



GHG REPORT Greenhouse Gas Emissions 2023

A. Menarini Farmaceutica Internazionale SRL – UK
Mercury Park, High Wycombe

Prepared by:
Sol Environment Ltd

Date:
April 2024

Project Issue Number:
SOL_24_S009_MEN

VERSION CONTROL RECORD			
Contract/Proposal Number:		SOL_24_S009_MEN	
Author's Name:		Freddie Wells	
Reviewer's Signature:		CJM	
Issue	Description of Status	Date	Reviewer Initials
0	For Review	22 nd April 2024	CJM

This report has been prepared by Sol Environment Ltd (Sol) with all reasonable skill, care, and diligence, and taking account of the Services and the Terms agreed between Sol and the Client. This report is confidential to the client, and Sol accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Sol beforehand. Any such party relies upon the report at their own risk.

Sol Environment Ltd disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the Services.

Contents

Glossary of Terms	iii
1. GENERAL DESCRIPTION	1
1.1 Background	1
1.2 Organisation Description	1
1.3 Purpose and Intended Users	2
1.4 Reporting Frequency	2
1.5 Data Collection and Evidence Gathering	2
2. ORGANISATIONAL BOUNDARIES	3
2.1 Organisational Boundaries	3
3. REPORTING BOUNDARIES	4
3.1 Reporting Boundaries	4
4. QUANTIFIED GHG INVENTORY	5
4.1 Calculation Methodology	5
4.2 Quantified Results	5
4.3 Uncertainty Assessment	9
4.3.1 Category 1.2: Direct Emissions from Mobile Combustion	9
4.3.2 Category 3.5: Emissions from business travel	9
4.4 Adding Uncertainties	11
4.5 Reducing Uncertainty	12
5. GHG PERFORMANCE TRACKING	14
5.1 Reduction Initiatives	14
5.2 Internal Performance Tracking	14
Annex A: Category 1.2 - Direct Emissions from Mobile Combustion	15
Annex B: Category 2.1 - Indirect Emissions from Imported Electricity	19
Annex C: Category 3.1 - Emissions from Upstream Transport and Distribution for Goods	20
Annex D: Category 3.2 - Emissions from Downstream Transport and Distribution for Goods	22
Annex E: Category 3.3 - Emissions from Employee Commuting	27

Annex F: Category 3.5 - Emissions from Business Travel	30
Annex G: Category 4.3 - Emissions from Disposal of Solid and Liquid Waste	67
Annex H: Category 4.4 - Emissions from use of Assets	69

Index of Tables

Table Ref	Table Title	Page
Table 1.1	Company Details	1
Table 4.1	Quantified GHG Inventory	6

Index of Figures

Figure Ref	Figure Title	Page
Figure 4.1	Methodology for Adding Uncertainties	10

Glossary of Terms

Term	Definition
GHG	Greenhouse Gas. Gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds
GHG Source	Process that releases a GHG into the atmosphere
GHG Sink	Process that removes a GHG from the atmosphere
GHG Reservoir	Component, other than the atmosphere, which has the capacity to accumulate GHGs, and to store and release them
GHG Emission	Release of a GHG into the atmosphere
GHG Removal	Withdrawal of a GHG from the atmosphere
GHG Emission Factor	Coefficient relating activity data with the GHG emission
GHG Removal Factor	Coefficient relating activity data with the GHG removal
Direct GHG Emission	GHG emission from GHG sources owned or controlled by the organisation
Direct GHG Removal	GHG removal from GHG sinks owned or controlled by the organisation
Indirect GHG Emission	GHG emission that is a consequence of an organisation's operations and activities, but that arises from GHG sources that are not owned or controlled by the organisation
CO₂e	Carbon Dioxide (CO ₂) Equivalent. Unit for comparing the radiative forcing of a GHG to that of carbon dioxide. CO ₂ e includes all of the greenhouse gases defined within the Kyoto protocol: carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride (SF ₆), and nitrogen trifluoride (NF ₃)
GWP	Global Warming Potential. Index, based on radiative properties of GHGs, measuring the radiative forcing following a pulse emission of a unit mass of a given GHG in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide (CO ₂)
Organisational Boundary	Grouping of activities or facilities in which an organisation exercises operational or financial control or has an equity share
Reporting Boundary	Grouping of GHG emission or GHG removals reported from within the organisational boundary, as well as those significant indirect emissions that are a consequence of the organisation's operations and activities
Activity Data	Quantitative measure of activity that results in a GHG emission or GHG removal
GHG Inventory	List of GHG sources and GHG sinks, and their quantified GHG emissions and GHG removals
GHG Statement	Factual and objective declaration that provides the subject matter for the verification or validation
Uncertainty	Parameter associated with the result of quantification that characterises the dispersion of the values that could be reasonably attributed to the quantified amount.
Biogenic Carbon	Carbon derived from biomass, material of biological origin
Fossil Carbon	Carbon that is contained in fossilised material
Carbon Offsetting	Mechanism for compensating for all or a part of the CFP or the partial CFP through the prevention of the release of, reduction in, or removal of an amount of GHG emissions in a process outside the product system under study

1. GENERAL DESCRIPTION

1.1 Background

This report has been prepared on behalf of A. Menarini Farmaceutica Internazionale SRL - UK ('Menarini UK' hereafter) by Sol Environment Ltd to provide a Greenhouse Gas Emissions Report on all activities across the organisation.

The Menarini Group is an Italian pharmaceutical company specialised in the treatment of pathologies in cardiology, oncology, pneumology, inflammation and gastroenterology. The UK division of Menarini supply the NHS and other parties with pharmaceuticals produced in Italy, Germany, Spain, and Belgium.

Menarini UK operates out of Menarini House, Mercury Park, Wooburn Green, Wycombe Lane, HP10 0HH, coordinating the importing of products to pre-wholesalers, and the sale and transport of products to pharmacies and hospitals.

All NHS suppliers are required to implement a Carbon Reduction Plan (CRP) in line with the central UK Government's PPN 06/21¹. This GHG report has been conducted and written in accordance with ISO 14064-1:2018² and the GHG Protocol Corporate Standard³ in order to support and inform Menarini UK's CRP and highlight potential areas of GHG emissions improvement.

This report has been prepared by Freddie Wells, Sustainability Consultant at Sol Environment. Freddie is a SGS certified ISO 14064 Lead Auditor and Greenhouse Gas Lead Verifier.

1.2 Organisation Description

Table 1.1 below gives details of the organisation.

Table 1.1: Company Details	
Name	A. Menarini Farmaceutica Internazionale SRL
Registration No.	BR016024
Address	Registered: 1 Via Sette Santi, Firenze, 50131, Italy UK Office: Menarini House, Mercury Park, Wooburn Green, Wycombe Lane, HP10 0HH
Phone	01628 856400
Email	reception@menariniuk.com
Number of employees	< 100
Brief description of activities	Import, distribution, and wholesale of pharmaceutical goods nationwide

¹ UK Government Cabinet Office - Procurement Policy Note 06/21 - [Taking Account of Carbon Reduction Plans in the procurement of major government contracts](#)

² European Committee for Standardization - EN ISO 14064-1:2018 - Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.

³ World Resources Institute - The Greenhouse Gas Protocol - [A Corporate Accounting and Reporting Standard](#)

The persons responsible for the data and production of this report is the Commercial, Performance, MA and BI Director, who in turn reports to the Executive Committee of the wider Menarini Organisation.

1.3 Purpose and Intended Users

This report is for the use of Menarini UK and the wider Menarini Group to aid decision making regarding the current GHG status and inventory of the business, informing future carbon policies and net-zero targets. This report will in turn form a foundation for the production of a Carbon Reduction Plan for Menarini UK in accordance with the NHS requirements for suppliers, which will be submitted to the NHS by Menarini UK when required.

The NHS do not require this report to undergo third-party validation, however, Menarini UK have expressed their wish for this report to be validated by a third party.

1.4 Reporting Frequency

This report accounts for the GHG emissions of Menarini UK for the 2023 calendar year. This is the second report to be conducted on behalf of Menarini UK by Sol, following on from the 2022 calendar year report, which has formed the base-year.

Reporting will be conducted on an annual basis with each calendar year reported by Q3 or earlier of the following year.

1.5 Data Collection and Evidence Gathering

All GHG data and evidence regarding Scope 1, 2 and a subset of Scope 3 emissions was collected via document review in accordance with ISO 14064-01 requirements.

A review of the base year GHG inventory has been conducted as part of the 2023 data review, to account for any substantial cumulative changes in base-year emissions. As no substantial changes were found, a site visit was not deemed necessary.

Examples of data collected to support the GHG inventory of this report include transport and mileage records, energy data, employee vehicle models and annual mileage, water usage, waste disposal, hotel stays etc.

2. ORGANISATIONAL BOUNDARIES

2.1 Organisational Boundaries

Menarini UK has chosen to use the **Financial Control Approach** for the purposes of consolidating and reporting GHG emissions. This approach is the most commonly used and is recommended in the GHG Protocol and ISO 14064-1 guidance on how to measure and report GHG emissions.

This approach will include GHG emissions from the head office, employee commuting and business travel, and stock transport to and from associated product manufacturing facilities and wholesale storage warehouses located at:

- A. Menarini Manufacturing Logistics and Services SRL, Via dei Confini, 24, 59100 Prato PO, Italy;
- Menarini Von Heyden GmbH., Leipziger Str. 7-13, 01097 Dresden, Germany;
- A. Menarini Research & Business Service GmbH, BHKW Adlershof, Glienicker Weg 125-127, 12489 Berlin, Germany;
- Grupo Menarini España, C. d'Alfons XII, 587, 08918 Badalona, Barcelona, Spain (LMSA);
- Turnhoutseweg 30, B-2340 Beerse, Belgium;
- AP1 Amber Park, Berristow Lane, South Normanton, Derbyshire, DE55 2FH, United Kingdom (Alloga); and
- Movianto UK Limited, 1 Progress Park, Bedford, MK42 9XE, United Kingdom.

3. REPORTING BOUNDARIES

3.1 Reporting Boundaries

Menarini UK's control starts from reception of stock from their continental suppliers, to importing goods into the UK, storage and distribution to end users, and office activities. The NHS CRP guidance requires only a subset of Scope 3 emissions be reported, therefore the GHG emissions inventory in this report consists of the following:

- Scope 1
 - Category 1: Direct GHG emissions and removals
 - 1.1: Direct emissions from stationary combustion
 - 1.2: Direct emissions from mobile combustion
 - 1.3: Direct process emissions and removals arising from industrial processes
 - 1.4: Direct fugitive emissions arising from the release of greenhouse gases in anthropogenic systems
 - 1.5: Direct emissions and removals from Land Use, Land Use Change, and Forestry
- Scope 2
 - Category 2: Indirect GHG emissions from imported energy
 - 2.1: Indirect emissions from imported electricity
 - 2.2: Indirect emissions from imported energy
- Scope 3
 - Category 3: Indirect GHG emissions from transportation
 - 3.1: Emissions from upstream transport and distribution for goods
 - 3.2: Emissions from downstream transport and distribution for goods
 - 3.3: Emissions from employee commuting
 - 3.5: Emissions from business travel
 - Category 4: Indirect GHG emissions from products used by the organisation
 - 4.3: Emissions from the disposal of solid and liquid waste
 - 4.4: Emissions from the water supply to the organisation

4. QUANTIFIED GHG INVENTORY

4.1 Calculation Methodology

Menarini UK has reported its GHG emissions using the **Emissions Factors** method. The UK Government's Department for Energy Security and Net-Zero (DESNZ), has published emissions factors which are annually updated to convert activity data into GHG emissions.⁴

It is standard practice to report GHG emissions in tonnes of CO₂e, which the DESNZ emissions factors provides for each of the Kyoto protocol products where applicable: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).

Menarini UK's emissions have been reported using the DESNZ GHG Conversion Factors updated for the year 2023 and has cited the source of all emission factors used where DESNG factors are not available.

Menarini UK operates out of their own office building. The staff members are split between office staff who work out of the head office, and sales team who operate remotely across the UK.

The methodology, results, and activity data for each category are appended as *Annexes A – H* of this report.

4.2 Quantified Results

Table 4.1 overleaf includes the quantified data results by emission or removal category.

⁴ UK GHG Emissions Factors 2023 <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023>

Table 4.1: Quantified GHG Inventory

Reporting Company		A. Menarini Farmaceutica Internazionale SRL - UK											
Person or Entity responsible for the report													
Reporting Period		From 01/01/2023			To 31/12/2023								
Organisational Boundary		Financial Control Approach including GHG emissions from the head office and product distribution network											
Reporting Boundary		Scopes 1, 2, and agreed subset of Scope 3 in accordance with NHS and UK PPN 06/21 requirements											
EMISSIONS		Notes	CO ₂ e Total (t.p.a.)	Carbon Dioxide (CO ₂)	Methane (CH ₄)	Nitrous Oxide (NO ₂)	Hydrofluoro-carbons (HFCs)	Perfluoro-carbons (PFCs)	Sulphur hexafluoride (SF ₆)	Nitrogen trifluoride (NF ₃)	Quantitative uncertainty	Qualitative uncertainty	
			GWP	1	30	265	5000	4000	23500	16100			
1	Category 1: Direct GHG emissions and removals in tonnes CO ₂ e												
1.1	Direct emissions from stationary combustion	NS	-	-	-	-	-	-	-	-	-	-	
1.2	Direct emissions from mobile combustion		100.39	99.73	0.21	0.46	-	-	-	-	10.0%	0.0%	
1.3	Direct process emissions and removals arising from industrial processes	NS	-	-	-	-	-	-	-	-	-	-	
1.4	Direct fugitive emissions arise from the release of greenhouse gases in anthropogenic systems	NS	-	-	-	-	-	-	-	-	-	-	
1.5	Direct emissions and removals from Land Use, Land Use Change and Forestry	NS	-	-	-	-	-	-	-	-	-	-	
2	Category 2: Indirect GHG emissions from imported energy in tonnes CO ₂ e												
2.1	Indirect emissions from imported electricity		26.25	25.99	0.11	0.15	-	-	-	-	0.0%	0.0%	
2.2	Indirect emissions from imported energy	NS	-	-	-	-	-	-	-	-	-	-	
3	Category 3: Indirect GHG emissions from transportation												
3.1	Emissions from upstream transport and distribution for goods		114.86	113.28	0.02	1.56	-	-	-	-	0.0%	0.0%	
3.2	Emissions from downstream transport and distribution for goods		924.82	914.15	0.15	10.52	-	-	-	-	0.0%	0.0%	
3.3	Emissions from employee commuting		37.45	25.53	0.03	0.15	-	-	-	-	0.0%	0.0%	
3.4	Emissions from client and visitor transport	OS	-	-	-	-	-	-	-	-	-	-	
3.5	Emissions from business travel		47.88	44.28	0.01	0.23	-	-	-	-	14.0%	0.0%	

4	Category 4: Indirect GHG emissions from products used by the organisation												
4.1	Emissions from purchased goods	OS	-	-	-	-	-	-	-	-	-	-	-
4.2	Emissions from capital goods	OS	-	-	-	-	-	-	-	-	-	-	-
4.3	Emissions from disposal of solid and liquid waste		0.10	-	-	-	-	-	-	-	-	0.0%	0.0%
4.4	Emissions from use of assets		0.02	-	-	-	-	-	-	-	-	0.0%	0.0%
4.5	Emissions from the use of services that are not described in the above subcategories	OS	-	-	-	-	-	-	-	-	-	-	-
5	Category 5: Indirect GHG emissions associated with the use of products from the organisation												
5.1	Emissions or removals from the use stage of the product	OS	-	-	-	-	-	-	-	-	-	-	-
5.2	Emissions from downstream leased assets	OS	-	-	-	-	-	-	-	-	-	-	-
5.3	Emissions from end of life stage of the product	OS	-	-	-	-	-	-	-	-	-	-	-
5.4	Emissions from investments	OS	-	-	-	-	-	-	-	-	-	-	-
5.5	Emissions from the use of services that are not described in the above subcategories	OS	-	-	-	-	-	-	-	-	-	-	-
6	Category 6: Indirect GHG emissions from other sources												
6.1	Indirect GHG emissions from other sources	OS	-	-	-	-	-	-	-	-	-	-	-
REMOVALS													
	Direct removals in tonnes CO ₂ e		-										
STORAGE													
	Total storage as of year end in tonnes CO ₂ e		-										

<u>CARBON FINANCIAL INSTRUMENTS</u>																	
Total Renewable Electricity purchased in kWh with contractual instruments compliant with ISO 14064-01 Annex E	-																
Total Renewable Electricity purchased in kWh with contractual instruments not compliant with ISO 14064-01 Annex E criteria	-																
Offsets from GHG Scheme AA in tonnes CO ₂ e	-																
Credits from GHG Scheme BB in tonnes CO ₂ e	-																
<u>OTHER RELATED INFORMATION</u>																	
Base year GHG emissions, removals, stocks and adjustments to base year	Second year of reporting																
Disclosure of most significant sources, sinks and reservoirs	All sources disclosed																
Statements of emissions per unit of relevant units	See tables																
Significance criteria	Refer to Data Collection Plan																
Uncertainty assessment	See Section 4.3 of GHG Report 2023																
<u>NOTES</u>																	
NS = not significant OS = outside scope																	
<u>TOTALS</u>																	
<table border="1"> <thead> <tr> <th colspan="2">GHG Emissions t CO₂e</th></tr> </thead> <tbody> <tr> <td>Category 1: Direct GHG emissions and removals in tonnes CO₂e</td><td>100.39</td></tr> <tr> <td>Category 2: Indirect GHG emissions from imported energy in tonnes CO₂e</td><td>26.25</td></tr> <tr> <td>Category 3: Indirect GHG emissions from transportation</td><td>1125.01</td></tr> <tr> <td>Category 4: Indirect GHG emissions from products used by the organisation</td><td>0.12</td></tr> <tr> <td>Category 5: Indirect GHG emissions associated with the use of products from the organisation</td><td>0.00</td></tr> <tr> <td>Category 6: Indirect GHG emissions from other sources</td><td>0.00</td></tr> <tr> <td>Total</td><td>1251.77</td></tr> </tbody> </table>		GHG Emissions t CO ₂ e		Category 1: Direct GHG emissions and removals in tonnes CO ₂ e	100.39	Category 2: Indirect GHG emissions from imported energy in tonnes CO ₂ e	26.25	Category 3: Indirect GHG emissions from transportation	1125.01	Category 4: Indirect GHG emissions from products used by the organisation	0.12	Category 5: Indirect GHG emissions associated with the use of products from the organisation	0.00	Category 6: Indirect GHG emissions from other sources	0.00	Total	1251.77
GHG Emissions t CO ₂ e																	
Category 1: Direct GHG emissions and removals in tonnes CO ₂ e	100.39																
Category 2: Indirect GHG emissions from imported energy in tonnes CO ₂ e	26.25																
Category 3: Indirect GHG emissions from transportation	1125.01																
Category 4: Indirect GHG emissions from products used by the organisation	0.12																
Category 5: Indirect GHG emissions associated with the use of products from the organisation	0.00																
Category 6: Indirect GHG emissions from other sources	0.00																
Total	1251.77																

4.3 Uncertainty Assessment

Organisations are required to assess the uncertainty associated with the quantification approaches (e.g., data used for quantification and models) and conduct an assessment that determines the uncertainty at the GHG inventory category level.

