

PURE offers the individual two routes to offset. The first is the Quality Assured route – the calculation process and projects all have the UK Government Quality Assurance mark.

- For a Quality Assured offset the consumer uses the PURE for You calculator and will need energy bill data available.
- All of the international projects PURE supports have the Quality Assurance mark
- The information in this paper sets out the methodology and factors used in the calculation process

If the consumer does not have access to energy bill data, they can still use the PURE for You calculator, but an alternative route is available. The measurement is not as accurate as a footprint calculated using energy bill data and is not, therefore a Quality Assured offset. Simply follow the prompts when using the calculator.

A. Household emissions - Quality Assured offsets through PURE

The 'PURE for You' calculator has been designed to calculate emissions from the home and from personal travel by road and air. The consumer is required to enter home energy bill data, (eg for gas and electricity usage input data as kWh) for the footprint calculation to comply with the requirements of the UK Government's Quality Assurance scheme. This ensures the accuracy of the calculation.

In order to build a picture of your household, you will be asked a number of questions including the age of your home, the type of dwelling (flat, semi-detached house etc), and the number of bedrooms (to indicate the size of your home). For a Quality Assured offset where energy bill data is provided, this information is collected simply to generate tailored energy saving advice that can be accessed when the calculation and payment process has been completed.

The following most commonly used emission factors that PURE uses are from the latest Defra GHG Conversion Factors for Company Reporting 2009. For a bill-based calculation PURE applies the relevant factor on a Gross CV basis. For additional factors and information follow the link below.

<http://www.defra.gov.uk/environment/business/reporting/pdf/20090928-guidelines-ghg-conversion-factors.pdf>

Fuel type	Units	Net CV basis ₁ KgCO ₂ per unit	Gross CV basis ₁ KgCO ₂ per unit
Electricity (UK Average)	kWh	0.5406	0.5406
Natural gas	kWh	0.2037	0.1836
Coal (Domestic)	tonne	2506.3	2506.3
Coal (Domestic)	kWh	0.3114	0.2958
Burning Oil	litre	2.5319	2.5319
Burning Oil	kWh	0.2585	0.2456
LPG	litre	1.4951	1.4951
LPG	kWh	0.2255	0.2142

₁ Gross CV or higher heating value (HHV) is the CV under laboratory conditions. Net CV or 'lower heating value (LHV) is the useful calorific value in typical real world conditions (e.g. boiler plant).

B. Transport emissions – Quality Assured offsets through PURE

Flights

The starting point for calculating the emissions from your flight is to establish the distance. You select the appropriate departure and destination airports and the distance between them is then calculated using the Great Circle measurement. This is a straight-line distance between the two airports using standard global longitude and latitude coordinates to measure the shortest flight path. An additional 9% uplift is applied to the distance to take into account indirect routing, circling and other similar real-world factors. The 9% distance inflation is recommended by DECC. The total distance is then multiplied by a CO₂ intensity factor (kg CO₂ per mile flown) to arrive at the total amount of CO₂ emitted. The calculator uses the latest government approved average emissions factors for domestic, short- haul or long-haul as appropriate. There is no provision for different classes of flight.

The emission factors used refer to CO₂ emissions only. There is still some uncertainty over the non CO₂ climate change effects of aviation such as water vapour, contrails, Nox etc. The best scientific evidence currently available recommends applying a radiative forcing multiplier of 1.9 to account for these other emissions. Providers that comply with the UK Government Quality Assurance Scheme for Carbon Offsetting may choose whether or not to apply this factor. The PURE calculator applies this factor to all flight calculations. Once this final figure has been established we multiply the CO₂ figure by the number of people who are travelling and whether it is a single or return journey.

Mode	Seating Class	Emission Factor KgCO ₂ /passenger km
Domestic flights	Average	0.1710
Short-haul flights	Average	0.0983
Long-haul flights	Average	0.1122

Emission factors are from the latest Defra GHG Conversion Factors for Company Reporting 2009.

<http://www.defra.gov.uk/environment/business/reporting/pdf/20090928-guidelines-ghg-conversion-factors.pdf>

Road

This calculation is based on the engine size of the car, the type of fuel used and the annual mileage. A conversion factor is then applied to arrive at the annual emissions. DECC recommended that where possible these emissions are calculated from the actual quantities of fuel used. In practice most individuals do not keep an accurate record of this, but if you wish to use this method then please call us Tel 0845 873 2429 or use the PURE for Business excel calculator – staff commuting tab.

Fuel Type	Engine size	Emission Factor Kgco ₂ /vehicle km
Petrol	Up to 1.4 litre	0.1798
Petrol	1.4 - 2 litre	0.2128
Petrol	Above 2 litre	0.2955
Diesel	Up to 1.7 litre	0.1510
Diesel	1.7 – 2 litre	0.1876
Diesel	Above 2 litre	0.2558
Hybrid	Medium	0.1262
Hybrid	Large	0.2240
LPG	Medium	0.1862
LPG	Large	0.2586

Emission factors are from the latest Defra/DECC GHG Conversion Factors for Company Reporting
<http://www.defra.gov.uk/environment/business/reporting/pdf/20090928-guidelines-ghg-conversion-factors.pdf>

C. Business emissions

The PURE for Business calculator has been developed to allow you to easily determine your business footprint, answering a small number of questions related to your operations.

