HEATHROW AIRPORT CARBON FOOTPRINT METHODOLOGY DOCUMENT

2023

Heathrow

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HEATHROW AIRPORT CARBON FOOTPRINT METHODOLOGY

Context

This document explains the approach taken by Heathrow Airport Limited (HAL) in collating and reporting our 2023 carbon footprint which is published in our 2023 Annual Report and Accounts (ARA). We monitor our carbon footprint and report on our greenhouse gas (GHG) emissions annually. This helps us to identify opportunities to reduce our emissions and assess our progress in delivering our carbon reduction goals.

Data is collected and reported in a way that is fully consistent with the GHG Protocol Corporate Reporting Standard (2015)[1] and Airport Carbon Accreditation (ACA) Standard[2]. HAL comply with the requirements of the ACA Scheme Level 4+.

Bureau Veritas UK Limited have provided external verification of the GHG emissions data used in the carbon footprint; this is recorded in their verification statement.

Scope

The GHG Protocol[1] requires organisations to report their GHG emissions under 3 scopes:

1. **Scope 1** – all direct GHG emissions from activities at Heathrow Airport under our direct control, such as HAL's own vehicles, fuel required to heat our terminals and non-carbon emissions including refrigerant gases.
2. **Scope 2** – all indirect GHG emissions from the electricity purchased for the organisation's owned and operated activities.
3. **Scope 3** – all other indirect GHG emissions from activities in relation to Heathrow Airport, occurring from sources that we do not own or control.

Reporting Period

Data is reported as calendar year and covers the reporting year commencing 01 January 2023 and ending 31 December 2023. The carbon footprint is required to be reported annually to be delivered for the ARA.

Reporting Boundary

Reporting is based on operations over which HAL has operational control and is aligned with the GHG Protocol[1] 'operational control' approach, under which a company accounts for 100% of emissions from operations over which it, or one of its subsidiaries, has control

[1] Available at: https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf
[2] Available at: https://www.airportcarbonaccreditation.org/

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to make operational decisions. This includes operational control both at the airport and offsite – including our business parking 'Pod' test track and Business Support Centre (BSC).

Emission Factors

Emissions factors are sourced from the Department for Business, Energy and Industrial Strategy (BEIS) UK Government GHG Conversion Factors for Company Reporting (2023)[3]. These factors are updated on an annual basis. Emissions are calculated in carbon dioxide equivalent (CO_2e) and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and hydrofluorocarbons. There are other GHGs (perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride) that are not relevant for Heathrow Airport.

The footprint includes dual reporting using location-based and market-based approaches for Scope 2 grid electricity consumption to reflect our use of a renewable electricity contract.

An alternative source is used for the emissions factor for de-icer, which is sourced from the Airport Carbon and Emissions Reporting Tool (ACERT)[4].

Calculation Methodology

Raw activity data are collected and used with emission factors to produce the annual carbon footprint in accordance with the methodology outlined by the GHG Protocol[1].

To represent the overall airport-wide impact, the reporting of Scope 2 emissions follows the ACA guidelines in that all electricity imported on to site is captured, with metered third-party usage included in the Scope 3 emissions. Scope 3 also includes aircraft landing and take-off (LTO) cycle and cruise emissions, and surface access.

The carbon footprint emission sources covered and the associated key performance indicators (KPIs), data sources and core assumptions, are detailed in the table overleaf.

[3] Available at: https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting
[4] Available at: https://aci.aero/about-aci/priorities/environment/acert/

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Emission Source	KPIs	Data Sources and Core Assumptions
Scope 1		
Fuel consumption utilities	tonnes CO_2e MWh	Natural gas – data supplied as kWh based on meter readings and invoice records. Gas oil – data supplied as litres of fuel used based on supplier invoice records. Biomass – data consisted of purchased tonnage of round timber (wood pellets) and wood chip based on supplier invoice records. BEIS emissions factors[3] applied for natural gas (gross CV – kg CO_2e per kWh), gas oil (kg CO_2e per litre) and biomass (wood pellets and wood chips – kg CO_2e per tonne). Market-based reporting – supplier emissions factor used: an emissions factor of 0 was used for green gas supplied. This was backed by green gas certificates.
Operational vehicles and equipment	tonnes CO_2e MWh	Data for HAL supplied from live pump tracking system as litres of fuel used per fuel type – diesel, gas oil, hydrogenated vegetable oil (HVO) and unleaded petrol. BEIS emissions factors[3] (kg CO_2e per litre) applied for diesel (average biofuel blend), gas oil, biodiesel HVO and petrol (average biofuel blend).
Refrigerants	tonnes CO_2e	Refrigerant leakage records (kg of refrigerant lost) provided for the large Johnson Chiller units which are managed directly by HAL. Refrigerant leakage has been estimated from the entire group of assets based on information held on refrigerant charge and type, with assumptions on annual leakage rate applied based on a monitoring sample. BEIS emissions factors[3] (kg CO_2e per kg) applied for refrigerant types: R134A, R22, R290, R32, R407C and R410A.