Uncertainty information typically specifies quantitative estimates of the likely dispersion of values and a qualitative description of the likely causes of the dispersion.

Where quantitative estimation of uncertainty is not possible or cost effective, it will be justified, and a qualitative assessment shall be conducted.

The principles and methodologies of ISO/IEC Guide 98-3 have been used to complete the uncertainty assessment.

The majority of emissions sources included in the inventory are calculated using recorded and measured data, and as we are unaware of the uncertainties included in the software and third-parties that recorded this data, it is not possible to evaluate those uncertainties.

4.3.1 *Category 1.2: Direct Emissions from Mobile Combustion*

Direct emissions from mobile combustion has a quantitative uncertainty applied as there is an inherent uncertainty in speedometers, and therefore odometers, in all vehicles. As the GHGs from company vehicles has been calculated using vehicle mileage, this margin for error needs to be considered. Under UK Law, all vehicle speedometers must never show less than the actual speed and must never show more than 110% of actual speed + a nominal value of 6.25mph. As the odometer reading is based on the speedometer reading in vehicles, we have assumed a percentage uncertainty of +/-10% for the vehicle mileage.

4.3.2 **Category 3.5: Emissions from business travel**

Emissions from business travel has a quantitative uncertainty due to various unknown values in the data provided by Menarini UK, as detailed below.

Rail

Domestic rail journey distances have been calculated using mapping software and trainline.com figures. For longer distances, there is some uncertainty regarding the emissions as multiple routes are available. For these journeys, the emissions from the recommended route has been used. To calculate uncertainty, the highest and lowest possible emissions from each individual journey were identified to produce a quantitative uncertainty of + 4.24% and – 2.1%.

London Underground journey distances have been calculated using a recently published 2023 cost per kilometre factor of 29 pence per km, therefore there is no uncertainty. As the cost of

each journey has been recorded, it is possible to use this metric to ascertain the distance of each journey without knowledge of respective stations or number of trips.

The majority of EU rail journeys have been calculated using a combination of QGIS, to measure the distances between stations; and UK Government 2023 figures for emission factors. Where necessary, journey routes were identified using trainline.com. EU figures were available solely for CO₂ emissions and were almost identical to UK figures, which provide a greater range of GHGs. The uncertainty for these journeys is therefore zero.

However, there were three journeys in Italy/Denmark which began and finished in the same city and which only had the costs recorded, no specific station data. Average fare costs for these locations is not publicly available and therefore a calculation of journey distances using price could not be carried out. Emissions generated have subsequently been estimated using the relationship between cost and distance from the other intercity EU journeys which provided destination and cost, with the exception of a London to Hamberg return journey which was a significant outlier in the dataset and so was not included in the cost per distance analysis. A cost of £2.69 per km was the resulting metric by which the same city journeys were measured. As these journeys have conservatively been assumed to be national rail as opposed to light rail or metro, no uncertainty has been applied.

Air Travel

Flight journey distances have been calculated using an online air miles calculator⁵, therefore no uncertainty has been applied.

Sea Travel

Ferry journey distances have been calculated using online mapping, therefore no uncertainty has been applied.

Taxis

Taxi journey distances have been calculated using either a city specific taxi pricing index or Google Maps. Where possible, city specific emission coefficients have been used.

London Black cabs

London to London journeys have been calculated using a TfL price index⁶ to measure distance. Due to a data gap of the type of taxi used, all journeys have been assumed to be black cabs as they have a higher emissions per kilometre and this represents the most conservative approach for the missing parameters. Therefore, no uncertainty has been applied.

⁵Air miles calculator: <https://www.airmilescalculator.com/>

⁶TfL taxi price index: <https://tfl.gov.uk/modes/taxis-and-minicabs/taxi-fares/tariffs>

Non-London UK and International Taxis

The majority of journeys have postcodes from which to calculate the distance. However, for journeys which have either the same postcode or same city as a designated start and end point, a city specific pricing index was used. Where possible, emissions have been calculated using a city specific taxi pricing as this was deemed more accurate than using postcodes to calculate a price based on distance. This is based upon the assumption that the taximeter was used, and no informal negotiations took place. However, as the journeys were not personally financed, this is deemed unlikely. Moreover, using two postcodes to calculate the distance can create a large degree of uncertainty when postcodes are adjacent, as depending where in the postcode the start and end points are, the distance can be many times greater or less than the distance between centre of each postcode. For these journeys, no uncertainty has been applied.

For journeys without available and credible local taxi pricing, mapping software has been used to identify distances from associated start and end points. Moreover, the distance of a number of airport journeys was calculated using mapping software and not a pricing index due to the unreliability of using a price to measure distance for airport taxi journeys, due to their inflated cost. For when multiple routes are possible, a conservative approach was taken and therefore no uncertainty has been applied.

Hotel stays

Emissions from hotel stays has a quantitative uncertainty due to various unknown values in the 2023 GHG conversion factors.

All but two overnight stays are exact; there was no published data for Denmark or Ireland for 2023. The highest (14.8) and lowest (6.7) emissions factors from other locations were used to ascertain a mean level of emissions from which an uncertainty percentage of +/- 18.79% was calculated.

4.4 Adding Uncertainties

Using the methodology for adding uncertainties following the weighted average approach as detailed in Figure 4.1 below, the total uncertainty for Category 3.5 emissions is +/- 14%.

Numeric uncertainties have been combined using root-sum-of-squares techniques, using the absolute values to adjust for the relative weight of each parameter or estimate.

Using this methodology, the total uncertainty for the GHG inventory is calculated to be +/-0.8%. A confidence level of 95% is typically required for carbon reporting but due to the limitations of the data, the uncertainty assessment of this report is deemed acceptable.

Figure 4.1: Methodology for Adding Uncertainties

Where: $(C \pm c\%) + (D \pm d\%) = E \pm e\%$

$$e = \frac{\sqrt{(Cxc)^2 + (Dxd)^2}}{E}$$

Where:

<i>C</i>	= CO ₂ e emissions
<i>D</i>	= CO ₂ e emissions
<i>E</i>	= CO ₂ e emissions
<i>c</i>	= Uncertainty percentage
<i>d</i>	= Uncertainty percentage
<i>e</i>	= Uncertainty percentage

4.5 Reducing Uncertainty

The largest uncertainties are those related to hotel stays. Fortunately, the GHG emissions from those particular activities are small in comparison to the largest business travel GHG contributor (downstream transport and distribution), and the total GHG emissions of Menarini UK as an organisation.

It is recommended that data collection is improved to reduce the requirement for estimates and level of uncertainty. Improvements such as recording business travel journeys with greater detail, particularly start and end points, travel routes for upstream and downstream distribution, onward journeys for delivery vehicles, and laden percentage of delivery vehicles, will contribute towards reducing uncertainties.

As above, the largest GHG contributors to Menarini UK's emissions releases have been recorded in detail. Downstream transport and distribution is by far the largest GHG release, with the number of deliveries and vehicle types accurately recorded, meaning uncertainty is minimal in this emissions category.

As it is not possible to know the uncertainties included in the software and third-parties that record the majority of the other inventory data, or online mapping and calculators, it is not possible to evaluate those uncertainties.

It is important to note there have been changes in the methods of measurement since calculation of the base-year on two fronts. Firstly, 'emissions from downstream transport and distribution for goods' (3.2) data for 2023 does not include duplicates whilst 2022 data does. Duplicates being where two or

more orders were recorded as being sent to the same customer on the same day. Menarini UK advised Sol that it would be appropriate to conclude that the same vehicle on the same trip would have been used for the total number of orders sent that day. The 2022 report does not make this distinction and registers every order as travelling separately.

Secondly, for 'direct emissions from mobile combustion' (1.1), different emission factors were used for Hybrid Electric vehicles. Data from this report made use of the emissions factor 'Plug-in Hybrid Electric Vehicle' whilst data for 2022 used the 'Hybrid' emissions factor for Hybrid Electrics. It is more accurate to classify Hybrid Electrics as 'Plug-in Hybrid Electric' vehicles rather than 'Hybrids' which is instead reserved for Diesel Electrics. In data received from Menarini UK for this report, the vehicles in question were recorded as 'Hybrid Electric' whilst there was no classification from Menarini UK for the previous report.

5. GHG PERFORMANCE TRACKING

5.1 Reduction Initiatives

Menarini UK are preparing a separate standalone Carbon Reduction Plan (CRP) in line with the central UK Government's PPN 06/21, as part of the NHS requirements for suppliers. This GHG report has been conducted and written in accordance with ISO 14064-1:2018 and the GHG Protocol Corporate Standard in order to support and inform Menarini UK's CRP and highlight potential areas of GHG emissions improvement.

As per the previous year's dialogue, Sol is aware of a number of reduction targets:

- Transitioning all company car and car allowance drivers to electric vehicles.
- Working with distribution partners to reduce downstream CO2 emissions in our supply chain.
- Minimising international travel through increased use of electronic meetings.
- Offsetting any remaining carbon emissions.

The aim of this report is to provide annual emissions calculations for internal reporting use and review against the base-year. Progress on the three specific targets has been discussed in the carbon reduction plan.

5.2 Internal Performance Tracking

The organisation has committed to annual reporting of its GHG emissions and reductions. Annual reporting will be compared against the CRP targets to determine performance, and to highlight further areas of improvement in data collection and operations.

Annex A: Category 1.2 - Direct Emissions from Mobile Combustion

Company Vehicles

Staff

Direct emission from the mobile combustion of 58 remote sales staff and 19 office based staff is reflected below. This does not include commuting.

Calculation

Table overleaf shows the vehicle types, mileage, coefficients, and total emissions from company vehicles in 2023.

Mileage is recorded per vehicle from the on-board odometer as part of the agreement with the third-party leasing company.

Fuel type	Model	Engine Size	Number Plate	Mileage per Vehicle	CO ₂ e Coefficient (miles)	kg CO ₂ e	CO ₂ Coefficient	kg CO ₂ e of CO ₂	CH ₄ Coefficient	kg CO ₂ e of CH ₄	N ₂ O Coefficient	kg CO ₂ e of N ₂ O
DIESEL	BMW 3 Series	Large	YUI533	1743	0.335696	585.117541	0.33299	580.40157	0.000011	0.019522	0.002694	4.696449
DIESEL	BMW 435D	Large	JAJ 385V	10678	0.335696	3584.55829	0.33299	3555.66722	0.000011	0.119594	0.002694	28.771477
DIESEL	Mercedes-Benz GLC	Large	LM68 TYD	7959	0.335696	2671.801783	0.33299	2650.26741	0.000011	0.089141	0.002694	21.445232
DIESEL	BMW 525	Large	VG53 KCG	1623	0.335696	544.834061	0.33299	540.44277	0.000011	0.018178	0.002694	4.373114
DIESEL	BMW 430	Large	WV16 XER	5154	0.335696	1730.175448	0.33299	1716.23046	0.000011	0.057725	0.002694	13.887263
DIESEL	Range Rover Evoque	Large	WX70 ZWW	2681	0.335696	900.000073	0.33299	892.74619	0.000011	0.030027	0.002694	7.223856
DIESEL	Range Rover Velar	Large	YM17 OZV	378	0.335696	126.892961	0.33299	125.87022	0.000011	0.004234	0.002694	1.018507
DIESEL	Ford Ranger	Large	YT68 HVM	1839	0.335696	617.344324	0.33299	612.36861	0.000011	0.020597	0.002694	4.955118
DIESEL	Mercedes-Benz E	Medium	BU16 WKB	745	0.269016	200.416669	0.26631	198.40095	0.000011	0.008344	0.002694	2.007375
DIESEL	Audi A3	Medium	DA67 YHF	236	0.269016	63.487696	0.26631	62.84916	0.000011	0.002643	0.002694	0.635893
DIESEL	BMW 520D	Medium	DP16 SVZ	10719	0.269016	2883.578893	0.26631	2854.57689	0.000011	0.120053	0.002694	28.88195
DIESEL	Mercedes-Benz C	Medium	DY67 YYD	3722	0.269016	1001.276298	0.26631	991.20582	0.000011	0.041686	0.002694	10.028792
DIESEL	Range Rover Evoque	Medium	GX69 TCK	6584	0.269016	1771.199126	0.26631	1753.38504	0.000011	0.073741	0.002694	17.740345
DIESEL	Volkswagen Passat	Medium	J33 OCR	19199	0.269016	5164.831716	0.26631	5112.88569	0.000011	0.215029	0.002694	51.730997
DIESEL	Volvo XC60	Medium	KE18 FKB	1868	0.269016	502.521259	0.26631	497.46708	0.000011	0.020922	0.002694	5.033257
DIESEL	Range Rover Evoque	Medium	KV18 DRX	3234	0.269016	869.996654	0.26631	861.24654	0.000011	0.036221	0.002694	8.713894
DIESEL	Range Rover Evoque	Medium	LA69 WLZ	6936	0.269016	1865.892639	0.26631	1847.12616	0.000011	0.077683	0.002694	18.688796
DIESEL	Land Rover Discovery Sport	Medium	LJ70 YGN	9716	0.269016	2613.756183	0.26631	2587.46796	0.000011	0.108819	0.002694	26.179403
DIESEL	Audi A7	Medium	A7 TNU	538	0.269016	144.730427	0.26631	143.27478	0.000011	0.006026	0.002694	1.449621
DIESEL	Audi A4	Medium	AO09 FXF	8219	0.269016	2211.039735	0.26631	2188.80189	0.000011	0.092053	0.002694	22.145792
DIESEL	Nissan Qashqai	Small	GY14 RGV	22	0.224196	4.932305	0.22149	4.87278	0.000011	0.000246	0.002694	0.059278
ELECTRIC	Mercedes-Benz EQC	Unknown	PK70 VXZ	201	0.088186	17.725482	0.08731	17.54931	0.00037	0.07429	0.00051	0.10188
ELECTRIC	Unknown	Unknown	AF72 WLR	656	0.088186	57.85033	0.08731	57.27536	0.00037	0.242458	0.00051	0.332513
ELECTRIC DIESEL	BMW X5 Xdrive 40d M	Large	RJ21 XUW	1674	0.2453	410.6322	0.24302	406.81548	0.000157	0.262818	0.002125	3.557812
ELECTRIC DIESEL	Volvo XC90	Medium	MX20 WFF	3983	0.17549	698.97667	0.17354	691.20982	0.000269	1.07063	0.001681	6.695423
HYBRID ELECTRIC	BMW X5	Large	BX23 WKR	30	0.11397	3.4191	0.11317	3.3951	0.00045	0.0135	0.00036	0.0108
HYBRID ELECTRIC	Land Rover Discovery	Large	DO19 UGP	4441	0.11397	506.14077	0.11317	502.58797	0.00045	1.99845	0.00036	1.59876
HYBRID ELECTRIC	Mitsubishi Outlander	Large	DS69 XAO	2314	0.11397	263.72658	0.11317	261.87538	0.00045	1.0413	0.00036	0.83304
HYBRID ELECTRIC	Mitsubishi Outlander	Large	DX69 RXJ	5409	0.11397	616.46373	0.11317	612.13653	0.00045	2.43405	0.00036	1.94724
HYBRID ELECTRIC	Ford Kuga	Large	EA23 YHP	4785	0.11397	545.34645	0.11317	541.51845	0.00045	2.15325	0.00036	1.7226
HYBRID ELECTRIC	Ford Kuga	Large	EK23 ABX	11562	0.11397	1317.72114	0.11317	1308.47154	0.00045	5.2029	0.00036	4.16232
HYBRID ELECTRIC	Ford Kuga	Large	EK23 ACJ	8751	0.11397	997.35147	0.11317	990.35067	0.00045	3.93795	0.00036	3.15036
HYBRID ELECTRIC	Ford Kuga	Large	EK23 ACU	6705	0.11397	764.16885	0.11317	758.80485	0.00045	3.01725	0.00036	2.4138
HYBRID ELECTRIC	Ford Kuga	Large	EO23 ZXZ	2544	0.11397	289.93968	0.11317	287.90448	0.00045	1.1448	0.00036	0.91584

