

Research Grants: Calculating your Carbon Offsetting Cost

Note: The current version of this document is available on the Sustainability Service website (<https://sustainability.leeds.ac.uk/business-travel/>). Please check here to ensure that you are using the correct version.

Introduction

Travel for research is one of the principal sources of carbon emissions at the University of Leeds. In 2018/2019, travel was responsible for 13,427 tonnes of CO₂e. This makes it our second highest source of measured greenhouse gas emissions after the energy used to operate our buildings and estate.

Collaboration with international partners and delivering global impacts from our research are key activities which help us to shape a better future for humanity. Certain travel is essential for staff and students for research, innovation and other learning opportunities. However, the Covid-19 pandemic has shown us that there is potential to do things differently. It is important to weigh not only the environmental impacts, but the social and economic impacts when making the decision to travel. Research councils are also now starting to ask for reductions in travel.

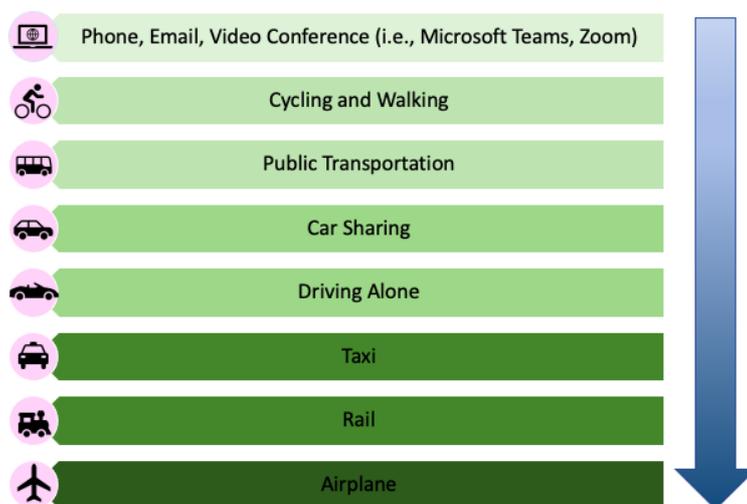
Carbon offsetting is the concept of negating (offsetting) the same amount of carbon emissions that have been produced, with investments into renewable energy sources such as solar / wind energy or planting trees. The following guidance is to help staff and students calculate their carbon offsetting costs for travel related to research grants. The purpose is to better manage the University's carbon emissions, and offset carbon costs whenever possible to help achieve our net zero commitments.

Here are some steps to follow when calculating your carbon offsetting costs for travel:

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1. Before Booking: The Travel Hierarchy

The diagram below is the travel hierarchy that should be used to determine your method of transportation, if necessary. The travel hierarchy indicates that whenever possible, travel should be avoided and meetings should take place by phone, or video conferencing (i.e., Microsoft Teams, Zoom, etc.). If this is not possible, active travel by walking, running or cycling is the next best option. If the journey is too long to walk or cycle, consider public transportation (and so on).



2. Calculate Your Carbon Emissions

A) Standard Journeys

Because emissions from flights occur at high altitude, they have an increased effect compared to ground level emissions, which is known as radiative forcing. Radiative forcing is the change in energy flux in the atmosphere that can be human caused (such as greenhouse gases) or naturally caused.

We recommend using a flight CO₂ calculator that accounts for the radiative forcing (RF) impacts of flying. The following calculator accounts for RF (make sure you tick the relevant box). You need to input where your journey will start and end:

<https://www.carbonfootprint.com/calculator.aspx>

B) Non-Standard Journeys

If you're not entirely sure of your final destination, or you are taking a more unique route, there is still a way to calculate your offsets.

Use the following [link](#) and click on “**Conversion Factors 2020: condensed set (for most users)**”.

a) For travel by air:

- Go to the “Business Travel – Air” tab at the bottom of the spreadsheet.
- Determine if your flight is going to be domestic, short-haul, or long haul. If you are unsure of the potential length of your journey, always remember to err on the side of caution. For example: If you think you will be going to the United States, but are unsure of exactly where, use the central United States as an estimated arrival point.
- Determine if you will be flying economy or business class. We recommend flying economy, as it is a smaller carbon footprint per person. If you are unsure of the class, please select “Average Passenger”.
- Based on the length of journey (haul) and the class you are sitting in, use the associated value under the column “kgCO₂e” under “With RF” (the very first column). This will give you your conversion factor.
- Multiply the conversion factor by the number of kilometres you have estimated your journey to be.
- Next, divide this value by 1000. This will give you the amount of carbon emissions for your trip in tonnes.

b) For travel by car, bus, motorbike or taxi:

- Use the “Business Travel – Land” Tab at the bottom of the spreadsheet.
- Determine which type of vehicle you will be using. If you are unsure, please select “Average” for motorbikes, buses or cars, and “Regular Taxi” for taxis.
- For cars, you must select the fuel type. If you are unsure, use the “Unknown” section of the table.
- Select the associated conversion factor under the column “kgCO₂e”.
- Multiply the conversion factor by the estimated number of kilometres of you plan on travelling. Please remember to err on the side of caution when estimating distance travelled.