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Emission Source	KPIs	Data Sources and Core Assumptions
De-icer	tonnes CO_2e	Data supplied as total litres of de-icer generated from the on-board telematics system on HAL's spreading vehicles. ACERT emissions factor[4] applied for airport surface de-icing glycol – pure undiluted.
LPG use for fire practice	tonnes CO_2e litres	Data on the level of LPG in storage tanks was used to calculate the litres of LPG used for fire practice. BEIS emissions factors[3] (kg CO_2e per litre) were applied.
Scope 2		
Grid electricity consumption	tonnes CO_2e MWh	Data supplied as kWh based on meter readings and invoice records, with third-party (Scope 3) consumption subtracted from the total grid electricity consumption. Location-based reporting – BEIS emissions factor[3] for UK grid electricity generated (kg CO_2e per kWh) applied. Market-based reporting – supplier emissions factor used: HAL's supplier, Engie, have an emissions factor of 0 backed by their Renewable Energy Guarantee of Origin (REGO) electricity contract.
Scope 3		
Passenger surface access	tonnes CO_2e	Passenger travel data is collected through interviews of a sample of passengers – data is weighted by the total number of departing passengers to give an estimate of the total number of passengers by start point and mode across the year.

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Emission Source	KPIs	Data Sources and Core Assumptions
		Distances travelled were estimated using the Google Maps Distance Matrix API[5]. BEIS emissions factors[3] (kg CO_2e per passenger km) applied for average car unknown (per km), local London bus, coach, national rail and London Underground.
Colleague surface access	tonnes CO_2e	Colleague travel data is sourced from the 2021 colleague travel survey which determined the onsite staff numbers, typical number of working days, and the start points and modes of travel. Data is scaled based on the number of active pass holders and assumptions on frequency that office based workers attend work on site. Distances travelled were estimated using the Google Maps Distance Matrix API[5]. BEIS emissions factors[3] (kg CO_2e per passenger km) applied for average car unknown fuel (per km), average motorbike (per km), local London bus, coach, national rail and London Underground.
Business travel	tonnes CO_2e	Mileage report – records of personal car miles travelled. Expenses report – records of employee expense claims for travel payments for public transport and taxis. Assumptions applied on cost (£) per km for each mode. ClickTravel – HAL's pre-booking system for business travel, including distance of flights (short and long haul) and train travel. Pre-paid travel cards for local public transport are also included based on assumptions on cost (£) per km for each mode. BEIS emissions factors[3] (kg CO_2e per passenger km) applied for average car unknown fuel (per km), regular taxi, local London bus, national rail, domestic air and long-haul.

[5] Available at: https://developers.google.com/maps/documentation/distance-matrix/overview

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Emission Source	KPIs	Data Sources and Core Assumptions
Waste	tonnes CO_2e	Waste is split between operational airport waste and construction contractor waste. Waste data is based on waste transfer notes and provided in tonnes of waste, by waste type and disposal destination. BEIS emissions factors[3] (kg CO_2e per tonne) applied for waste disposal of the various waste types and disposal methods.
Water	tonnes CO_2e	Data includes the volume (m^3) of water consumption and wastewater treatment based on meter readings and supplier invoice records. BEIS emissions factors[3] (kg CO_2e per m^3) applied for water supply and water treatment.
De-icer	tonnes CO_2e	Data supplied by airlines as total litres of de-icer (type I) and anti-icer (type IV) used. ACERT emissions factor[4] applied for aircraft de-icing glycol – pure undiluted glycol for type IV and accounting for 35% dilution for type I de-icer.
Operational vehicles and equipment	tonnes CO_2e	Data for third parties supplied from live pump tracking system as litres of fuel used per fuel type – diesel, gas oil, HVO and unleaded petrol. BEIS emissions factors[3] (kg CO_2e per litre) applied for diesel (average biofuel blend), gas oil, biodiesel HVO and petrol (average biofuel blend).
Construction vehicle fuels	tonnes CO_2e	Data was provided as total litres of diesel used per construction company. BEIS emissions factors[3] (kg CO_2e per litre) applied for diesel (average biofuel blend).