HYRBID ELECTRIC	Ford Kuga	Large	EO23 ZZT	2141	0.11397	244.00977	0.11317	242.29697	0.00045	0.96345	0.00036	0.77076
HYRBID ELECTRIC	Kia Sportage	Large	FD23 WGZ	3555	0.11397	405.16335	0.11317	402.31935	0.00045	1.59975	0.00036	1.2798
HYRBID ELECTRIC	Kia Sportage	Large	GD72 JNL	8654	0.11397	986.29638	0.11317	979.37318	0.00045	3.8943	0.00036	3.11544
HYRBID ELECTRIC	Toyota RAV4	Large	RK20 MYN	5615	0.11397	639.94155	0.11317	635.44955	0.00045	2.52675	0.00036	2.0214
HYRBID ELECTRIC	Kia Sportage	Medium	AY22 WSK	1358	0.09887	134.26546	0.09816	133.30128	0.0004	0.5432	0.00031	0.42098
HYRBID ELECTRIC	Volvo XC40	Medium	BG20 WMX	22325	0.09887	2207.27275	0.09816	2191.422	0.0004	8.93	0.00031	6.92075
HYRBID ELECTRIC	Volvo XC40	Medium	BK21 MYN	25929	0.09887	2563.60023	0.09816	2545.19064	0.0004	10.3716	0.00031	8.03799
HYRBID ELECTRIC	Volvo XC40	Medium	BK70 EVB	8418	0.09887	832.28766	0.09816	826.31088	0.0004	3.3672	0.00031	2.60958
HYRBID ELECTRIC	Volvo XC40	Medium	BK70 XPC	12726	0.09887	1258.21962	0.09816	1249.18416	0.0004	5.0904	0.00031	3.94506
HYRBID ELECTRIC	Range Rover Evoque	Medium	BP70 YPN	6894	0.09887	681.60978	0.09816	676.71504	0.0004	2.7576	0.00031	2.13714
HYRBID ELECTRIC	Hyundai Ioniq	Medium	DU69 TFO	9692	0.09887	958.24804	0.09816	951.36672	0.0004	3.8768	0.00031	3.00452
HYRBID ELECTRIC	BMW 330E	Medium	EF72 BTU	19857	0.09887	1963.26159	0.09816	1949.16312	0.0004	7.9428	0.00031	6.15567
HYRBID ELECTRIC	BMW 330E	Medium	EO69 RLU	9702	0.09887	959.23674	0.09816	952.34832	0.0004	3.8808	0.00031	3.00762
HYRBID ELECTRIC	Toyota C-HR	Medium	FL20 GXO	1702	0.09887	168.27674	0.09816	167.06832	0.0004	0.6808	0.00031	0.52762
HYRBID ELECTRIC	BMW 330E	Medium	FP73 HXN	1956	0.09887	193.38972	0.09816	192.00096	0.0004	0.7824	0.00031	0.60636
HYRBID ELECTRIC	BMW 330E	Medium	HX20 OAY	4628	0.09887	457.57036	0.09816	454.28448	0.0004	1.8512	0.00031	1.43468
HYRBID ELECTRIC	BMW 330E M	Medium	LO72 OHW	6381	0.09887	630.88947	0.09816	626.35896	0.0004	2.5524	0.00031	1.97811
HYRBID ELECTRIC	Range Rover Evoque	Medium	LB21 KWK	11707	0.09887	1157.47109	0.09816	1149.15912	0.0004	4.6828	0.00031	3.62917
HYRBID ELECTRIC	BMW 330E M	Medium	LL72 XSR	12974	0.09887	1282.73938	0.09816	1273.52784	0.0004	5.1896	0.00031	4.02194
HYRBID ELECTRIC	BMW 330E M	Medium	LL72 XTA	14088	0.09887	1392.88056	0.09816	1382.87808	0.0004	5.6352	0.00031	4.36728
HYRBID ELECTRIC	BMW 330E M	Medium	LL72 XTB	12498	0.09887	1235.67726	0.09816	1226.80368	0.0004	4.9992	0.00031	3.87438
HYRBID ELECTRIC	BMW 330E M	Medium	LL72 XTJ	7298	0.09887	721.55326	0.09816	716.37168	0.0004	2.9192	0.00031	2.26238
HYRBID ELECTRIC	BMW 330E M	Medium	LL72 YYG	5930	0.09887	586.2991	0.09816	582.0888	0.0004	2.372	0.00031	1.8383
HYRBID ELECTRIC	BMW 330E M	Medium	LL72 YYS	10638	0.09887	1051.77906	0.09816	1044.22608	0.0004	4.2552	0.00031	3.29778
HYRBID ELECTRIC	BMW 330E M	Medium	LL72 YZX	9309	0.09887	920.38083	0.09816	913.77144	0.0004	3.7236	0.00031	2.88579
HYRBID ELECTRIC	BMW 330E M	Medium	LO72 KYZ	8157	0.09887	806.48259	0.09816	800.69112	0.0004	3.2628	0.00031	2.52867
HYRBID ELECTRIC	BMW X3	Medium	ML20 HYU	1771	0.09887	175.09877	0.09816	173.84136	0.0004	0.7084	0.00031	0.54901
HYRBID ELECTRIC	Mercedes-Benz C	Medium	N888 ARD	140	0.09887	13.8418	0.09816	13.7424	0.0004	0.056	0.00031	0.0434
HYRBID ELECTRIC	Toyota Corolla	Medium	RK69 LBV	1899	0.09887	187.75413	0.09816	186.40584	0.0004	0.7596	0.00031	0.58869
HYRBID ELECTRIC	BMW 330E	Medium	WP70 XLT	13113	0.09887	1296.48231	0.09816	1287.17208	0.0004	5.2452	0.00031	4.06503
HYRBID ELECTRIC	Kia Sportage	Medium	LD23 TYD	1017	0.09887	100.55079	0.09816	99.82872	0.0004	0.4068	0.00031	0.31527
HYRBID ELECTRIC	SEAT Leon	Small	LM23 CVJ	2079	0.02163	44.96877	0.02149	44.67771	0.00008	0.16632	0.0001	0.2079
HYRBID ELECTRIC	Volkswagen Passat	Small	RE20 TRZ	2905	0.02163	62.83515	0.02149	62.42845	0.00008	0.2324	0.0001	0.2905
HYRBID ELECTRIC	Volkswagen Tiguan	Small	WN73 UGZ	1595	0.02163	34.49985	0.02149	34.27655	0.00008	0.1276	0.0001	0.1595
HYRBID ELECTRIC	MINI Cooper S	Small	HK23 RZJ	3141	0.02163	67.93983	0.02149	67.50009	0.00008	0.25128	0.0001	0.3141
PETROL	Kia Sportage	Large	GJ70 ZHH	4941	0.43812	2164.75092	0.43703	2159.36523	0.000571	2.822299	0.000516	2.548429
PETROL	Land Rover Freelander	Large	M21 JME	9774	0.43812	4282.18488	0.43703	4271.53122	0.000571	5.582909	0.000516	5.041154
PETROL	Audi A6	Large	PL67 FPA	998	0.43812	437.24376	0.43703	436.15594	0.000571	0.570058	0.000516	0.51474
PETROL	Toyota RAV4	Large	RS69 SJU	115	0.43812	50.3838	0.43703	50.25845	0.000571	0.065688	0.000516	0.059314
PETROL	Range Rover Evoque	Medium	AK69 WUB	6865	0.28676	1968.6074	0.28567	1961.12455	0.000571	3.921288	0.000516	3.540773
PETROL	VW Golf	Medium	AR07 LMF	154	0.28676	44.16104	0.28567	43.99318	0.000571	0.087965	0.000516	0.079429
PETROL	Volvo XC40	Medium	BL69 EFZ	18241	0.28676	5230.78916	0.28567	5210.90647	0.000571	10.419259	0.000516	9.408194

PETROL	Mercedes-Benz CLA	Medium	BU71 AYK	9666	0.28676	2771.82216	0.28567	2761.28622	0.000571	5.521219	0.000516	4.98545
PETROL	Land Rover Discovery Sprt	Medium	BW72 CCY	10745	0.28676	3081.2362	0.28567	3069.52415	0.000571	6.137544	0.000516	5.541968
PETROL	Mercedes-Benz A	Medium	CA72 GUX	359	0.28676	102.94684	0.28567	102.55553	0.000571	0.205061	0.000516	0.185162
PETROL	MINI Cooper S	Medium	LB22 DXK	1031	0.28676	295.64956	0.28567	294.52577	0.000571	0.588907	0.000516	0.531761
PETROL	Mercedes-Benz GLC	Medium	X99 LAS	801	0.28676	229.69476	0.28567	228.82167	0.000571	0.457531	0.000516	0.413133
PETROL	BMW 320	Medium	PT20 SUZ	1438	0.28676	412.36088	0.28567	410.79346	0.000571	0.821386	0.000516	0.74168
PETROL	Audi A4	Medium	RY68 OVF	5073	0.28676	1454.73348	0.28567	1449.20391	0.000571	2.897698	0.000516	2.61651
PETROL	Ford C-MAX	Medium	SK62 TZB	261	0.28676	74.84436	0.28567	74.55987	0.000571	0.149083	0.000516	0.134616
PETROL	Mercedes-Benz A-Class	Medium	T564 SMV	303	0.28676	86.88828	0.28567	86.55801	0.000571	0.173074	0.000516	0.156279
PETROL	BMW 318i M	Medium	YC21 HFH	338	0.28676	96.92488	0.28567	96.55646	0.000571	0.193066	0.000516	0.174331
PETROL	Audi Q3	Medium	S88 JJM	3165	0.28676	907.5954	0.28567	904.14555	0.000571	1.807848	0.000516	1.632418
PETROL	Volvo V40	Medium	YH15 MYR	3075	0.28676	881.787	0.28567	878.43525	0.000571	1.75644	0.000516	1.585998
PETROL	Nissan Qashqai	Small	CDE 276X	822	0.2266	186.2652	0.22551	185.36922	0.000571	0.469526	0.000516	0.423964
PETROL	Citroen C3 Shine + Puretech S/S	Small	CJ71 HWU	5759	0.2266	1304.9894	0.22551	1298.71209	0.000571	3.289541	0.000516	2.97033
PETROL	SEAT Arona	Small	HY71 KVA	403	0.2266	91.3198	0.22551	90.88053	0.000571	0.230194	0.000516	0.207856
PETROL	Volkswagen UP	Small	LO21 JLX	287	0.2266	65.0342	0.22551	64.72137	0.000571	0.163934	0.000516	0.148027
PETROL	Volkswagen Polo	Small	LT19 EYD	314	0.2266	71.1524	0.22551	70.81014	0.000571	0.179357	0.000516	0.161952
PETROL	SEAT Toledo	Small	NL68 JDF	146	0.2266	33.0836	0.22551	32.92446	0.000571	0.083395	0.000516	0.075303
PETROL	Audi A4	Small	OE67 GOU	147	0.2266	33.3102	0.22551	33.14997	0.000571	0.083966	0.000516	0.075818
PETROL	Volkswagen	Small	OXZ 1534	288	0.2266	65.2608	0.22551	64.94688	0.000571	0.164506	0.000516	0.148542
PETROL	Mercedes-Benz A	Small	PO20 TLJ	6406	0.2266	1451.5996	0.22551	1444.61706	0.000571	3.659107	0.000516	3.304034
PETROL	MINI Countryman	Small	SB72 OHN	99	0.2266	22.4334	0.22551	22.32549	0.000571	0.056549	0.000516	0.051061
PETROL	Vauxhall Grandland	Small	SH70 FWZ	2546	0.2266	576.9236	0.22551	574.14846	0.000571	1.454275	0.000516	1.313155
PETROL	Dacia Duster Journey	Small	ST23 AOO	12269	0.2266	2780.1554	0.22551	2766.78219	0.000571	7.008053	0.000516	6.328004
PETROL	Volkswagen	Small	VIG 2803	17127	0.2266	3880.9782	0.22551	3862.30977	0.000571	9.782942	0.000516	8.833624
PETROL	Ford Puma	Small	WP70 WLL	840	0.2266	190.344	0.22551	189.4284	0.000571	0.479808	0.000516	0.433248
PETROL	BMW 118	Small	WP72 AGU	5348	0.2266	1211.8568	0.22551	1206.02748	0.000571	3.054778	0.000516	2.758348
PETROL	Fiat 500C	Small	WR62 YZS	2855	0.2266	646.943	0.22551	643.83105	0.000571	1.630776	0.000516	1.472529
PETROL	SEAT Leon	Small	YK22 YST	744	0.2266	168.5904	0.22551	167.77944	0.000571	0.424973	0.000516	0.383734
PETROL	Unknown	Unknown	YC70 HFW	262	0.26379	69.11298	0.2627	68.8274	0.000571	0.149654	0.000516	0.135132

<u>Totals</u>			
kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
100394.578	99728.88739	206.9044332	459.4373691

Annex B: Category 2.1 - Indirect Emissions from Imported Electricity

Imported Electricity

Provider

Electricity is supplied by British Gas and metered, read monthly.

Calculation

Electricity generation co-efficient for the UK National Grid is provided below.

Generation			
CO ₂ e	CO ₂	CH ₄	N ₂ O
Coefficient	Coefficient	Coefficient	Coefficient
0.207074	0.20496	0.000896	0.001218

Table below shows the monthly electricity for the office and calculated GHG emissions.

Month	Day Use (kWh)	Night Use (kWh)	Total Use (kWh)	kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
January	10426	3399.5	13825.5	2862.901587	2833.67448	12.387648	16.839459
February	8864	2985.3	11849.3	2453.681948	2428.632528	10.6169728	14.4324474
March	9115.7	2878.3	11994	2483.645556	2458.29024	10.746624	14.608692
April	7436.7	2465.7	9902.4	2050.529578	2029.595904	8.8725504	12.0611232
May	7852.4	2416.7	10269.1	2126.463613	2104.754736	9.2011136	12.5077638
June	7158.2	1599.1	8757.3	1813.40914	1794.896208	7.8465408	10.6663914
July	6891.1	1505.3	8396.4	1738.676134	1720.926144	7.5231744	10.2268152
August	6556.9	1398.7	7955.6	1647.397914	1630.579776	7.1282176	9.6899208
September	6963.2	1391.8	8355	1730.10327	1712.4408	7.48608	10.17639
October	8494.2	2585.3	11079.5	2294.276383	2270.85432	9.927232	13.494831
November	9372.4	3123.1	12495.5	2587.493167	2561.07768	11.195968	15.219519
December	8851.5	3052.9	11904.4	2465.091726	2439.925824	10.6663424	14.4995592

Totals			
kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
26253.67002	25985.64864	113.598464	154.422912

Annex C: Category 3.1 - Emissions from Upstream Transport and Distribution for Goods

Upstream Transport

Manufacturing Facilities

- **Florence** - A. Menarini Manufacturing Logistics and Services SRL, Via dei Confini, 24, 59100 Prato PO, Italy
- **Dresden** - Menarini Von Heyden GmbH, Leipziger Str. 7-13, 01097 Dresden, Germany
- **Berlin** - A. Menarini Research & Business Service GmbH, BHKW Adlershof, Glienicke Weg 125-127, 12489 Berlin, Germany
- **Barcelona (LMSA)** - Grupo Menarini España, C. d'Alfons XII, 587, 08918 Badalona, Barcelona, Spain
- **Beerse** – Turnhoutseweg 30, B-2340, Belgium
- **Alloga** – AP1 Amber Park, Berristow Lane, South Normanton, Derbyshire, DE55 2FH

Destination

All deliveries are to the pre-wholesaler: Movianto UK Limited, 1 Progress Park, Bedford, MK42 9XE.

Vehicles

Lorry

Model – Refrigerated articulated HGV (diesel).

Co-efficient – Assumed 'all artics' and average laden to account for unknown return trip.

Rail

Model - National rail

Co-efficient – Vehicle assumed as 1 passenger.

Calculation

Table overleaf details the number of deliveries from each manufacturing facility and shows the calculation to establish the GHG emissions from upstream distribution.

Distance (km)	Annual return trips	Cumulative distance (km)	Vehicle type	CO ₂ e Coefficient	kg CO ₂ e	CO ₂ Coefficient	kg CO ₂ e of CO ₂	CH ₄ Coefficient	kg CO ₂ e of CH ₄	N ₂ O Coefficient	kg CO ₂ e of N ₂ O
<u>Florence to Calais Channel Tunnel</u>											
1439	4	11512	Refrigerated Arctic HGV	1.04867	12072.28904	1.03424	11906.171	0.00015	1.7268	0.01428	164.3914
<u>LMSA (Barcelona) to Calais Channel Tunnel</u>											
1330	5	13295	Refrigerated Arctic HGV	1.04867	13942.06765	1.03424	13750.221	0.00015	1.99425	0.01428	189.8526
<u>Dresden to Calais Channel Tunnel</u>											
957	18	34452	Refrigerated Arctic HGV	1.04867	36128.77884	1.03424	35631.636	0.00015	5.1678	0.01428	491.9746
<u>Berlin to Calais Channel Tunnel</u>											
937	11	20614	Refrigerated Arctic HGV	1.04867	21617.28338	1.03424	21319.823	0.00015	3.0921	0.01428	294.3679
<u>Beerse to Calais Channel Tunnel</u>											
251	14	7028	Refrigerated Arctic HGV	1.04867	7370.05276	1.03424	7268.6387	0.00015	1.0542	0.01428	100.3598
<u>Calais to Folkestone (Channel Tunnel)</u>											
50.5	52	5252	Train	0.035463	186.251676	0.0351	184.3452	0.000078	0.409656	0.000285	1.49682
<u>Folkestone Channel Tunnel to Bedford</u>											
210	52	21840	Refrigerated Arctic HGV	1.04867	22902.9528	1.03424	22587.802	0.00015	3.276	0.01428	311.8752
<u>Alloga to Bedford</u>											
101	3	606	Refrigerated Arctic HGV	1.04867	635.49402	1.03424	626.74944	0.00015	0.0909	0.01428	8.65368

<u>Totals</u>			
<u>kg CO₂e</u>	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
<u>114,855.17</u>	113,275.39	16.81	1,562.97

Annex D: Category 3.2 - Emissions from Downstream Transport and Distribution for Goods

Downstream Transport

Deliveries

All initial deliveries are from the Movianto site in Bedford to their hub in Tamworth, prior to onward distribution to the various wholesalers and purchasers who purchase product in bulk.