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- Next, divide this value by 1000. This will give you the amount of carbon emissions for your trip in tonnes.

c) For travel by rail:

- Use the "Business Travel – Land" Tab at the bottom of the spreadsheet
- Select the type of rail line you will be using.
- Select the associated conversion factor under the column " kgCO₂e".
- Multiply this conversion factor by the estimated number of kilometres travelled. Please remember to err on the side of caution when estimating distance travelled.
- Next, divide this value by 1000. This will give you the amount of carbon emissions for your trip in tonnes.

d) For travel by sea:

- Use the "Business Travel – Sea" tab at the bottom of the spreadsheet.
- Select if you are a foot passenger or car passenger. If you are unsure if you will be taking a car or not, please select "Average Passenger".
- Select the associated conversion factor under the column " kgCO₂e".
- Multiply the conversion factor by the estimated number of kilometres travelled. Please remember to err on the side of caution when estimating distance travelled.
- Next, divide this value by 1000. This will give you the amount of carbon emissions for your trip in tonnes.

3. Price of off-sets

The University is currently a member of the carbon coalition, where-by off-sets are verified by a board of experts, practitioners and scientists from the education sector to provide quality assurance. The current cost per tonne for this is £31.68.

We recommend that this figure is used to estimate the cost to off-set a tonne of CO₂. Once you have calculated your tonnes of carbon emissions, simply use this number to multiply and determine your total cost for offsetting.

Please note that annual off-setting costs are subject to change. Please contact the Sustainability Service if you are still unsure about how to calculate the cost to offset carbon emissions of your trip

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4. Ask us for help!

If you have any questions on calculating your carbon emissions, offsetting costs, or would like some help to minimize the environmental impact of your journey, you can contact the University of Leeds Sustainability Service at sustainability@leeds.ac.uk.

Appendix 1: Example Calculation for Standard Journeys

Calculating the offsetting cost of flying from London to Toronto as part of a research grant:

A) Input the details of your trip into the carbon calculator:

The screenshot shows a web-based "Flight carbon footprint calculator". At the top, there is a navigation menu with tabs for "Welcome", "House", "Flights", "Car", "Motorbike", "Bus & Rail", "Secondary", and "Results". The "Flights" tab is active. Below the menu, there is a green airplane icon and the title "Flight carbon footprint calculator" with the subtitle "You can enter details for up to 3 flight itineraries". The main form includes the following fields and options:

- Radio buttons for "Return trip" (selected) and "One-way flight".
- "From:" dropdown menu set to "LHR: Heathrow, London, United Kingdom".
- "To:" dropdown menu set to "YTO: Toronto All Airports, Canada".
- "Via (optional):" dropdown menu.
- "Class:" dropdown menu set to "Economy class".
- "Trips:" input field set to "1".
- Checkbox "Click to include radiative forcing" which is checked, with a link "what's this?".
- A green button labeled "Calculate & Add To Footprint".

Below the form, a green box displays the result: "Total Flights Footprint = 1.67 metric tons of CO₂e" with a green "Offset Now" button. At the bottom of the calculator, it shows "1.67 metric tons: Economy class direct return flight from LHR to YTO" with a "[remove]" link. Navigation buttons "< House" and "Car >" are located at the bottom left and right respectively.

B) Ensure to select "Click to include radiative forcing"

C) Select "Calculate and Add to Footprint"

D) Use this value to calculate the cost of your carbon offset based on the University's of Leeds determined value of price per tonne (**£31.68**)

$$\mathbf{\pounds 31.68 \times 1.67 = \pounds 52.91}$$

Therefore, the cost to offset this flight would be **£52.91**.

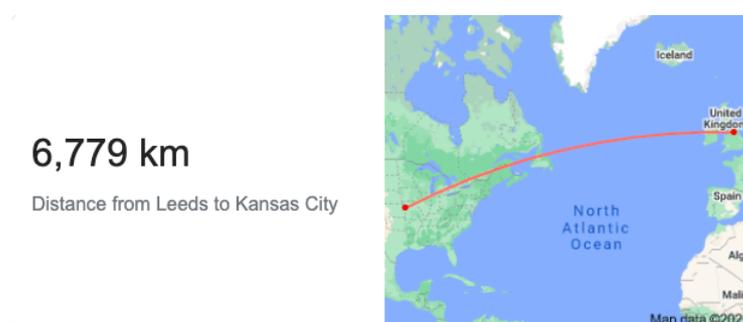
Appendix 2: Example Calculations for Non-Standard Journeys

Scenario: Flying from Leeds to the United States, but unsure of where.