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Emission Source	KPIs	Data Sources and Core Assumptions
Third-party grid electricity consumption	tonnes CO_2e	Data supplied as kWh based on meter readings and invoice records for third parties. Location-based reporting – BEIS emissions factor[3] for UK grid electricity generated (kg CO_2e per kWh) applied. For Scope 3 reporting, market-based reporting is not included as it is not a factor that HAL can control therefore only location-based reporting is used.
Fuel consumption utilities	tonnes CO_2e	Natural gas – data supplied as kWh based on meter readings and invoice records. BEIS emissions factors[3] applied for natural gas (gross CV – kg CO_2e per kWh)
Aircraft in the LTO cycle	tonnes CO_2e	Emissions are calculated using the Carbon Emissions software provided by Envirosuite which uses actual radar aircraft movement data. Envirosuite ran a software update end of last year which revealed emissions factor corrections for less than 2% of movements to be necessary. This uncertainty might have an impact on the total emissions, but it is expected to be insignificantly small. Auxiliary Power Unit (APU) emissions are not included in Carbon Emissions, so an uplift based on HAL's emissions inventory is applied to account for APU emissions on stand.
Cruise emissions from all departure flights	tonnes CO_2e	Emissions are calculated using the Carbon Emissions software provided by Envirosuite which uses actual radar aircraft movement data. Envirosuite ran a software update end of last year which revealed emissions factor corrections for less than 2% of movements to be necessary. This uncertainty might have an impact on the total emissions, but it is expected to be insignificantly small.
Supply Chain	tonnes CO_2e	Emissions related to the Heathrow Airport supply chain have been included in the 2023 footprint. This is the first occasion that this has been done.

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Emission Source	KPIs	Data Sources and Core Assumptions
		Supply chain spend has been used to derive the emissions from the supply chain. Oracle breakdown the Heathrow Airport spend into major categories of supplier. The sum of the spend on each category was taken and carbon intensity factors, developed by the Carbon Trust, were applied to calculate emissions. Adjustments were made to the final figure to avoid duplication of emissions.
Carbon intensity		
Passenger numbers	kg CO_2e / passenger	Five intensity metrics are produced: • Scope 1 and 2 GHG emissions per passenger • Scope 3 GHG emissions per passenger (excluding WTT) • Scope 1, 2 and 3 GHG emissions per passenger (excluding WTT) • 'On the Ground' emissions per passenger (Scope 1, 2 and 3 excluding aircraft related emissions and WTT) • 'In the Air' emissions per passenger (Scope 3 aircraft related emissions excluding WTT) Passenger numbers are collated by HAL and sourced from airline records. The passenger numbers are the sum of all arriving, connecting, and departing passengers.

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Well to Tank and Transmission and Distribution

Well-to-Tank (WTT) and Transmission and Distribution (T&D) was included as a Scope 3 category for the first time in 2019. It covers the emissions associated with the mining and transportation of the fuels and electricity used. It is calculated by multiplying the fuel consumption by the relevant WTT and T&D emission factors.

WTT emissions are included for the following sources:

1. Electricity (HAL and third-party electricity).
2. Aviation (including LTO and Cruise).
3. Utilities fuel consumption (HAL and third-party electricity).
4. Vehicles.
5. Surface access.

T&D emissions are included for all electricity (HAL and third-party electricity).

Sustainable Aviation Fuel

Sustainable Aviation Fuel (SAF) was used at the airport in 2023 and emissions savings from use of SAF has been included as a line item, separate to the scopes of the carbon footprint, for the first time.

The benefits of SAF are associated with the savings in upstream emissions in comparison to fossil jet fuel. As a result of this, savings from SAF, have been calculated and subtracted from aviation WTT emissions.