All wholesaler addresses and number of deliveries are included in the calculation table overleaf.

Data is extracted from online portal with total number of units per wholesale customer.

Deliveries to addresses in Northern Ireland include a ferry crossing between Larne and Cairnryan, Scotland. The emission factors used for these crossings were for a ferry car passenger under business travel – sea.

Vehicles

All initial journeys are conducted by refrigerated Articulated HGVs (diesel) using the same types and coefficients as upstream distribution, i.e., all arctics and assumed average laden to account for unknown return trip.

All onward journeys are completed by refrigerated rigid vehicles (>3.5 - 7.5 tonnes) (diesel). Also assumed average laden to account for unknown return trip.

Calculation

Overleaf

Customer			Pre-wholesaler to Hub						
Name	Post Code	Number of deliveries	Road distance from pre-wholesaler (km)	Total return distance (km)	Cumulative Distance (km)	kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
						Coefficients			
						1.04867	1.03424	0.00015	0.01428
Phoenix Healthcare Distribution Ltd	AB12 3LE	17	129	258	4386	4599.46662	4536.17664	0.6579	62.63208
AAH Pharmaceuticals Ltd	AB12 3LU	7	129	258	1806	1893.89802	1867.83744	0.2709	25.78968
Phoenix Healthcare Distribution Ltd	AL2 2DQ	25	129	258	6450	6763.9215	6670.848	0.9675	92.106
Phoenix Healthcare Distribution Ltd	B46 1DA	53	129	258	13674	14339.51358	14142.19776	2.0511	195.26472
AAH 406P Pharmaceuticals Ltd	B6 7UG	62	129	258	15996	16774.52532	16543.70304	2.3994	228.42288
Lexon UK Ltd	B98 0RE	14	129	258	3612	3787.79604	3735.67488	0.5418	51.57936
Lexon UK Ltd	B98 0RF	15	129	258	3870	4058.3529	4002.5088	0.5805	55.2636
Phoenix Healthcare Distribution Ltd	BR8 8NJ	23	129	258	5934	6222.80778	6137.18016	0.8901	84.73752
AAH 501G Pharmaceuticals Ltd	BS2 0XJ	56	129	258	14448	15151.18416	14942.69952	2.1672	206.31744
Alliance Healthcare (Dist) Ltd	BT3 9JQ	28	129	258	7224	7575.59208	7471.34976	1.0836	103.15872
Phoenix Healthcare Distribution Ltd	BT5 6QR	49	129	258	12642	13257.28614	13074.86208	1.8963	180.52776
AAH 108Q Pharmaceuticals Ltd	BT5 6SR	56	129	258	14448	15151.18416	14942.69952	2.1672	206.31744
Phoenix Healthcare Distribution Ltd	CF15 5JN	23	129	258	5934	6222.80778	6137.18016	0.8901	84.73752
Alliance Healthcare (Dist) Ltd 02	CR9 0DB	34	129	258	8772	9198.93324	9072.35328	1.3158	125.26416
Alliance Healthcare (Dist) Ltd	DE55 2DT	45	129	258	11610	12175.0587	12007.5264	1.7415	165.7908
Lexon UK Ltd	DL17 0PD	16	129	258	4128	4328.90976	4269.34272	0.6192	58.94784
Alliance Healthcare (Dist) Ltd 16	EX2 8QW	37	129	258	9546	10010.60382	9872.85504	1.4319	136.31688
AAH Pharmaceuticals Ltd	G42 0PH	47	129	258	12126	12716.17242	12541.19424	1.8189	173.15928
Phoenix Healthcare Distribution Ltd	G75 0YA	54	129	258	13932	14610.07044	14409.03168	2.0898	198.94896
Drugs R Us Limited	HA1 1XD	17	129	258	4386	4599.46662	4536.17664	0.6579	62.63208
AAH 703M Pharmaceuticals Ltd	HA4 0JP	64	129	258	16512	17315.63904	17077.37088	2.4768	235.79136
Alliance Healthcare (Dist) Ltd 01	KT9 1SN	39	129	258	10062	10551.71754	10406.52288	1.5093	143.68536
Alliance Healthcare (Dist) Ltd 05	LE10 3BS	35	129	258	9030	9469.4901	9339.1872	1.3545	128.9484
Phoenix Healthcare Distribution Ltd	LL13 7TF	30	129	258	7740	8116.7058	8005.0176	1.161	110.5272
Alliance Healthcare (Dist) Ltd 06	LS11 0LR	31	129	258	7998	8387.26266	8271.85152	1.1997	114.21144

Lexon UK Ltd	LS12 6LS	14	129	258	3612	3787.79604	3735.67488	0.5418	51.57936
AAH 201D Pharmaceuticals Ltd	LS27 0YD	51	129	258	13158	13798.39986	13608.52992	1.9737	187.89624
Alliance Healthcare (Dist) Ltd	MLS 5AW	31	129	258	7998	8387.26266	8271.85152	1.1997	114.21144
Alliance Healthcare (Dist) Ltd 10	NE5 2TF	35	129	258	9030	9469.4901	9339.1872	1.3545	128.9484
AAH 204J Pharmaceuticals Ltd	NE8 4YR	35	129	258	9030	9469.4901	9339.1872	1.3545	128.9484
Phoenix Healthcare Distribution Ltd	NR7 9BB	53	129	258	13674	14339.51358	14142.19776	2.0511	195.26472
Phoenix Healthcare Distribution Ltd	PL7 5JY	19	129	258	4902	5140.58034	5069.84448	0.7353	70.00056
Phoenix Healthcare Distribution Ltd	PO6 1UP	49	129	258	12642	13257.28614	13074.86208	1.8963	180.52776
Alliance Healthcare (Dist) Ltd 09	PR5 8AE	32	129	258	8256	8657.81952	8538.68544	1.2384	117.89568
AAH 706S Pharmaceuticals Ltd	RM3 8SU	64	129	258	16512	17315.63904	17077.37088	2.4768	235.79136
Alliance Healthcare (Dist) Ltd 08	SA5 4HA	27	129	258	6966	7305.03522	7204.51584	1.0449	99.47448
AAH 504M Pharmaceuticals Ltd	SA7 0AH	56	129	258	14448	15151.18416	14942.69952	2.1672	206.31744
Alliance Healthcare (Dist) Ltd 04	SG6 2HB	32	129	258	8256	8657.81952	8538.68544	1.2384	117.89568
AAH 908B Pharmaceuticals Ltd	SO40 3SZ	47	129	258	12126	12716.17242	12541.19424	1.8189	173.15928
AAH 602J Pharmaceuticals Ltd	TN40 2JP	48	129	258	12384	12986.72928	12808.02816	1.8576	176.84352
AAH 502X Pharmaceuticals Ltd	TQ3 2HU	10	129	258	2580	2705.5686	2668.3392	0.387	36.8424
LAXMICO LIMITED	UB6 7JD	7	129	258	1806	1893.89802	1867.83744	0.2709	25.78968
AAH 305M Pharmaceuticals Ltd	WA2 8UH	65	129	258	16770	17586.1959	17344.2048	2.5155	239.4756
Phoenix Healthcare Distribution Ltd	WA7 3DJ	56	129	258	14448	15151.18416	14942.69952	2.1672	206.31744
Phoenix Healthcare Distribution Ltd	WF3 4BY	19	129	258	4902	5140.58034	5069.84448	0.7353	70.00056
CST Pharma Limited	WS9 8ER	45	129	258	11610	12175.0587	12007.5264	1.7415	165.7908
Phoenix Healthcare Distribution Ltd	YO31 9BL	12	129	258	3096	3246.68232	3202.00704	0.4644	44.21088

Customer			Hub to customer						
Name	Post Code	Number of deliveries	Road distance from hub (km)	Total return distance (km)	Cumulative Distance (km)	kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
						Coefficients			
						0.5783	0.57287	0.00011	0.00532
Phoenix Healthcare Distribution Ltd	AB12 3LE	17	682	1364	23188	13409.6204	13283.70956	2.55068	123.36016
AAH Pharmaceuticals Ltd	AB12 3LU	7	682	1364	9548	5521.6084	5469.76276	1.05028	50.79536
Phoenix Healthcare Distribution Ltd	AL2 2DQ	25	159	318	7950	4597.485	4554.3165	0.8745	42.294
Phoenix Healthcare Distribution Ltd	B46 1DA	53	12.6	25.2	1335.6	772.37748	765.125172	0.146916	7.105392
AAH 406P Pharmaceuticals Ltd	B6 7UG	62	27.6	55.2	3422.4	1979.17392	1960.590288	0.376464	18.207168
Lexon UK Ltd	B98 0RE	14	46.8	93.6	1310.4	757.80432	750.688848	0.144144	6.971328
Lexon UK Ltd	B98 0RF	15	46.4	92.8	1392	804.9936	797.43504	0.15312	7.40544
Phoenix Healthcare Distribution Ltd	BR8 8NJ	23	233	466	10718	6198.2194	6140.02066	1.17898	57.01976
AAH 501G Pharmaceuticals Ltd	BS2 0XJ	56	171	342	19152	11075.6016	10971.60624	2.10672	101.88864
Alliance Healthcare (Dist) Ltd	BT3 9JQ	28	586	1172	32816	18977.4928	18799.30192	3.60976	174.58112
Phoenix Healthcare Distribution Ltd	BT5 6QR	49	566	1132	55468	32077.1444	31775.95316	6.10148	295.08976
AAH 108Q Pharmaceuticals Ltd	BT5 6SR	56	570	1140	63840	36918.672	36572.0208	7.0224	339.6288
Phoenix Healthcare Distribution Ltd	CF15 5JN	23	204	408	9384	5426.7672	5375.81208	1.03224	49.92288
Alliance Healthcare (Dist) Ltd 02	CR9 0DB	34	254	508	17272	9988.3976	9894.61064	1.89992	91.88704
Alliance Healthcare (Dist) Ltd	DE55 2DT	45	72.5	145	6525	3773.4075	3737.97675	0.71775	34.713
Lexon UK Ltd	DL17 0PD	16	268	536	8576	4959.5008	4912.93312	0.94336	45.62432
Alliance Healthcare (Dist) Ltd 16	EX2 8QW	37	288	576	21312	12324.7296	12209.00544	2.34432	113.37984
AAH Pharmaceuticals Ltd	G42 0PH	47	467	934	43898	25386.2134	25147.84726	4.82878	233.53736
Phoenix Healthcare Distribution Ltd	G75 0YA	54	465	930	50220	29042.226	28769.5314	5.5242	267.1704
Drugs R Us Limited	HA1 1XD	17	172	344	5848	3381.8984	3350.14376	0.64328	31.11136
AAH 703M Pharmaceuticals Ltd	HA4 0JP	64	184	368	23552	13620.1216	13492.23424	2.59072	125.29664
Alliance Healthcare (Dist) Ltd 01	KT9 1SN	39	220	440	17160	9923.628	9830.4492	1.8876	91.2912
Alliance Healthcare (Dist) Ltd 05	LE10 3BS	35	18.8	37.6	1316	761.0428	753.89692	0.14476	7.00112
Phoenix Healthcare Distribution Ltd	LL13 7TF	30	119	238	7140	4129.062	4090.2918	0.7854	37.9848
Alliance Healthcare (Dist) Ltd 06	LS11 0LR	31	163	326	10106	5844.2998	5789.42422	1.11166	53.76392

Lexon UK Ltd	LS12 6LS	14	165	330	4620	2671.746	2646.6594	0.5082	24.5784
AAH 201D Pharmaceuticals Ltd	LS27 0YD	51	162	324	16524	9555.8292	9466.10388	1.81764	87.90768
Alliance Healthcare (Dist) Ltd	ML5 5AW	31	458	916	28396	16421.4068	16267.21652	3.12356	151.06672
Alliance Healthcare (Dist) Ltd 10	NE5 2TF	35	310	620	21700	12549.11	12431.279	2.387	115.444
AAH 204J Pharmaceuticals Ltd	NE8 4YR	35	301	602	21070	12184.781	12070.3709	2.3177	112.0924
Phoenix Healthcare Distribution Ltd	NR7 9BB	53	268	536	28408	16428.3464	16274.09096	3.12488	151.13056
Phoenix Healthcare Distribution Ltd	PL7 5JY	19	344	688	13072	7559.5376	7488.55664	1.43792	69.54304
Phoenix Healthcare Distribution Ltd	PO6 1UP	49	256	512	25088	14508.3904	14372.16256	2.75968	133.46816
Alliance Healthcare (Dist) Ltd 09	PR5 8AE	32	171	342	10944	6328.9152	6269.48928	1.20384	58.22208
AAH 706S Pharmaceuticals Ltd	RM3 8SU	64	210	420	26880	15544.704	15398.7456	2.9568	143.0016
Alliance Healthcare (Dist) Ltd 08	SA5 4HA	27	270	540	14580	8431.614	8352.4446	1.6038	77.5656
AAH 504M Pharmaceuticals Ltd	SA7 0AH	56	261	522	29232	16904.8656	16746.13584	3.21552	155.51424
Alliance Healthcare (Dist) Ltd 04	SG6 2HB	32	151	302	9664	5588.6912	5536.21568	1.06304	51.41248
AAH 908B Pharmaceuticals Ltd	SO40 3SZ	47	236	472	22184	12829.0072	12708.54808	2.44024	118.01888
AAH 602J Pharmaceuticals Ltd	TN40 2JP	48	313	626	30048	17376.7584	17213.59776	3.30528	159.85536
AAH 502X Pharmaceuticals Ltd	TQ3 2HU	10	319	638	6380	3689.554	3654.9106	0.7018	33.9416
LAXMICO LIMITED	UB6 7JD	7	319	638	4466	2582.6878	2558.43742	0.49126	23.75912
AAH 305M Pharmaceuticals Ltd	WA2 8UH	65	138	276	17940	10374.702	10277.2878	1.9734	95.4408
Phoenix Healthcare Distribution Ltd	WA7 3DJ	56	136	272	15232	8808.6656	8725.95584	1.67552	81.03424
Phoenix Healthcare Distribution Ltd	WF3 4BY	19	136	272	5168	2988.6544	2960.59216	0.56848	27.49376
CST Pharma Limited	WS9 8ER	45	24.9	49.8	2241	1295.9703	1283.80167	0.24651	11.92212
Phoenix Healthcare Distribution Ltd	YO31 9BL	12	211	422	5064	2928.5112	2901.01368	0.55704	26.94048

<u>Totals</u>			
kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
924,821.69	914,146.62	154.42	10,520.64

Annex E: Category 3.3 - Emissions from Employee Commuting

Commuting

Staff

77 total staff - 19 office based and 58 remote.

Office days

252 working days in 2023 - 25 holiday days = 227 working days.

Office based staff split days between office and homeworking.

Remote staff typically spend 4 days per week travelling and 1 day per week working from home.

All business travel days are subtracted from office days and not homeworking, reducing the number of commuting journeys.

Calculation

Overleaf.

Office based staff

Employee	Days in office per week	Daily commute - return (miles)	Annual trips	Cumulative distance	Fuel type	Size	CO ₂ e Coefficient	kg CO ₂ e	CO ₂ Coefficient	kg CO ₂ e of CO ₂	CH ₄ Coefficient	kg CO ₂ e of CH ₄	N ₂ O Coefficient	kg CO ₂ e of N ₂ O
1	3	14.8	136	2015.76	Petrol	Small	0.226597	456.7651119	0.22551	454.5740376	0.000571	1.151402112	0.000516	1.039672188
2	5	82.6	227	18750.2	Petrol	Small	0.226597	4248.738541	0.22551	4228.357602	0.000571	10.71011424	0.000516	9.670824631
3	2	36.4	91	3305.12	Petrol	Large	0.438117	1448.029259	0.43703	1444.436594	0.000571	1.88722352	0.000516	1.70544192
4	3	14.8	136	2015.76	Diesel	Large	0.335696	676.6818898	0.33299	671.2279224	0.000011	0.022576512	0.002694	5.431390913
5	1	170	45	7718	Petrol	Medium	0.286757	2213.190308	0.28567	2204.80106	0.000571	4.4085216	0.000516	3.980726846
6	3	11.8	136	1607.16	Diesel	Small	0.224196	360.3183019	0.22149	355.9698684	0.000011	0.018000192	0.002694	4.330433295
7	1	68.2	45	3096.28	Diesel	Medium	0.269016	832.9478173	0.26631	824.5703268	0.000011	0.034678336	0.002694	8.342812168
8	1	5.6	45	254.24	Electric	Medium	0.08474	21.54404336	0.0839	21.330736	0.00036	0.0915264	0.00303	0.7703472
9	3	6	136	817.2	Petrol	Small	0.226597	185.1750454	0.22551	184.286772	0.000571	0.46678464	0.000516	0.421488725
10	3	16	136	2179.2	Petrol	Large	0.438117	954.744505	0.43703	952.375776	0.000571	1.24475904	0.000516	1.123969933
11	4	40.8	182	7409.28	Petrol	Small	0.226597	1678.920411	0.22551	1670.866733	0.000571	4.232180736	0.000516	3.821497772
12	5	11	227	2497	Electric	Large	0.093305	232.982585	0.09233	230.54801	0.00041	1.02377	0.00056	1.39832
13	5	0.6	227	136.2	Petrol	Small	0.226597	30.86250756	0.22551	30.714462	0.000571	0.07779744	0.000516	0.070248121
14	3	236	136	32143.2	Diesel	Medium	0.269016	8647.024262	0.26631	8560.055592	0.000011	0.36000384	0.002694	86.60866591
15	3	24.6	136	3350.52	Electric	Small	0.0769	257.654988	0.06443	215.8740036	0.00025	0.83763	0.00043	1.4407236
16	2	11	91	998.8	Petrol	Small	0.226597	226.3250554	0.22551	225.239388	0.000571	0.57051456	0.000516	0.515152886
17	1	126	45	5720.4	Diesel	Large	0.335696	1920.313471	0.33299	1904.835996	0.000011	0.06406848	0.002694	15.41340664
18	5	19.6	227	4449.2	Petrol	Small	0.226597	1008.175247	0.22551	1003.339092	0.000571	2.54138304	0.000516	2.294771946
19	3	11.6	136	1579.92	Diesel	Small	0.224196	354.211212	0.22149	349.9364808	0.000011	0.017695104	0.002694	4.257036121

Total			
kg CO ₂ e	kg CO ₂ e	kg CO ₂ e	kg CO ₂ e
	of CO ₂	of CH ₄	of N ₂ O
25752.17	25575.12	27.70188	153.7183

Remote staff homeworking

No. of staff	Homeworking days	Cumulative homeworking days	Cumulative Homeworking hours	CO ₂ e Coefficient	kg CO ₂ e
58	45	2610	20880	0.33378	6969.3264

Office staff homeworking

Employee	Days at home per week	Homeworking days	Homeworking hours	CO ₂ e Coefficient	kg CO ₂ e
1	2	91	726	0.333781205	242.459
2	0	0	0	0.333781205	0
3	3	136	1090	0.333781205	363.688
4	2	91	726	0.333781205	242.459
5	4	182	1453	0.333781205	484.917
6	2	91	726	0.333781205	242.459
7	4	182	1453	0.333781205	484.917
8	4	182	1453	0.333781205	484.917
9	2	91	726	0.333781205	242.459
10	2	91	726	0.333781205	242.459
11	1	45	363	0.333781205	121.229
12	0	0	0	0.333781205	0
13	0	0	0	0.333781205	0
14	2	91	726	0.333781205	242.459
15	2	91	726	0.333781205	242.459
16	3	136	1090	0.333781205	363.688
17	4	182	1453	0.333781205	484.917
18	0	0	0	0.333781205	0
19	2	91	726	0.333781205	242.459

Total
kg CO₂e
4727.944006

Totals			
kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
37449.44039	25575.12272	27.70188144	153.7183

Annex F: Category 3.5 - Emissions from Business Travel

Business Travel

All data is extracted or adapted from 'Business Travel' spreadsheet, with hotel stays also noted.