- A) Select a destination to use as a basis for your calculation. Since this flight is in the United States, using a destination point in the middle of the country would be reasonable. For this example, we chose Kansas City as the approximate mid-point.



- B) Use Google again to find the distance between your start and end point:



- C) Use the [conversion factors](#) on the UK Government webpage. You can find these under the tab “Business Travel – Air”. This is a long haul flight, sitting in economy class, and we always select the section that *includes radiative forcing*. Therefore, the conversion factor for this flight would be **0.14615 kgCO₂e**.

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Example of calculating emissions from air travel

Company L reports its emissions from flights over the course of a year. To do so it requests a report from its dedicated travel agent, which reports the distances travelled for domestic, short-haul and long-haul flights, in each class of travel (ranging from economy to first class).

A subsidiary of company L does not use the same travel agent. Instead, it uses its expenses system to note the flight type, distance and class of travel each time an employee flies.

The company then multiplies the distance (km) travelled in each class for each category of journey by the appropriate conversion factor. Company L uses the factor set inclusive of the influence of RF. Where the 'haul' of the journey is known, but the class is unknown, the company uses the 'average passenger' factor.

Activity	Haul	Class	Unit	With RF				Without RF			
				kg CO ₂ e	kg CO ₂	kg CH ₄	kg N ₂ O	kg CO ₂ e	kg CO ₂	kg CH ₄	kg N ₂ O
Flights	Domestic, to/from UK	Average passenger	passenger.km	0.2443	0.24298	0.00011	0.00121	0.1292	0.12788	0.00011	0.00121
		Average passenger	passenger.km	0.15553	0.15475	0.00001	0.00077	0.08223	0.08145	0.00001	0.00077
		Economy class	passenger.km	0.15298	0.15221	0.00001	0.00076	0.08088	0.08011	0.00001	0.00076
	Short-haul, to/from UK	Business class	passenger.km	0.22947	0.22832	0.00001	0.00114	0.12132	0.12017	0.00001	0.00114
		Average passenger	passenger.km	0.19085	0.18989	0.00001	0.00095	0.1009	0.09994	0.00001	0.00095
		Economy class	passenger.km	0.14615	0.14542	0.00001	0.00072	0.07727	0.07654	0.00001	0.00072
	Long-haul, to/from UK	Premium economy class	passenger.km	0.23385	0.23268	0.00001	0.00116	0.12363	0.12246	0.00001	0.00116
		Business class	passenger.km	0.42385	0.42173	0.00002	0.0021	0.22408	0.22196	0.00002	0.0021
		First class	passenger.km	0.58462	0.5817	0.00002	0.0029	0.30908	0.30616	0.00002	0.0029
	International, to/from non-UK	Average passenger	passenger.km	0.18181	0.1809	0.00001	0.0009	0.09612	0.09521	0.00001	0.0009
		Economy class	passenger.km	0.139245	0.13855	0.000005	0.00069	0.073615	0.07292	0.000005	0.00069
		Premium economy class	passenger.km	0.22278	0.22167	0.00001	0.0011	0.11778	0.11667	0.00001	0.0011
		Business class	passenger.km	0.40379	0.40177	0.00002	0.002	0.21348	0.21146	0.00002	0.002
		First class	passenger.km	0.55695	0.55417	0.00002	0.00276	0.29445	0.29167	0.00002	0.00276

Waste disposal	Business travel- air	Business travel- sea	Business travel- land	Freighting goods	Managed assets- vehicles	Conversions	Fuel properties	+
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D) Assuming this is a return flight, your total distance travelled will be:

$$6779\text{km} \times 2 \text{ Trips} = 13,558\text{km}$$

E) Take the total distance, and Multiply by the conversion factor:

$$13,558 \text{ (Total Distance)} \times 0.14615 \text{ (Conversion Factor)} = 1,981.5$$

F) Divide this number by 1000 to get the number of tonnes:

$$1,981.5/1000 = 1.98 \text{ tonnes of Co2e}$$

G) Multiply this number by £31.68:

$$£31.68 \times 1.98 = £62.77$$

Therefore, the cost to offset the carbon emissions from the flight of this trip would be approximately £62.77.

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