.
- Based on their data inputs, and using the conversion factors figures, the user's total carbon footprint will then be calculated.
- The figures for each emissions category will be calculated as follows:
    - Metric x Conversion Factor = CO_2.
    - Energy Emissions + Travel Emissions + Materials Emissions + Water Emissions = Total Carbon Footprint.

Climate Toolkit for Business - Business Carbon Footprint Emissions Calculations				
Category	Scope	Metric	Conversion Factors	Calculation
Energy	Natural Gas	€ or kWh Per Annum	€0.064875 per kWh 202.2 gCO_2/kWh (NCV)	xxxx tCO_2
	Heating Oil	€ or litres Per Annum	€1 = 0.0020 tCO_2 eq 2,732.02 $gC0_2$/ litre	xxxx tCO_2
	LPG	€ or litres Per Annum	0.892 €/litre €1 = 0.00182 tCO_2 eq	xxxx tCO_2
	Electricity	€ or kWh Per Annum	€0.21 per kWh 333 gCO_2/kWh (NCV)	xxxx tCO_2
	Heavy Fuel Oil	€ or Litres Per Annum	€1.095 per litre 273.6 gCO_2/kWh (NCV) 11.45 kWh/litre (NCV)	xxxx tCO_2

	Coal	€ or Tonnes Per Annum	€0.0164 per kWh		xxxx tCO_2
			7,733 kWh/tonne (NCV) 340.6 gCO_2/kWh (NCV)		
Travel	Petrol	€ or Business Kilometres	€0.19 Price Per kWh 257.9 gCO_2/kWh (NCV) 1km = 200 gCO_2 eq		xxxx tCO_2
	Diesel	€ or Business Kilometres	€0.1577 Price Per kWh 263.9 gCO_2/kWh (NCV) 1km = 200 gCO_2 eq		xxxx tCO_2
	Business Flights	EU/UK (short-haul) and/or Non-EU return Flights (Long-haul)	Destination:	CO_2eq (kg) per person per return flight:	xxxx tCO_2
			Short-haul	181.50	
			Long-haul	1,392.80	
Materials	Material Intensity	% of Expenditure	Sliding Scale – % of Expenditure: "What % of your businesses expenditure is attributed to goods or raw materials? (not wages services or utilities).		this metric is to inform recommended actions but does not contribute to carbon footprint estimate.
	Bin weights	Black bin	0.00098 tCO_2 per kg		xxxx tCO_2
		Green bin	0		
		Brown bin	0.00014 tCO_2 per kg		
Water	Water Usage	Volume m^3 Per Annum	0.1517 kgCO2/m^3		xxxx tCO_2

- Natural Gas + Heating Oil + LPG + Electricity + Heavy Fuel Oil + Coal = Total Energy Emissions.
- Petrol + Diesel + flights = Total Travel Emissions. black bin + brown bin = Total Materials Emissions Water Usage = Total Water Emissions.
- Energy + Travel + Resource Use + Water = Total tCO_2 Emissions.

Notes:

Energy – Heating Oil

- Utilising a cost (€ amount) for heating fuels such as Natural Gas, LPG and Kerosene, or Electricity, requires some assumptions to be made to calculate the emissions footprint. The assumption is that the cost paid is close to the average cost paid by all consumers and could introduce an error depending on the actual cost paid by the business.

Delivered Energy Cost (Cent Per kWh)

- Natural Gas – averaged across the bands.
- Heating Oil – averaged across the densities, excluding "heavy".
- Electricity – averaged across the bands excluding the night rate.
- Coal – Based on average price per unit of €127.88 and calorific value of 7759.2 per unit.

Note on use of "green electricity"

- Green electricity purchasing means you are buying the green portion of overall electricity, but this does not change the overall average emissions from the use of grid electricity and therefore the emissions from your electricity use

Petrol & Diesel

- Using the Avg Biofuel Blend Rates.
- Monthly prices for petrol and diesel taken from the CSO Databank – National Average Price as of the beginning of 2021.
- Due to the potential range of vehicle emissions per km as shown in the table below, we are using a simplified estimate of 1km = 0.0002 tCO2 eq for diesel passenger or small commercial vehicle.
- We note that utilising a cost (€ amount) for transport fuels requires some assumptions to be made to calculate the emissions footprint. The assumption is that the vehicle efficiency is close to a small van on average and depending on the vehicles your business uses this could introduce a significant error.

	km	Efficiency (l/100km)	kgCO2e	tCO2e
Petrol New Car	1.0	4	0.0967	0.00010

Petrol Old Car	1.0	7	0.1693	0.00017
Diesel New Car	1.0	4.5	0.1294	0.00013
Diesel Old Car	1.0	6.5	0.1870	0.00019
Diesel Small Van	1.0	7.5	0.2157	0.00022
Diesel Large Van	1.0	9	0.2589	0.00026
Diesel Small Truck	1.0	15	0.4315	0.00043
Diesel Large Truck	1.0	20	0.5753	0.00058
Diesel Tractor	1.0	35	1.0068	0.00101
Diesel Construction Vehicle	1.0	35	1.0068	0.00101

Business Flights

Destination	CO_2eq (kg) per passenger (mean) per flight (80% occupancy)	
	low	high
Domestic	76.8	63.1
UK	71.0	61.4
EU27	142.1	120.1
Other International	696.4	515.8

The "low" and the "high" represent the range of configurations that each aircraft type can handle. "High" represents roughly the maximum number of seats (i.e. the plane is all economy class). The “High” may more closely reflect the reality on shorter flights and on all economy carriers whereas the “low” is more likely to be representative of traditional long-haul flights with business class, first class.

We assume no domestic flights.

For EU / UK flights, we assume "high" and average 61.4 and 120.1 = 90.75 kg CO_2 eq per person per flight

For non-EU flights, we assume "low" = 696.4 kg CO_2 eq per person per flight

Water Usage

- The operational carbon impact per litre is 0.1674 $kgCO_2/m^3$, as per Irish Water.

Resource Use

Waste Destination	Tonnes CO_2 eq per tonne of waste
Landfill	0.98
Composting & Anaerobic Digestion	0.14

- Figures provided here by the EPA have been divided by

1,000 in the calculator to give tCO2 per kg waste

- We assume

o landfill = black bin and

o composting & AD = brown bin and do not use green bin weights to contribute towards the carbon footprint estimate.

October 2021