Calculation

Overleaf.

London Black cabs

London Black cabs have greater emissions factor resulting in separate calculations and tables. The official TfL taxi price index was used to calculate distance.

Expense costs and journeys have been provided where possible.

All vehicle types are 'Black cab,' assumed 1 passenger per journey.

Cost (£)	Stops	Distance (km)
6.57	E14 - E14	1.51
6.58	E14 - E14	1.52
6.92	E14 - E14	1.68
6.99	E14 - E14	1.71
7.96	E14 - E14	2.18
8.10	E14 - E14	2.24
9.91	E14 - E14	3.11
22.60	EC2M - W1G	9.16
5.50	London - London	1.00
5.90	London - London	1.19
6.60	London - London	1.53
6.84	London - London	1.64
6.84	London - London	1.64
6.92	London - London	1.68
6.93	London - London	1.68
6.93	London - London	1.68
6.98	London - London	1.71
7.00	London - London	1.72
7.00	London - London	1.72
7.20	London - London	1.81
7.30	London - London	1.86
7.80	London - London	2.10
7.95	London - London	2.17
7.96	London - London	2.18
8.00	London - London	2.19
8.20	London - London	2.29
9.00	London - London	2.67
9.20	London - London	2.77
9.30	London - London	2.81
9.40	London - London	2.86
9.96	London - London	3.13
10.00	London - London	3.15
10.00	London - London	3.15
10.80	London - London	3.53
10.80	London - London	3.53
10.93	London - London	3.59
10.94	London - London	3.60
11.00	London - London	3.63
11.00	London - London	3.63

11.40	London - London	3.82
11.40	London - London	3.82
11.70	London - London	3.96
11.70	London - London	3.96
11.84	London - London	4.03
11.96	London - London	4.08
12.00	London - London	4.10
12.00	London - London	4.10
12.00	London - London	4.10
12.20	London - London	4.20
12.20	London - London	4.20
12.40	London - London	4.29
12.60	London - London	4.39
12.80	London - London	4.48
12.80	London - London	4.48
12.80	London - London	4.48
12.90	London - London	4.53
13.00	London - London	4.58
13.00	London - London	4.58
13.20	London - London	4.67
13.20	London - London	4.67
13.20	London - London	4.67
13.60	London - London	4.87
13.92	London - London	5.02
14.20	London - London	5.15
14.80	London - London	5.44
15.00	London - London	5.53
15.91	London - London	5.97
15.92	London - London	5.97
16.00	London - London	6.01
16.94	London - London	6.46
17.20	London - London	6.58
17.91	London - London	6.92
17.92	London - London	6.93
17.99	London - London	6.96
18.00	London - London	6.96
18.60	London - London	7.25
18.60	London - London	7.25
18.80	London - London	7.35
18.80	London - London	7.35
19.80	London - London	7.82
19.80	London - London	7.82

19.90	London - London	7.87
20.93	London - London	8.36
20.93	London - London	8.36
20.98	London - London	8.39
21.69	London - London	8.72
21.98	London - London	8.86
22.00	London - London	8.87
22.00	London - London	8.87
22.80	London - London	9.25
22.94	London - London	9.32
22.98	London - London	9.34
23.20	London - London	9.44
23.50	London - London	9.59
23.93	London - London	9.79
23.97	London - London	8.95
24.86	London - London	9.34
25.00	London - London	9.40
25.94	London - London	9.81
26.00	London - London	9.84
27.00	London - London	10.27
27.00	London - London	10.27
27.80	London - London	10.62
28.20	London - London	10.79
30.00	London - London	11.57
30.00	London - London	11.57
30.00	London - London	11.57
30.60	London - London	11.84
30.60	London - London	11.84
30.94	London - London	11.98
30.96	London - London	11.99
31.00	London - London	12.01
31.80	London - London	12.36
32.00	London - London	12.44
32.85	London - London	12.81
32.95	London - London	12.86
33.00	London - London	12.88
33.40	London - London	13.05
34.00	London - London	13.31
36.60	London - London	14.44
36.80	London - London	14.53
38.40	London - London	15.22
38.60	London - London	15.31

39.22	London - London	15.58
39.60	London - London	15.75
40.20	London - London	16.01
41.18	London - London	16.43
41.40	London - London	16.53
48.00	London - London	19.40
115.00	London - HP10	48.51
14.00	N1C - WC1X	5.06
15.00	N1C - W1G	5.53
17.90	N1C - W1G	6.92
9.00	NW1 - W1G	2.67
9.00	NW1 - W1G	2.67
10.78	NW1 - W1G	3.52
20.60	NW1 - SW1E	8.20
26.40	NW1 - W14	10.01
7.10	SE1 - SE1	1.76
9.40	SE1 - SW1P	2.86
10.20	SE1 - SE1	3.24
13.08	SE1 - SE1	4.62
13.47	SE1 - SE1	4.80
13.92	SE1 - SE1	5.02
27.00	SE1 - WC1B	10.27
36.00	SE1 - W1	14.18
7.77	SE10 - SE10	2.08
27.00	SE16 - NW1	10.27
25.98	SW12 - NW1	9.83
19.80	SW1E - NW1	7.82
28.40	W14 - NW1	10.88
12.00	W1G - N1C	4.10
13.00	W1G - NW1	4.58
13.30	W1G - NW1	4.72
18.60	W1G - WC1X	7.25
30.60	W2 - W14	11.84
115.00	W2 - HP10	48.51
7.94	W6 - W14	2.17
12.60	WC1X - N1C	4.39
17.90	WC1X - W1G	6.92
27.03	WC1X - SE10	10.28

Total distance by London black cab (km)	kg CO ₂ e	kg CO ₂ e of CO ₂ per unit	kg CO ₂ e of CH ₄ per unit	kg CO ₂ e of N ₂ O per unit
	Coefficients			
	0.306036	0.30436	0.000005	0.001672
1163.87	356.1875231	354.2363497	0.005396646	1.945776741

Distance (Metres)	Cost (£)
190.8	3.80
95.4	0.20
Until distance has reached 9,635.4	
86.9	0.20

Non-London UK taxis

For other UK taxis, the majority used the respective council published taxi price index. Certain long distance journeys, mostly airport runs, used Google Maps as this was deemed more accurate as aforementioned.

Expense costs and journeys have been provided where possible.

All vehicle types are 'regular taxis,' assumed 1 passenger per journey.

Cost (£)	Stops	Distance (km)
7.73	B15 - B3	3.60
7.93	B15 - B7	3.76
9.20	B15 - B2	4.83
8.93	B16 - B7	4.60
10.00	B2 - B3	5.50
10.40	B2 - B15	5.83
118.45	B26 - OX4	118.45
70.00	B26 - CV35	55.78
7.50	B3 - B2	3.40
5.98	B3 - B1	2.13
36.20	B3 - B26	14.81
7.94	B4 - B15	3.77
24.91	B7 - B26	17.99
8.97	B7 - B1	4.64
10.00	Birmingham - Birmingham	5.50
7.00	Birmingham - Birmingham	2.98
6.90	Birmingham - Birmingham	2.90
10.00	Birmingham - Birmingham	5.50
25.20	Birmingham - Birmingham	18.24
25.00	BT29 - BT39	17.54
7.00	CF10 - CF10 - CF10	2.95
12.50	CF10 - CF64	7.24
11.50	CF64 - CF10	6.46
10.00	Cheltenham - Cheltenham	4.26
25.00	CV34 - CV31	12.37
25.00	CV35 - CV35	12.37
30.00	CV35 - CV35	15.07
70.00	CV35 - B26	36.67
7.00	FY3 - FY6	3.68
40.00	G1 - PA3	34.86
11.80	G1 - G20	8.26
34.00	G20 - PA3	29.20
11.20	G20 - G1	7.69
24.94	G53 - PA3	20.66
37.20	G77 - PA3	32.22
18.94	Glasgow - Glasgow	7.41
19.96	Glasgow - Glasgow	7.90
4.93	High Wycombe - High Wycombe	1.37

4.91	High Wycombe - High Wycombe	1.35
13.00	HP10 - HP13	8.47
9.17	HP10 - HP13	5.10
125.00	HP10 - RH6	94.63
9.91	HP10 - HP9	5.75
40.00	HP10 - OX9	32.21
13.91	HP10 - SL9	9.27
9.20	HP10 - HP9 - HP10	10.25
50.00	HP10 - TW6	41.00
11.00	HP10 - HP9	6.71
9.80	HP10 - SL1	5.65
14.74	HP10 - HP13	10.00
39.94	HP10 - TW6	32.15
6.69	HP10 - HP9	2.92
22.65	HP10 - SL6	16.95
15.00	HP10 - HP13	10.23
92.00	HP10 - RH6	87.55
10.99	HP10 - HP9	6.70
9.91	HP10 - HP9	5.75
9.93	HP10 - HP9	5.77
24.94	HP10 - HP9 - HP10	18.97
77.00	HP10 - TW6	34.92
10.00	HP11 - SL7	5.83
15.04	HP11 - HP9	10.26
7.01	HP11 - SL7	3.20
12.97	HP11 - HP10	8.44
14.00	HP13 - HP10	9.35
9.99	HP9 - HP10	5.82
14.99	HP9 - HP10	10.22
10.00	HP9 - HP9	5.83
11.00	HP9 - HP9	6.71
6.86	HP9 - HP10	3.07
26.30	HP9 - SL9	20.16
13.93	HP9 - SL1	9.28
15.00	HP9 - SL9	10.23
18.50	HP9 - HP11	13.30
9.97	HP9 - HP10	5.80
9.95	HP9 - HP10	5.78
20.00	IP33 - IP32 - IP33	15.78
30.98	KT13 - SW19	26.88
7.80	L1 - L3	4.81
8.00	L1 - L3	5.00

11.20	LA1 - LA2	8.08
15.00	LL17 - LL18	9.01
20.00	LL18 - LL17	12.23
9.45	LS11 - LS8	7.14
4.58	LS8 - LS14	2.13
9.15	LS8 - LS14	6.75
17.10	M1 - M41	8.80
7.97	M1 - M11	3.17
23.92	M1 - M90	13.01
5.00	M1 - M1	1.34
15.25	M1 - M41	16.74
11.75	M11 - M1	5.50
11.88	M11 - M1	5.58
4.96	M2 - M1	1.31
9.02	M3 - M1	3.82
4.92	M3 - M1	1.29
15.30	M41 - M1	7.69
10.14	M41 - M1	4.51
25.00	M41 - M90	10.30
14.96	M41 - M60	16.90
25.00	M41 - M60	16.90
16.00	M41 - M1	16.74
9.20	M60 - M41	16.90
25.00	M90 - M41	13.67
21.99	M90 - M1	11.82
10.80	Manchester - Manchester	4.91
5.00	Manchester - Manchester	1.34
4.93	Manchester - Manchester	1.29
24.54	Manchester - Manchester	13.39
4.97	Manchester - Manchester	1.32
5.44	Manchester - Manchester	1.61
4.92	Manchester - Manchester	1.29
30.00	Manchester - Manchester	16.76
5.80	ME1 - ME1	1.83
9.95	NE1 - NE8	4.97
36.42	NE1 - TW6	34.92
6.93	NE8 - NE8	3.05
7.97	NE8 - NE1	3.71
120.00	NN4 - TW6	135.83
20.00	OX33 - OX9	10.41
25.00	OX33 - OX9	12.86
23.50	OX4 - OX1 - OX4	12.13

89.25	OX4 - TW6	77.09
119.00	OX4 - B26	118.45
11.10	OX4 - OX1	6.04
19.00	OX9 - OX33	9.92
25.00	OX9 - OX33	12.86
80.00	OX9 - TW11	92.22
60.00	OX9 - TW11	92.22
97.50	OX9 - TW6	72.26
67.50	OX9 - HP10	33.73
20.60	PA3 - G77	16.56
25.80	PA3 - G53	21.47
32.40	PA3 - G1	27.69
25.40	PE27 - CB1	43.45
25.90	PE29 - PE27	14.14
101.00	RH6 - SS15	82.88
120.00	RH6 - SS15	82.88
73.44	RH6 - SL4	83.20
100.00	RH6 - HP10	94.47
22.70	S4 - S35	19.74
15.00	SL1 - HP11	12.56
6.90	SL1 - SL1	3.24
6.98	SL1 - SL1	3.34
5.92	SL1 - SL1	2.03
6.98	SL1 - SL1	3.34
15.50	SL4 - SL1	13.13
15.00	SL7 - HP11	12.56
23.99	SL7 - SL9	22.89
7.41	SL7 - HP11	3.83
50.00	SL9 - TW6	31.87
13.95	SL9 - HP10	11.35
25.04	SL9 - HP9	24.10
28.97	SL9 - SL7	28.61
14.00	SL9 - HP9	11.41
8.00	SL9 - SL9	4.51
7.00	SL9 - SL9	3.36
65.00	SS15 - E16	49.35
80.00	TW11 - OX9	92.22
150.00	TW6 - OX9	72.42
77.08	TW6 - OX9	72.26
94.50	TW6 - OX4	77.09
94.50	TW6 - OX4	77.09
89.25	TW6 - OX4	77.09
125.00	TW6 - NN4	136.63
55.00	TW6 - HP10	36.53
14.97	TW6 - HP10	36.53
36.10	TW6 - HP10	34.92
70.00	TW6 - HP10	34.92
25.80	Woking - London - Woking	13.11
7.94	WV1 - WV3	5.24
9.90	WV3 - WV1	8.46
100.00	WV6 - B13 - WV6	84.63
24.00	YO24 - YO26	15.98

International Taxis

Where possible, these journeys have been calculated using an official taxi price index. Where this was not feasible, due to a lack of credible information, mapping software was used to measure distances between journey start and end locations provided by Menarini UK.

Expense costs and journeys have been provided where possible.

All vehicle types are 'regular taxis,' assumed 1 passenger per journey.