It covers:

- Utilities - consumption of electricity, water and fossil fuels such as gas and oil.
- Business transport - use of private and public transport, air travel and movement of freight.
- Staff commute - use of car, motor cycle, bus or train.
- Home office - the use of resources at home for the business.
- Other greenhouse gasses - optional for businesses that have this data.

A summary of the carbon emissions of your business is produced, with those activities generating the most carbon clearly identified. The PURE for business calculator is an excel based document that you can download and complete at your convenience.

Fuel type	Units	Net CV basis ₁ KgCO ₂ per unit	Gross CV basis ₁ KgCO ₂ per unit
Electricity (UK Average)	kWh	0.5406	0.5406
Natural gas	kWh	0.2037	0.1836
Natural gas	M ³	2.0091	2.0091
Natural gas	therms	5.9712	5.3801
Coal	tonne	2301.0	2301.0
Coal	kWh	0.3241	0.3079
Burning Oil	litre	2.5319	2.5319
Burning Oil	kWh	0.2585	0.2456
LPG	litre	1.4951	1.4951
LPG	kWh	0.2255	0.2142
Gas oil	litre	2.7619	2.7619
Gas oil	kWh	0.2770	0.2632

Please use the link below to access conversion factors for freight, business travel and staff commute factors.

All emission factors are from the latest Defra GHG Conversion Factors for Company Reporting 2009. Calculations are made using the appropriate factor on a Gross CV basis.

<http://www.defra.gov.uk/environment/business/reporting/pdf/20090928-guidelines-ghg-conversion-factors.pdf>

The non Quality Assured route for household emissions

Where energy bill data is not available we offer an alternative route through the PURE for You calculator. In order to build a picture of your household, you will be asked a number of questions including the age of your home, the type of dwelling and the number of bedrooms. You will also be asked about your household electrical appliances and how they are used. Because this method of calculation is less accurate the resulting offset is not Quality Assured. For further information about the assumptions we make about your household and electrical appliances, please see the table (Appendix 1) at the end of this document.

We are happy to provide further information about the calculation and offset process. Please e-mail us at: info@puretrust.org.uk or call 0845 873 2429.

Appendix 1 – Assumptions for a Household non Quality Assured Offset

No.	Issue	Options 1	Options 2	Assumptions
1.	Age of the property	pre 1930s	-	Houses are comprised of solid walls
2.		between 1930 - 1995	-	Houses are comprised of cavity walls
3.		post 1995	-	Houses have cavity wall filling
4.	Total number of rooms		-	Total number of rooms in the dwelling equals number of bedrooms plus an additional 5 (bathroom, kitchen, corridors, lounge & dining room)
5.	Total number of light bulbs		-	3 bulbs per room
6.	Oven and hob using electricity and gas			CO ₂ emissions are an average of the values associated with gas and electricity
7.	Food stored in fridges	Fridge only	0 – 2 years	A rated fridge
8.			2 – 8 years	C rated fridge
9.			> 8 years	D rated fridge
10.		Fridge with a freezer	0 – 2 years	A rated fridge freezer
11.			2 – 8 years	C rated fridge freezer
12.			> 8 years	D rated fridge freezer
13.	Washing machines	0 – 2 years	-	A rated washing machine at 50 deg C. Number of washes = 6 per person per month.
14.		2 – 8 years	-	C rated washing machine at 50 deg C. Number of washes = 6 per person per month.
15.		> 8 years	-	D rated washing machine at 50 deg C. Number of washes = 6 per person per month.
16.	Clothes driers	Used sometimes	-	C rated tumble drier used for 50% of the calculated number of cycles per month for washing machines
17.	Dishwashers	new and on the economy setting	-	Under 2 years old. Number of uses = 4 per person per month
18.		Old and on the economy setting	-	Over 5 years old. Number of uses = 4 per person per month
19.		New and on the normal setting	-	Under 2 years old. Number of uses = 4 per person per month
20.		Old and on the normal setting	-	Over 5 years old. Number of uses = 4 per person per month
21.	Main TV	plasma >32"	-	42-43" plasma screen with 120 hours viewing per month
22.		plasma <32"	-	37" plasma screen with 120 hours viewing per month
23.		other >32"	-	42" LCD screen with 120 hours viewing

No.	Issue	Options 1	Options 2	Assumptions
				per month
24.		other <32"	-	32" LCD screen with 120 hours viewing per month
25.	Additional TVs	-	-	20" standard screen with 45 hours viewing per month, for each additional TV.
26.	Kettle	-	-	Every home has one which is filled half way when used
27.	Microwave	-	-	Every home has one
28.	DVD	-	-	Every home has one
29.	VCR	-	-	Every home has one
30.	Computer	-	-	Every home has one
31.	Satellite, cable, or freeview box	-	-	Average emissions from all three devices used for every home
32.	Low energy light bulbs	some	-	30% of all bulbs are low energy type
33.		most	-	70% of bulbs are low energy type
34.		all	-	100% of bulbs are low energy type