Cost (£)	Stops	Distance (km)
9.35	20004 - 20566	4.866250513
22.84	20566 - 20004	15.3716667
56.08	20004 - 20166	41.2575106
8.33	20024 - 20004	4.071919563
13.67	20004 - 20057	8.230475713
12.13	20007 - 20004	7.03119173
7.41	20004 - 20037	3.355464197
14.44	20037 - 20004	8.830117704
16.20	20745 - 20004	10.20072797
17.80	Washington - Washington	11.4467373
8.66	Washington - Washington	4.328908988
11.10	Washington - Washington	6.229073221
8.40	Washington - Washington	4.126432472
17.07	Washington - Washington	10.87824555
46.67	Washington - Washington	33.92941821
37.87	08918 - 08820	46.8319104
17.87	08007 - 8918	13.8403584
13.10	08918 - 08007	13.5184896
27.48	08820 - 08007	24.3010944
33.02	08008 - 08820	31.5431424
27.94	08820 - 08918	46.8319104
12.86	Madrid - Madrid	10.83616825
12.06	Madrid - Madrid	10.02674391
8.75	Madrid - Madrid	6.67775074
4.54	Dublin - Dublin	1.332570841
4.54	Dublin - Dublin	1.332570841
9.07	Dublin - Dublin	5.383938366
16.20	Dublin - Dublin	11.76059409
23.79	A94 - D06	14.73572855
23.95	Dublin - Dublin	14.84859195
25.07	Dublin - Dublin	15.63863569
25.84	A94 - D06	16.18179077
27.57	A94 - D01	17.40212621
28.58	A94 - D01	18.11457637
28.97	Dublin Airport - D06	30.8994048
30.00	A94 - D01	19.11623898
30.98	D06 - Dublin Airport	30.8994048
31.82	Dublin Airport - D06	30.8994048
32.49	DUB Airport - D06	30.8994048

32.85	DO6 - Dublin Airport	30.8994048
33.15	Dublin Airport - DO6	30.8994048
33.34	DO6 - Dublin Airport	30.8994048
33.73	Dublin Airport - DO6	30.8994048
33.79	DO6 - Dublin Airport	30.8994048
34.73	DO6 - Dublin Airport	30.8994048
34.97	DO6 - Dublin Airport	30.8994048
35.22	Dublin Airport - A94	22.79840717
35.23	Dublin Airport - DO6	30.8994048
36.24	Dublin Airport - DO6	30.8994048
36.68	Dublin Airport - DO6	30.8994048
37.42	DUB Airport - DO6	30.8994048
37.93	DO6 - Dublin Airport	30.8994048
38.65	DO6 - Dublin Airport	30.8994048
38.84	DO6 - Dublin Airport	30.8994048
39.03	DO6 - Dublin Airport	30.8994048
39.20	DO6 - DUB Airport	30.8994048
39.21	A94 - D03	25.61293803
39.25	Dublin Airport - DO6	30.8994048
39.31	DO6 - Dublin Airport	30.8994048
39.33	DO6 - Dublin Airport	30.8994048
39.37	DO6 - Dublin Airport	30.8994048
39.59	DO6 - Dublin Airport	30.8994048
39.64	DO6 - Dublin Airport	30.8994048
39.65	DO6 - Dublin Airport	30.8994048
39.71	Dublin Airport - DO6	30.8994048
39.83	DO6 - Dublin Airport	30.8994048
40.44	Dublin Airport - DO6	30.8994048
40.59	DO6 - Dublin Airport	30.8994048
40.80	DO6 - Dublin Airport	30.8994048
40.95	Dublin Airport - DO6	30.8994048
41.18	Dublin Airport - DO6	30.8994048
41.71	DO6 - Dublin Airport	30.8994048
42.42	DO6 - Dublin Airport	30.8994048
42.62	DO6 - DUB Airport	30.8994048
43.57	DO6 - Dublin Airport	30.8994048
43.67	Dublin Airport - DO6	30.8994048
44.41	DO6 - Dublin Airport	30.8994048
31.02	1101 - 1118	49.2459264
11.07	1017 - 1013	9.9779328
18.04	Florence - Florence	16.20775352
19.87	Florence - Florence	18.15779882

24.35	Florence - Florence	22.9316802
24.08	Florence - Florence	22.6439686
15.19	Florence - Florence	13.17079774
12.72	Florence - Florence	10.53876939
21.98	Florence - Florence	20.4062117
12.90	Florence - Florence	10.73057712
11.97	Florence - Florence	9.739570494
11.09	Florence - Florence	8.801843794
42.90	Florence - Florence	42.69853279
45.13	Florence - Florence	45.07481749
37.94	Florence - Florence	37.41316412
26.59	Florence - Florence	25.31862089
9.55	Florence - Florence	7.16082207
13.61	Florence - Florence	11.48715207
25.39	Florence - Florence	24.03990266
25.79	Florence - Florence	24.46614207
16.44	Florence - Florence	14.50279589
176.03	56121 - 50123	186.683904
14.55	21020 - 20124	118.4477184
20.65	20122 - 20124	6.7592448
33.37	00165 - 00161	26.7151104
36.59	50123 - 50131	7.7248512
23.49	50123 - 50127	9.8169984
53.99	Rome - Rome	57.19493509
10.78	Rome - Rome	9.104000175
36.37	50127 - 50123	9.8169984
20.32	50123 - 50131	7.7248512
21.18	50131 - 50123	7.7248512
30.78	50123 - 50131	7.7248512
30.43	50131 - 50123	7.7248512
29.65	50127 - 50131	13.5184896
29.78	50131 - 50127	13.5184896
20.86	50127 - 50131	13.5184896
21.86	50131 - 50127	13.5184896
19.92	50127 - 50131	13.5184896
18.95	50131 - 50127	13.5184896
25.72	50127 - 50123	9.8169984
14.99	50123 - 50131	7.7248512
20.30	50131 - 50127	13.5184896
36.08	50123 - 50131	7.7248512
17.81	50131 - 50123	7.7248512
19.77	50123 - 50131	7.7248512
19.67	50123 - 50131	7.7248512

32.07	22335 - 20097	18.9902592
11.70	20097 - 20357	22.530816
33.67	20097 - 22335	18.9902592
16.64	20097 - 20357	22.530816
14.74	20357 - 20099	18.6683904
10.23	20099 - 20097	4.6670976
26.26	20097 - 20357	8.3685888
25.02	20097 - 20357	8.3685888
35.75	22335 - 20097	18.9902592
22.33	20357 - 22335	7.242048
17.86	20097 - 20357	8.3685888
22.35	20097 - 20357	8.3685888
16.18	20357 - 20097	8.3685888
26.85	20097 - 20357	8.3685888
18.71	20357 - 20097	8.3685888
16.44	20357 - 20097	8.3685888
25.02	20097 - 20357	8.3685888
13.86	20357 - 20097	8.3685888
26.53	20097 - 20357	8.3685888
35.76	20097 - 22335	8.3685888
16.08	20357 - 20097	8.3685888
31.29	22335 - 20097	19.7949312
31.27	22335 - 20097	19.7949312
17.88	20097 - 20357	8.3685888
35.80	20097 - 22335	19.7949312
13.16	20357 - 20097	8.3685888
33.67	20097 - 22335	19.7949312
13.41	20357 - 20097	8.3685888
16.09	20097 - 20357	8.3685888
16.46	20097 - 20357	8.3685888
31.89	22335 - 20097	19.7949312
8.86	20099 - 20097	4.6670976
33.14	20097 - 22335	19.7949312
28.94	20097 - 20357	8.3685888
12.80	20357 - 20097	8.3685888
38.77	22335 - 20097	19.7949312
38.43	22335 - 20097	19.7949312
132.09	Nice - Monaco - Nice	66.6268416
17.64	94150 - 94390	9.9779328
14.03	94390 - 94150	9.9779328
10.03	Copenhagen - Copenhagen	7.100584437

13.33	Copenhagen - Copenhagen	11.32255356
15.06	Copenhagen - Copenhagen	13.53588889
41.65	2300 - 2770	18.1855872
30.23	1172 - 2300	11.265408
31.56	1172 - 2300	11.265408
37.93	2300 - 1172	11.265408
48.36	2770 - 1172	19.9558656
41.72	1172 - 2300	11.265408
32.33	2300 - 1172	11.265408
47.75	2770 - 1172	19.9558656
30.60	1172 - 2300	11.265408
35.85	1172 - 2300	11.265408
52.61	2770 - 1172	19.9558656
34.26	2300 - 1172	11.265408
30.59	1172 - 2300	11.265408
39.04	2300 - 1172	11.265408
30.53	1172 - 2300	11.265408
53.92	2770 - 1172	19.9558656
24.43	1172 - 2770	19.9558656
54.14	2770 - 1172	19.9558656
52.48	2770 - 1172	19.9558656

Totals				
Total distance by non London and international taxi (km)	kg CO ₂ e	kg CO ₂ e of CO ₂ per unit	kg CO ₂ e of CH ₄ per unit	kg CO ₂ e of N ₂ O per unit
	Coefficients			
	0.208056	0.20638	0.000005	0.001672
7504.27	1561.312377	1548.731847	0.034795813	12.54573414

Copenhagen

Distance (yards)	Cost (£)
0	4.48
1760	1.26

Madrid

Distance (yards)	Cost (£)
0	2.15
1093.61	0.99

Florence

Distance (yards)	Cost (£)
0	2.83
1093.61	0.94

Washington

Distance (yards)	Cost (£)
220	3.36
1760	2.07

Rome

Distance (yards)	Cost (£)
0	2.60
1093.61	0.90

Dublin

Distance (yards)	Cost (£)
546.8	3.61
1093.61	1.12
Until distance has reached 15,857.39	
1093.61	1.42

London

Distance (Metres)	Cost (£)
190.8	3.80
95.4	0.20
Until distance has reached 9,635.4	
86.9	0.20

Birmingham

Distance (Metres)	Cost (£)
187.5	3.20
125	0.20
Until distance has reached 1,062.5	
183.3	0.20

Leeds

Distance (Yards)	Cost (£)
180	2.20
180	0.20
Until cost has reached 5.80	
258	0.20
Until cost has reached 11.20	
234	0.20

Liverpool

Distance (yards)	Cost (£)
330	3.00
205	0.20
Until distance has reached 35,200	
300	0.20

Oxford

Distance (Metres)	Cost (£)
53.6	2.80
53.6	0.10
Until distance has reached 1,608	
94.6	0.10
Until distance has reached 6,432	
53.6	0.10

Sheffield

Distance (yards)	Cost (£)
100	2.60
60	0.20
Until distance has reached 160	
220	0.20
Until distance has reached 17,600	
195	0.20

Slough

Distance (yards)	Cost (£)
250	3.40
151	0.20
Until cost has reached 5.60	
251	0.20
Until cost has reached 11.20	
135	0.20

Cheltenham

Distance (yards)	Cost (£)
0	3.00
133	0.20

Beaconsfield

Distance (yards)	Cost (£)
124	3.50
192	0.20

Manchester

Distance (yards)	Cost (£)
381.1	3.40
134.7	0.20

Coventry

Distance (km)	Cost (£)
0.922	3.80
0.162	0.30

High Wycombe

Distance (yards)	Cost (£)
124	3.50
192	0.20

Northampton

Distance (yards)	Cost (£)
158	2.40
1760	0.24

Belfast

Distance (yards)	Cost (£)
0	3.20
1760	4.40
1760	1.86

Wolverhampton

Distance (yards)	Cost (£)
440	3.30
1760	2.00

Woking

Distance (yards)	Cost (£)
1760	5.72
1760	2.82

Huntindon

Distance (yards)	Cost (£)
110	2.90
200	0.30

Paisley

Distance (yards)	Cost (£)
880	3.90
309	0.30

Elmbridge

Distance (yards)	Cost (£)
1760	6.10
107	0.20

Ipswich

Distance (yards)	Cost (£)
478.43	3.00
197.03	0.20

York

Distance (yards)	Cost (£)
215.8	3.40
144.8	0.20

Lancaster

Distance (yards)	Cost (£)
660	3.30
310	0.30

Blackpool

Distance (yards)	Cost (£)
160	2.60
160	0.20

Newcastle

Distance (yards)	Cost (£)
174	2.40
174	0.25

Domestic UK Rail

Expense costs and journeys have been provided.

All rail distances between cities was extracted from trainline.com.

All vehicle types are 'national rail,' assumed 1 passenger per journey.

UK Rail Cost	Stops	Distance (km)
204.30	Egham - Newcastle - Egham	880.0
121.97	Markinch - Manchester - Markinch	742.9
121.76	Rhyl - Slough - Rhyl	697.1
120.58	Wigan - High Wycombe - Wigan	674.3
133.38	Manchester - High Wycombe - Manchester	691.4
77.74	Manchester - High Wycombe - Manchester	691.4
211.29	York - High Wycombe - York	668.6
69.19	Manchester - Glasgow - Manchester	645.7
165.78	Liverpool - London - Liverpool	628.6
119.11	London - Liverpool - London	588.6
138.57	Wigan - London - Wigan	588.6
392.85	Manchester - London - Manchester	560.0
97.45	Milton Keynes - Liverpool - Milton Keynes	440.0
97.45	Milton Keynes - Liverpool - Milton Keynes	440.0
68.78	Yeovil - London - Yeovil	434.3
66.89	Watford - Nottingham - Watford	405.7
95.00	Wolverhampton - London - Wolverhampton	388.6
70.56	Wolverhampton - London - Wolverhampton	388.6
30.66	London - Birmingham - London	354.3
99.85	Westbury - London - Westbury	337.1
39.80	Maidenhead - Birmingham - Maidenhead	331.4
52.57	Maidenhead - Birmingham - Maidenhead	331.4
76.05	Wolverhampton - Preston - Wolverhampton	280.0
76.68	Birmingham - Gerrads Cross - Birmingham	280.0
34.50	Oxford - London - Oxford	205.7
61.90	Huntingdon - London - Huntingdon	182.9
25.06	Lancaster - Manchester - Lancaster	160.0
22.00	Manchester - Chester - Manchester	137.1
20.30	Tamworth - Nottingham - Tamworth	114.3
44.62	Fleet - London - Fleet	114.3
33.90	Farnborough - London - Farnborough	102.9
44.90	Farnborough - London - Farnborough	102.9
13.76	Markinch - Edinburgh - Markinch	97.1
36.70	Luton - London - Luton	91.4
15.60	London - High Wycombe - London	85.7
25.70	High Wycombe - London - High Wycombe	85.7
25.00	High Wycombe - London - High Wycombe	85.7
20.40	Maidenhead - London - Maidenhead	74.3
20.30	Maidenhead - London - Maidenhead	74.3

29.87	Beaconsfield - London - Beaconsfield	68.6
25.80	Beaconsfield - London - Beaconsfield	68.6
11.40	Wigan - Manchester - Wigan	62.9
24.14	Egham - London - Egham	62.9
40.30	Ebbsfleet - London - Ebbsfleet	62.9
40.40	Ebbsfleet - London - Ebbsfleet	62.9
27.60	Slough - London - Slough	57.1
30.30	Gerrards Cross - London - Gerrards Cross	57.1
30.30	Gerrards Cross - London - Gerrards Cross	57.1
35.00	Watford - London - Watford	51.4
18.19	Wolverhampton - Birmingham - Wolverhampton	40.0
34.80	Hammerton - York - Hammerton	22.9
72.20	Farnborough - London - Farnborough x2	205.7
74.80	Beaconsfield - London - Beaconsfield x2	137.1
60.60	Gerrards Cross - London - Gerrards Cross x2	114.3
54.30	Chatham - London - Chatham x2	205.7
50.43	Markinch - Edinburgh - Markinch x2	194.3
79.30	Chatham - London - Chatham x 3	308.6
112.9	Chatham - London - Chatham x 4	411.4
370.27	Cheltenham - Manchester - Cheltenham	840.0
	Cheltenham - London - Cheltenham	
138.86	Hammerton - York - Hammerton	605.7
	York - London - York	
79.00	Headcorn - London - Headcorn	274.3
	Headcorn - London - Headcorn	
53.90	Rochester - London - Rochester	194.3
	Rochester - London - Rochester	
	Ebbsfleet - London	
152.80	Ebbsfleet - London	151.4
	London - Ebbsfleet	
	Ashford (Kent) - London - Ashford (Kent)	
252.49	London - Liverpool	294.3
25	Liverpool - London	294.3
201	Leeds - London	291.4
185.6	London - Manchester	280.0
45.69	Cardiff - High Wycombe	217.1
58.37	London - Loughborough	165.7
21.6	High Wycombe - Rochester	88.6
16.15	Rochester - London	48.6
13.25	London - High Wycombe	42.9
14.6	London - High Wycombe	42.9
21.1	Ebbsfleet - London	31.4

11.3	Gerrards Cross - London	28.6
19.8	York - Hammerton	11.4
14	Hammerton -York	11.4
	Manchester - London - Manchester	
213.78	Manchester - London - Manchester	1120
29.99	Glasgow - Edinburgh - Glasgow	143
37.40	Beaconsfield - London -Beaconsfield	69
25.70	Beaconsfield - Paddington - Beaconsfield	69
34.80	Bedford - London - Bedford	149
37.49	Cheltenham - Birmingham - Cheltenham	137
24.65	Cheltenham - Cardiff - Cheltenham	217
52.47	Cheltenham - Birmingham - Cheltenham	137
38.70	Farnborough - London - Farnborough	103
30.30	Gerrards Cross - London - Gerrards Cross	57
41.80	High Wycombe - Birmingham - High Wycombe	251
41.80	Huntingdon - London - Huntingdon	183
28.30	Laindon - London - Laindon	69
28.30	Laindon - London - Laindon	69
28.30	Laindon - London - Laindon	69
28.60	London - High Wycombe - London	86
32.80	London - High Wycombe - London	86
20.40	Maidenhead - London - Maidenhead	74
54.64	Manchester - London - Manchester	560
94.80	Oxford - Birmingham - Oxford	211
103.00	Rhyl - Cardiff - Rhyl	640
18.25	Rochester - London - Rochester	97
21.50	Teddington - London - Teddington	40
61.33	Westbury - London - Westbury	366
102.30	Wolverhampton - London - Wolverhampton	457
44.60	Birmingham - Manchester	123
37.00	Heathrow - London	23
25.00	Heathrow - Paddington	23
38.30	High Wycombe - London	43
28.90	High Wycombe - London	43
16.50	High Wycombe - London	43
27.30	High Wycombe - London	43
19.05	Kirkcaldy - Edinburgh	40
25.00	London - Haddenham	63
16.50	London - High Wycombe	43
37.00	Paddington - Heathrow	23
33.82	Westbury - London	186
42.40	Birmingham - Manchester	246

103.83	Birmingham - Euston	177
7.43	Birmingham - Cannock	29
57.77	Charlbury - Paddington	234
108.77	Cheltenham - London	457
52.57	Cheltenham - Birmingham	137
129.61	Cheltenham - London	457
221.21	Cheltenham - London	457
50.12	Euston - Birmingham	177
72.7	Euston - Manchester	280
75.2	Euston - Manchester	280
56.10	Headcorn - London	137
29.20	Headcorn - London	137
30.80	High Wycombe - Birmingham	251
52.5	London - Sherborne	183
25	London - High Wycombe	86
25.00	Paddington - Heathrow	23
25.00	Paddington - Heathrow	23
37	Paddington - Heathrow	23
25	Paddington - Heathrow	23
7.40	Rugby - Birmingham	97
38.70	Farnborough - Waterloo	103
40.04	Heathrow - Farringdon	51
16.50	High Wycombe - Marylebone	86
16.50	High Wycombe - Marylebone	86
16.5	High Wycombe - Marylebone	86
44.09	Warwick - Marylebone	274
25.8	Woking - Waterloo	74
25.80	Woking - Waterloo	74
25.80	Woking - Waterloo	74
21.50	Woking - Waterloo	74
21.50	Woking - Waterloo	74

Total Distance by UK train (km)	Total kg CO2e	kg CO2e of CO2	kg CO2e of CH4	kg CO2e of N2O
	<u>Coefficients</u>			
	0.03549	0.0351	0.000078	0.000285
31472.00	1116.94128	1104.6672	2.454816	8.96952

London Underground

Only expense costs for 2023 were provided by Menarini UK.

The expense costs were subsequently used with the emissions factor to ascertain the emissions produced.

All vehicle types are 'London Underground' rail, assumed 1 passenger per journey.

Calculation

The average fare for a journey in 2023 was 29 pence per km.

Total expenses from London Underground for 2023 were £1,038, therefore a total distance of 3577.79 km was estimated.

All vehicle types are 'London Underground', assumed 1 passenger per journey.

Cost (£)	Journey	Type
6.40	London - London	Single
15.00	London - London	Return
15.20	London - London	Return
17.10	London - London	Various
15.00	London - London	Return
19.59	London - London	Single
24.45	London - London	Various
27.20	London - London	Various
7.75	London - London	Single
15.20	London - London	Return
15.20	London - London	Various
15.60	London - London	Return
8.24	London - London	Single
202.67	London - London	Various
58.20	London - London	Various
241.10	London - London	Various
14.30	London - London	Return
21.50	London - London	Various
30.00	London - London	Various
30.00	London - London	Various
30.00	London - London	Return
13.40	London - London	Single
6.70	London - London	Single
13.40	London - London	Single
20.30	London - London	Single
9.90	SE1 - SW1P	Single
10.95	SW1P - SE1	Single
7.97	W6 - W14	Single
7.94	W6 - W14	Single
14.80	London - London	Various

5.50	Charing Cross - Marble Arch	Single
13.90	London Bridge - Sutton	Return
2.70	London Bridge - Waterloo	Single
14.40	London - London	Various
6.70	London - London	Various
6.70	London - London	Various
6.7	London - London	Various
6.7	London - London	Various
5.60	Paddington - Olympia	Return
2.70	Waterloo - Westminster	Single
5.6	Waterloo - Tower Hill	Return
5.50	Waterloo - Marble Arch	Return
5.40	Waterloo - London Bridge	Return
5.50	Waterloo - Russell Square	Return
2.70	Westminster - London Bridge	Single
6.20	Wood Lane - Baker Street	Return

Total Distance by Tube (km)	kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
	Coefficients			
	0.027802	0.02753	0.000112	0.00016
3577.79	99.46980386	98.49664414	0.400712828	0.572446897

UK light rail

UK light rail journey distances were calculated using QGIS and conservative estimates of light rail cost per distance.

Vehicle type – 'Light Rail and tram,' assuming 1 passenger per journey.

Cost	Journey	Distance
6.30	Manchester - Manchester - Manchester	35
3.20	Manchester - Manchester	17.5
6	Oldham - Manchester	11.7
7.50	EH12 - EH12	13
7.50	EH12 - EH12	13

Total Distance by Light Rail (km)	kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
	Coefficients			
	0.028603	0.02832	0.000123	0.00016
90.20	2.580014694	2.554464	0.01111264	0.014438054

International Rail

Most international rail journeys were calculated using a combination of QGIS. The emissions for the three same-city journeys were calculated by working out a cost per km average from the other EU journeys and subsequently using the known cost for the same-city journeys to produce a distance travelled. The three same city journeys were 'Pisa – Pisa', 'Rome – Rome' and 'Copenhagen – Copenhagen'.

Vehicle type – 'National Rail,' assuming 1 passenger per journey.

Cost	Journey	Distance (km)
51.02	Pisa - Florence - Pisa	158
224.48	London - Hamberg - London	2160
220.87	Bologna - Florence - Bologna	180
67.58	Rome - Florence	260
48.59	Florence - Rome	260
83.28	Florence - Rome	260
83.28	Florence - Rome	260
83.28	Florence - Rome	260
20.96	Pisa - Pisa	56
7.89	Rome - Rome	78
11.66	Florence - Pisa	54
12.23	20124 - 21020	32
17.61	00054 - 00185	47
	Copenhagen - Copenhagen	

Total Distance by EU train (km)	kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
	<u>Coefficients</u>			
	0.03549	0.0351	0.000078	0.000285
4064.53	144.2501697	142.665003	0.31703334	1.15839105

Flights

Flights are either 'domestic to/from UK flights', 'short-haul to/from UK' or 'international to/from non-UK', with emissions factors for the average passenger with RF used.

All journeys assumed 1 passenger.

Calculation

Overleaf.

Domestic Flights

Cost	Domestic Flights Stops	Distance (km)	CO ₂ e Coefficient	kg CO ₂ e	CO ₂ Coefficient	kg CO ₂ e of CO ₂	CH ₄ Coefficient	kg CO ₂ e of CH ₄	N ₂ O Coefficient	kg CO ₂ e of N ₂ O
367.40	Aberdeen - Heathrow - Aberdeen	1296	0.27258	353.26368	0.27101	351.22896	0.00022	0.28512	0.00134	1.73664
447.43	Aberdeen - Heathrow - Aberdeen	1296	0.27258	353.26368	0.27101	351.22896	0.00022	0.28512	0.00134	1.73664
446.80	Aberdeen - Heathrow - Aberdeen	1296	0.27258	353.26368	0.27101	351.22896	0.00022	0.28512	0.00134	1.73664
396.20	Aberdeen - Heathrow - Aberdeen	1296	0.27258	353.26368	0.27101	351.22896	0.00022	0.28512	0.00134	1.73664
415.20	Aberdeen - Heathrow - Aberdeen	1296	0.27258	353.26368	0.27101	351.22896	0.00022	0.28512	0.00134	1.73664
460.00	Aberdeen - Heathrow - Aberdeen	1296	0.27258	353.26368	0.27101	351.22896	0.00022	0.28512	0.00134	1.73664
452.90	Aberdeen - Heathrow - Aberdeen	1296	0.27258	353.26368	0.27101	351.22896	0.00022	0.28512	0.00134	1.73664
457.53	Glasgow - Heathrow - Glasgow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
300.83	Glasgow - Heathrow - Glasgow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
606.13	Glasgow - Heathrow - Glasgow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
254.40	Glasgow - Heathrow - Glasgow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
285.63	Glasgow - Heathrow - Glasgow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
390.93	Glasgow - Heathrow - Glasgow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
484.03	Glasgow - Heathrow - Glasgow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
457.53	Heathrow - Glasgow - Heathrow	1112	0.27258	303.10896	0.27101	301.36312	0.00022	0.24464	0.00134	1.49008
105.30	Stansted - Glasgow - Stansted	1078	0.27258	293.84124	0.27101	292.14878	0.00022	0.23716	0.00134	1.44452
383.25	Edinburgh - Heathrow - Edinburgh	1068	0.27258	291.11544	0.27101	289.43868	0.00022	0.23496	0.00134	1.43112
235.83	Aberdeen - Birmingham - Aberdeen	1058	0.27258	288.38964	0.27101	286.72858	0.00022	0.23276	0.00134	1.41772
119.63	Belfast Int - Luton - Belfast Int	996	0.27258	271.48968	0.27101	269.92596	0.00022	0.21912	0.00134	1.33464
487.45	Belfast City - Heathrow - Belfast City	1008	0.27258	274.76064	0.27101	273.17808	0.00022	0.22176	0.00134	1.35072

150.32	Belfast City - Heathrow - Belfast City	1008	0.27258	274.76064	0.27101	273.17808	0.00022	0.22176	0.00134	1.35072
185.28	Belfast City - Heathrow - Belfast City	1008	0.27258	274.76064	0.27101	273.17808	0.00022	0.22176	0.00134	1.35072
212.37	Edinburgh - Luton - Edinburgh	990	0.27258	269.8542	0.27101	268.2999	0.00022	0.2178	0.00134	1.3266
250.81	Edinburgh - Luton - Edinburgh	990	0.27258	269.8542	0.27101	268.2999	0.00022	0.2178	0.00134	1.3266
232.36	Edinburgh - Luton - Edinburgh	990	0.27258	269.8542	0.27101	268.2999	0.00022	0.2178	0.00134	1.3266
308.39	Aberdeen - Manchester - Aberdeen	856	0.27258	233.32848	0.27101	231.98456	0.00022	0.18832	0.00134	1.14704
152.41	Birmingham - Glasgow - Birmingham	838	0.27258	228.42204	0.27101	227.10638	0.00022	0.18436	0.00134	1.12292
182.64	Belfast Int - Birmingham - Belfast Int	768	0.27258	209.34144	0.27101	208.13568	0.00022	0.16896	0.00134	1.02912
52.95	Belfast Int - Birmingham - Belfast Int	768	0.27258	209.34144	0.27101	208.13568	0.00022	0.16896	0.00134	1.02912
239.02	Belfast Int - Birmingham - Belfast Int	768	0.27258	209.34144	0.27101	208.13568	0.00022	0.16896	0.00134	1.02912
199.83	Belfast Int - Manchester - Belfast Int	592	0.27258	161.36736	0.27101	160.43792	0.00022	0.13024	0.00134	0.79328
257.73	London City - Dundee	586	0.27258	159.73188	0.27101	158.81186	0.00022	0.12892	0.00134	0.78524
80.95	Glasgow - Heathrow	556	0.27258	151.55448	0.27101	150.68156	0.00022	0.12232	0.00134	0.74504
198.26	Manchester - Heathrow - Manchester	486	0.27258	132.47388	0.27101	131.71086	0.00022	0.10692	0.00134	0.65124
117.58	Edinburgh - Belfast Int - Edinburgh	462	0.27258	125.93196	0.27101	125.20662	0.00022	0.10164	0.00134	0.61908
90.95	Edinburgh - Belfast Int - Edinburgh	462	0.27258	125.93196	0.27101	125.20662	0.00022	0.10164	0.00134	0.61908
81.72	Edinburgh - Belfast Int - Edinburgh	462	0.27258	125.93196	0.27101	125.20662	0.00022	0.10164	0.00134	0.61908
80.70	Edinburgh - Belfast Int - Edinburgh	462	0.27258	125.93196	0.27101	125.20662	0.00022	0.10164	0.00134	0.61908
107.88	Manchester - Heathrow	243	0.27258	66.23694	0.27101	65.85543	0.00022	0.05346	0.00134	0.32562

International Flights

Cost	Internation Flight Stops	Distance (km)	CO ₂ e Coefficient	kg CO ₂ e	CO ₂ Coefficient	kg CO ₂ e of CO ₂	CH ₄ Coefficient	kg CO ₂ e of CH ₄	N ₂ O Coefficient	kg CO ₂ e of N ₂ O
228.92	Dublin - Nice - Dublin	2936	0.13464	395.30304	0.13397	393.33592	0.00001	0.02936	0.00067	1.96712
214.97	Gatwick - Rome - Gatwick	2852	0.18287	521.54524	0.18196	518.94992	0.00001	0.02852	0.0009	2.5668
333.63	Birmingham - Florence - Birmingham	2770	0.18287	506.5499	0.18196	504.0292	0.00001	0.0277	0.0009	2.493
375.33	Birmingham - Barcelona - Birmingham	2548	0.18287	465.95276	0.18196	463.63408	0.00001	0.02548	0.0009	2.2932
409.91	London City - Florence - London City	2390	0.18287	437.0593	0.18196	434.8844	0.00001	0.0239	0.0009	2.151
213.01	London City - Florence - London City	2390	0.18287	437.0593	0.18196	434.8844	0.00001	0.0239	0.0009	2.151
240.71	London City - Florence - London City	2390	0.18287	437.0593	0.18196	434.8844	0.00001	0.0239	0.0009	2.151
222.23	Gatwick - Florence - Gatwick	2364	0.18287	432.30468	0.18196	430.15344	0.00001	0.02364	0.0009	2.1276
297.37	Heathrow - Florence - Heathrow	2440	0.18287	446.2028	0.18196	443.9824	0.00001	0.0244	0.0009	2.196
309.57	Heathrow - Florence - Heathrow	2440	0.18287	446.2028	0.18196	443.9824	0.00001	0.0244	0.0009	2.196
309.57	Heathrow - Florence - Heathrow	2440	0.18287	446.2028	0.18196	443.9824	0.00001	0.0244	0.0009	2.196
297.37	Heathrow - Florence - Heathrow	2440	0.18287	446.2028	0.18196	443.9824	0.00001	0.0244	0.0009	2.196
523.77	Heathrow - Florence - Heathrow	2440	0.18287	446.2028	0.18196	443.9824	0.00001	0.0244	0.0009	2.196
384.47	Heathrow - Florence - Heathrow	2440	0.18287	446.2028	0.18196	443.9824	0.00001	0.0244	0.0009	2.196
75.59	London City - Florence - London City	2390	0.18287	437.0593	0.18196	434.8844	0.00001	0.0239	0.0009	2.151
51.25	London City - Florence - London City	2390	0.18287	437.0593	0.18196	434.8844	0.00001	0.0239	0.0009	2.151
341.61	London City - Florence - London City	2390	0.18287	437.0593	0.18196	434.8844	0.00001	0.0239	0.0009	2.151
411.11	London City - Florence - London City	2390	0.18287	437.0593	0.18196	434.8844	0.00001	0.0239	0.0009	2.151
216.58	Heathrow - Pisa - Heathrow	2300	0.18287	420.601	0.18196	418.508	0.00001	0.023	0.0009	2.07
182.47	Heathrow - Bologna - Heathrow	2330	0.18287	426.0871	0.18196	423.9668	0.00001	0.0233	0.0009	2.097
182.47	Heathrow - Bologna - Heathrow	2330	0.18287	426.0871	0.18196	423.9668	0.00001	0.0233	0.0009	2.097
182.47	Heathrow - Bologna - Heathrow	2330	0.18287	426.0871	0.18196	423.9668	0.00001	0.0233	0.0009	2.097
182.47	Heathrow - Bologna - Heathrow	2330	0.18287	426.0871	0.18196	423.9668	0.00001	0.0233	0.0009	2.097
253.27	Heathrow - Nice - Heathrow	2084	0.18287	381.10108	0.18196	379.20464	0.00001	0.02084	0.0009	1.8756
257.37	Heathrow - Kastrup - Heathrow	1964	0.18287	359.15668	0.18196	357.36944	0.00001	0.01964	0.0009	1.7676

294.07	Heathrow - Kastrup - Heathrow	1964	0.18287	359.15668	0.18196	357.36944	0.00001	0.01964	0.0009	1.7676
314.47	Heathrow - Kastrup - Heathrow	1964	0.18287	359.15668	0.18196	357.36944	0.00001	0.01964	0.0009	1.7676
314.47	Heathrow - Kastrup - Heathrow	1964	0.18287	359.15668	0.18196	357.36944	0.00001	0.01964	0.0009	1.7676
314.47	Heathrow - Kastrup - Heathrow	1964	0.18287	359.15668	0.18196	357.36944	0.00001	0.01964	0.0009	1.7676
394.57	Heathrow - Milan - Heathrow	1964	0.18287	359.15668	0.18196	357.36944	0.00001	0.01964	0.0009	1.7676
251.79	Rome - Dublin	1908	0.13464	256.89312	0.13397	255.61476	0.00001	0.01908	0.00067	1.27836
405.97	Dublin - Florence	1666	0.13464	224.31024	0.13397	223.19402	0.00001	0.01666	0.00067	1.11622
212.79	Florence - Dublin	1666	0.13464	224.31024	0.13397	223.19402	0.00001	0.01666	0.00067	1.11622
249.09	Dublin - Paris - Dublin	1574	0.13464	211.92336	0.13397	210.86878	0.00001	0.01574	0.00067	1.05458
480.47	Heathrow - Hamberg - Heathrow	1496	0.18287	273.57352	0.18196	272.21216	0.00001	0.01496	0.0009	1.3464
366.47	Heathrow - Hamberg - Heathrow	1496	0.18287	273.57352	0.18196	272.21216	0.00001	0.01496	0.0009	1.3464
480.47	Heathrow - Hamberg - Heathrow	1496	0.18287	273.57352	0.18196	272.21216	0.00001	0.01496	0.0009	1.3464
390.87	Heathrow - Hamberg - Heathrow	1496	0.18287	273.57352	0.18196	272.21216	0.00001	0.01496	0.0009	1.3464
425.57	Heathrow - Hamberg - Heathrow	1496	0.18287	273.57352	0.18196	272.21216	0.00001	0.01496	0.0009	1.3464
480.47	Heathrow - Hamberg - Heathrow	1496	0.18287	273.57352	0.18196	272.21216	0.00001	0.01496	0.0009	1.3464
366.87	Heathrow - Hamberg - Heathrow	1496	0.18287	273.57352	0.18196	272.21216	0.00001	0.01496	0.0009	1.3464
130.15	Rome - Heathrow	1464	0.18287	267.72168	0.18196	266.38944	0.00001	0.01464	0.0009	1.3176
253.99	Florence - Birmingham	1358	0.18287	248.33746	0.18196	247.10168	0.00001	0.01358	0.0009	1.2222
338.39	Madrid - Birmingham	1337	0.18287	244.49719	0.18196	243.28052	0.00001	0.01337	0.0009	1.2033
137.44	Nice - Manchester	1284	0.18287	234.80508	0.18196	233.63664	0.00001	0.01284	0.0009	1.1556
320.79	Birmingham - Barcelona	1274	0.18287	232.97638	0.18196	231.81704	0.00001	0.01274	0.0009	1.1466
191.80	Florence - Heathrow	1220	0.18287	223.1014	0.18196	221.9912	0.00001	0.0122	0.0009	1.098
35.39	Florence - Heathrow	1220	0.18287	223.1014	0.18196	221.9912	0.00001	0.0122	0.0009	1.098
395.48	Heathrow - Florence	1200	0.18287	219.444	0.18196	218.352	0.00001	0.012	0.0009	1.08
162.89	Florence - London City	1195	0.18287	218.52965	0.18196	217.4422	0.00001	0.01195	0.0009	1.0755
329.71	London City - Florence	1195	0.18287	218.52965	0.18196	217.4422	0.00001	0.01195	0.0009	1.0755
329.71	London City - Florence	1195	0.18287	218.52965	0.18196	217.4422	0.00001	0.01195	0.0009	1.0755

126.05	Florence - Gatwick	1182	0.18287	216.15234	0.18196	215.07672	0.00001	0.01182	0.0009	1.0638
209.56	Gatwick - Florence	1182	0.18287	216.15234	0.18196	215.07672	0.00001	0.01182	0.0009	1.0638
50.00	Pisa - Heathrow	1180	0.18287	215.7866	0.18196	214.7128	0.00001	0.0118	0.0009	1.062
134.67	Milan - Gatwick	945	0.18287	172.81215	0.18196	171.9522	0.00001	0.00945	0.0009	0.8505
182.60	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
249.64	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
274.96	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
370.05	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
234.36	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
288.35	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
177.95	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
180.75	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
180.75	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
366.62	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
235.10	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
270.56	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
185.81	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
250.30	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
270.87	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
216.33	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
219.71	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
232.61	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
220.62	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
216.50	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
245.31	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
100.03	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
179.85	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81

145.79	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
274.00	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
349.98	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
382.77	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
216.52	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
131.18	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
197.66	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
259.58	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
204.40	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
118.13	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
118.13	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
148.47	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
118.13	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
118.13	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
118.13	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
235.02	Dublin - Heathrow - Dublin	900	0.18287	164.583	0.18196	163.764	0.00001	0.009	0.0009	0.81
188.59	Hamburg - Heathrow	748	0.18287	136.78676	0.18196	136.10608	0.00001	0.00748	0.0009	0.6732
311.49	Hamburg - Heathrow	748	0.18287	136.78676	0.18196	136.10608	0.00001	0.00748	0.0009	0.6732
271.09	Hamburg - Heathrow	748	0.18287	136.78676	0.18196	136.10608	0.00001	0.00748	0.0009	0.6732
26.39	Heathrow - Hamberg	748	0.18287	136.78676	0.18196	136.10608	0.00001	0.00748	0.0009	0.6732
353.27	Heathrow - Hamberg	748	0.18287	136.78676	0.18196	136.10608	0.00001	0.00748	0.0009	0.6732
353.27	Heathrow - Hamberg	748	0.18287	136.78676	0.18196	136.10608	0.00001	0.00748	0.0009	0.6732
428.17	Heathrow - Hamberg	748	0.18287	136.78676	0.18196	136.10608	0.00001	0.00748	0.0009	0.6732
189.70	Gatwick - Amsterdam - Gatwick	744	0.18287	136.05528	0.18196	135.37824	0.00001	0.00744	0.0009	0.6696

102.74	Dublin - Birmingham - Dublin	644	0.18287	117.76828	0.18196	117.18224	0.00001	0.00644	0.0009	0.5796
221.44	Dublin - Birmingham - Dublin	644	0.18287	117.76828	0.18196	117.18224	0.00001	0.00644	0.0009	0.5796
173.48	Dublin - Heathrow	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
127.21	Dublin - Heathrow	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
159.59	Dublin - Heathrow	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
98.59	Dublin - Heathrow	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
84.98	Dublin - Heathrow	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
126.29	Dublin - Heathrow	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
127.85	Dublin - Heathrow	450	0.18287	82.2915	1.18196	531.882	1.00001	450.005	1.0009	450.405
127.92	Heathrow - Dublin	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
137.93	Heathrow - Dublin	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
71.49	Heathrow - Dublin	450	0.18287	82.2915	0.18196	81.882	0.00001	0.0045	0.0009	0.405
100.33	Amsterdam - Gatwick	366	0.18287	66.93042	0.18196	66.59736	0.00001	0.00366	0.0009	0.3294
72.19	Bristol - Dublin	331	0.18287	60.52997	0.18196	60.22876	0.00001	0.00331	0.0009	0.2979
89.61	Glasgow - Dublin	297	0.18287	54.31239	0.18196	54.04212	0.00022	0.06534	0.0009	0.2673
133.49	Manchester - Dublin	266	0.18287	48.64342	0.18196	48.40136	0.00001	0.00266	0.0009	0.2394

Cost	Internation Flight Stops	Distance (km)	CO ₂ e Coefficient	kg CO ₂ e	CO ₂ Coefficient	kg CO ₂ e of CO ₂	CH ₄ Coefficient	kg CO ₂ e of CH ₄	N ₂ O Coefficient	kg CO ₂ e of N ₂ O
319.47	Heathrow - Amsterdam Amsterdam - Florence	372 1059	0.18287 0.13464	210.6114	0.18196 0.13397	209.56335	0.00001 0.00001	0.010481	0.0009 0.00067	1.041096
228.21	Dublin - Heathrow Birmingham - Dublin	450 322	0.18287	141.17564	0.18196	140.47312	0.00001	0.00772	0.0009	0.6948
1,350.42	Dublin - Florence - Dublin Dublin - London - Dublin Dublin - London - Dublin	3322 900 900	0.13464 0.18287 0.18287	776.44008	0.13397 0.18196 0.18196	772.57634	0.00001 0.00001 0.00001	0.032699	0.0009 0.0009 0.0009	3.835596
892.49	Dublin - London - Dublin Dublin - London - Dublin Dublin - London - Dublin	2700	0.18287	493.749	0.18196	491.292	0.00001	0.027	0.0009	2.43
827.28	Dublin - London - Dublin Dublin - London - Dublin Dublin - London - Dublin Dublin - London - Dublin	3600	0.18287	658.332	0.18196	655.056	0.00001	0.036	0.0009	3.24
90.09	Dublin - Birmingham Manchester - Dublin	588	0.18287	107.52756	0.18196	106.99248	0.00001	0.00588	0.0009	0.5292
1,272.66	Bordeaux - London London - Dublin Knock - London - Knock Glasgow - London London - Dublin Dublin - Glasgow Dublin - London - Dublin	739 450 1252 556 450 297 900	0.18287 0.18287 0.18287 0.27258 0.18287 0.18287 0.18287	899.12704	0.18196 0.18196 0.18196 0.27101 0.18196 0.18196 0.18196	894.53404	0.00001 0.00001 0.00001 0.00022 0.00001 0.00001 0.00001	0.1632	0.00134	4.42424
270.23	Manchester - Heathrow Heathrow - Nice	243 1042	0.27258 0.18287	256.78748	0.27101 0.18196	255.45775	0.00022 0.0001	0.06388	0.00134 0.0009	1.26342

Totals			
kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
<u>41,210.22</u>	41,447.19	459.97	652.85

Ferry

Three ferry journeys were taken in 2023. Assumed to be by 1 car passenger.

Cost	Ferry	Distance (km)	CO ₂ e Coefficient	kg CO ₂ e	CO ₂ Coefficient	kg CO ₂ e of CO ₂	CH ₄ Coefficient	kg CO ₂ e of CH ₄	N ₂ O Coefficient	kg CO ₂ e of N ₂ O
352.19	Belfast - Cairnryan	59.7	0.12933	7.720934	0.12774	7.626018	0.00004	0.002541	0.00155	0.092375
331.69	Belfast - Cairnryan	59.7	0.12933	7.720934	0.12774	7.626018	0.00004	0.002541	0.00155	0.092375
347.07	Belfast - Cairnryan - Belfast	119.4	0.12933	15.44187	0.12774	15.25204	0.00004	0.005082	0.00155	0.184749

Totals			
kg CO ₂ e	kg CO ₂ e of CO ₂	kg CO ₂ e of CH ₄	kg CO ₂ e of N ₂ O
<u>30.88</u>	30.50	0.01	0.37

Overnight Stays

All overnight stays have previously been provided in the 'Business Travel' spreadsheet.

Hotel emission factors for each individual country used in the calculation are from the Department for Energy Security and Net-Zero. As aforementioned, Copenhagen and Dublin did not have published data meaning an average from the other locations was used to produce an emissions factor to calculate emissions produced.

Calculations

Trip	Date	Date	City	Days	Total Days	CO ₂ e Coefficient	kg of CO ₂ e
75	14-Nov-23	18-Nov-23	Amsterdam	4	4	14.8	59.2
52	02-Oct-23	06-Oct-23	Barcelona	4		7	
91	27-Mar-23	29-Mar-23	Barcelona	2	6	7	42
11	13-Apr-23	18-Apr-23	Copenhagen	5		10.75	
12	14-Apr-23	17-Apr-23	Copenhagen	3		10.75	
13	14-Apr-23	18-Apr-23	Copenhagen	4		10.75	
14	14-Apr-23	18-Apr-23	Copenhagen	4		10.75	
15	14-Apr-23	18-Apr-23	Copenhagen	4	20	10.75	215
2	16-Jan-23	18-Jan-23	Dublin	2		10.75	
3	09-Jan-23	12-Jan-23	Dublin	3		10.75	
4	24-Jan-23	26-Jan-23	Dublin	2		10.75	
5	27-Jan-23	01-Feb-23	Dublin	5		10.75	
6	07-Feb-23	09-Feb-23	Dublin	2		10.75	
7	05-Mar-23	09-Mar-23	Dublin	4		10.75	
8	15-Feb-23	17-Feb-23	Dublin	2		10.75	
9	27-Feb-23	01-Mar-23	Dublin	2		10.75	
10	08-Feb-23	10-Feb-23	Dublin	2		10.75	
16	06-Mar-23	11-Mar-23	Dublin	5		10.75	
21	12-Mar-23	14-Mar-23	Dublin	2		10.75	
22	19-Mar-23	21-Mar-23	Dublin	2		10.75	
23	25-Mar-23	27-Mar-23	Dublin	2		10.75	
24	03-May-23	05-May-23	Dublin	2		10.75	
25	17-May-23	20-May-23	Dublin	3		10.75	
26	27-Apr-23	30-Apr-23	Dublin	3		10.75	
27	12-Jun-23	15-Jun-23	Dublin	3		10.75	
28	19-Jun-23	21-Jun-23	Dublin	2		10.75	
29	03-Jun-23	06-Jun-23	Dublin	3		10.75	
30	17-Jul-23	20-Jul-23	Dublin	3		10.75	
31	09-Jul-23	14-Jul-23	Dublin	5		10.75	
35	17-Jul-23	20-Jul-23	Dublin	3		10.75	
36	21-Jun-23	25-Jun-23	Dublin	4		10.75	
37	01-Aug-23	04-Aug-23	Dublin	3		10.75	
40	19-Sep-23	20-Sep-23	Dublin	1		10.75	
41	25-Sep-23	27-Sep-23	Dublin	2		10.75	
42	29-Aug-23	31-Aug-23	Dublin	2		10.75	
43	11-Sep-23	15-Sep-23	Dublin	4		10.75	
44	28-Sep-23	29-Sep-23	Dublin	1		10.75	

45	28-Sep-23	29-Sep-23	Dublin	1		10.75	
46	28-Sep-23	29-Sep-23	Dublin	1		10.75	
47	28-Sep-23	29-Sep-23	Dublin	1		10.75	
48	28-Sep-23	29-Sep-23	Dublin	1		10.75	
49	28-Sep-23	29-Sep-23	Dublin	1		10.75	
70	13-Nov-23	16-Nov-23	Dublin	3		10.75	
71	16-Oct-23	19-Oct-23	Dublin	3		10.75	
72	21-Nov-23	23-Nov-23	Dublin	2		10.75	
73	23-Oct-23	26-Oct-23	Dublin	3		10.75	
74	31-Oct-23	12-Nov-23	Dublin	12		10.75	
79	07-Nov-23	09-Nov-23	Dublin	2		10.75	
81	10-Dec-23	12-Dec-23	Dublin	2		10.75	
82	14-Dec-23	16-Dec-23	Dublin	2		10.75	
83	02-Dec-23	05-Dec-23	Dublin	3		10.75	
84	13-Dec-23	16-Dec-23	Dublin	3		10.75	
87	18-Sep-23	21-Sep-23	Dublin	3		10.75	
92	21-Mar-23	23-Mar-23	Dublin	2		10.75	
93	03-Apr-23	05-Apr-23	Dublin	2		10.75	
94	10-Apr-23	12-Apr-23	Dublin	2		10.75	
96	02-Oct-23	04-Oct-23	Dublin	2		10.75	
97	09-Oct-23	11-Oct-23	Dublin	2		10.75	
98	16-Oct-23	18-Oct-23	Dublin	2		10.75	
99	23-Oct-23	25-Oct-23	Dublin	2	136	10.75	1462
17	27-Mar-23	29-Mar-23	Florence	2		14.3	
20	27-Mar-23	29-Mar-23	Florence	2		14.3	
32	28-Jun-23	29-Jun-23	Florence	1		14.3	
33	19-Jun-23	21-Jun-23	Florence	2		14.3	
33	19-Jun-23	21-Jun-23	Florence	2		14.3	
39	12-Aug-23	14-Aug-23	Florence	2		14.3	
59	21-Nov-23	27-Nov-23	Florence	6		14.3	
60	13-Nov-23	15-Nov-23	Florence	2		14.3	
61	13-Nov-23	16-Nov-23	Florence	3		14.3	
62	13-Nov-23	16-Nov-23	Florence	3		14.3	
63	13-Nov-23	16-Nov-23	Florence	3		14.3	
64	13-Nov-23	16-Nov-23	Florence	3		14.3	
65	13-Nov-23	16-Nov-23	Florence	3		14.3	
66	13-Nov-23	16-Nov-23	Florence	3		14.3	
67	13-Nov-23	16-Nov-23	Florence	3		14.3	
68	13-Nov-23	16-Nov-23	Florence	3		14.3	

69	21-Nov-23	24-Nov-23	Florence	3		14.3	
77	21-Nov-23	26-Nov-23	Florence	5		14.3	
78	21-Nov-23	24-Nov-23	Florence	3		14.3	
85	04-Dec-23	07-Dec-23	Florence	3		14.3	
86	05-Dec-23	07-Dec-23	Florence	2		14.3	
89	24-May-23	28-May-23	Florence	4		14.3	
95	17-Apr-23	20-Apr-23	Florence	3	66	14.3	943.8
50	02-Oct-23	06-Oct-23	Hamburg	4		13.2	
51	02-Oct-23	06-Oct-23	Hamburg	4		13.2	
53	02-Oct-23	06-Oct-23	Hamburg	4		13.2	
54	02-Oct-23	06-Oct-23	Hamburg	4		13.2	
55	02-Oct-23	06-Oct-23	Hamburg	4		13.2	
56	03-Oct-23	05-Oct-23	Hamburg	2		13.2	
57	03-Oct-23	06-Oct-23	Hamburg	3		13.2	
58	03-Oct-23	06-Oct-23	Hamburg	3		13.2	
88	02-Oct-23	05-Oct-23	Hamburg	3	31	13.2	409.2
38	07-Sep-23	11-Sep-23	Milan	4	4	14.3	57.2
18	29-Mar-23	01-Apr-23	Nice	3		6.7	
19	29-Mar-23	01-Apr-23	Nice	3		6.7	
90	29-Mar-23	01-Apr-23	Nice	3	9	6.7	60.3
1	26-Jan-23	28-Jan-23	Paris	2	2	6.7	13.4
80	10-Dec-23	14-Dec-23	Pisa	4	4	14.3	57.2
76	13-Nov-23	16-Nov-23	Rome	3	3	14.3	42.9

Totals

Location	Total Days	CO ₂ e Coefficient	kg CO ₂ e
Amsterdam	4	14.8	59.2
Barcelona	6	7	42
Copenhagen	20	10.75	215
Dublin	136	10.75	1462
Florence	66	14.3	943.8
Hamberg	31	13.2	409.2
Milan	4	14.3	57.2
Nice	9	6.7	60.3
Paris	2	6.7	13.4
Pisa	4	14.3	57.2
Rome	3	14.3	42.9

<u>Totals</u>
kg CO₂e
<u>3362.2</u>

Adding all emissions from the various business travel types give the totals below.

<u>Total</u>
kg CO₂e
<u>47,884.04</u>

Annex G: Category 4.3 - Emissions from Disposal of Solid and Liquid Waste

Waste Disposal

Waste water

Water supply to the office building is metered by Castle Water.

The water use by the office is pro rata calculated from 6-monthly invoices from Castle Water.

Bill period	m3	Return to Sewage (%)	Pro rata for 2023 m3
01/10/2022 - 31/03/2023	44	100	22
01/04/2023 - 30/09/2023	40	0.95	38
01/10/2023 - 29/02/2024	47	0.95	26.79
Total			86.79

Waste water (m3)	kg CO ₂ e coefficient	total kg CO ₂ e
86.79	0.201	17.44479

Bins

Office recyclable waste is collected and placed into an external 1,100L bin, which is collected weekly.

Non-recyclable waste is collected and placed into an external 1,100L bin and collected fortnightly

Worst case is both bins full every time collected.

A 1,100L bin can hold an average of 50 kg of waste.

	Collection weight (kg)	Annual collections	Total annual weight (kg)	Total tonnage	Coefficient	Total kg CO ₂ e
Recyclable	50	52	2600	2.6	21.2801938	55.3285
Non-recyclable	50	26	1300	1.3	21.2801938	27.66425
					Total	82.99276

Total

The total GHG emissions from waste disposal for 2023 is **100.4375 kg CO₂e**.

Annex H: Category 4.4 - Emissions from use of Assets

Water Usage

Water supply

Water supply to the office building is the same as in Annex G.

Calculation

Bill period	m3	Pro rata for 2023 m3
01/10/2022 - 31/03/2023	44	22
01/04/2023 - 30/09/2023	40	40
01/10/2023 - 29/02/2024	47	28.2
Total		90.2

Water supply (m3)	kg CO2e coefficient	total kg CO2e
90.2	0.201	18.1302