

Appendix 3: Manchester Aviation Emissions Report

This report provides a summary of Manchester's Aviation Emissions Report, the analysis of which was commissioned to the University of Manchester and is due to be published by Manchester Climate Change Partnership (MCCP) in January 2024.

The city's aviation emissions are here defined as the CO₂ emissions from flights taken by Manchester residents, from Manchester and other UK airports, and flights from Manchester Airport. It is important to note that there are other airports in which the city has a stake, due to its share in the Manchester Airports Group (MAG). Manchester's organisations also play a role in aviation emissions through business travel.

The figures provided are extrapolated from Manchester Airport passenger numbers, flight destination data, and national data sets. In the absence of exact details of flight routing and fuel burn these figures should be considered approximations.

UK air traffic is rebounding, reaching 75% of 2019 levels in 2022 according to the UK Civil Aviation Authority (CAA). Manchester Airport has similarly seen a rebound, with around 23.3 million passengers, equivalent to 79% of pre-pandemic levels.

For 2022, emissions from all non-chartered passenger flights departing from Manchester Airport are estimated to be 3.05m tCO₂.

Flights from all UK airports by Manchester residents have nearly doubled since 2021, resulting in an emission of 0.15 m tCO₂. An estimated 0.13 m tCO₂ is attributed to flights by Manchester residents departing from Manchester Airport (approximately 88% of all aviation emissions from flights taken by Manchester residents).

Approximately 10.7% of UK aviation emissions from passenger flights in 2022 are from non-chartered passenger flights departing Manchester Airport.

Introduction

Manchester's Climate Change Partnership (MCCP) and Manchester's Climate Change Agency (MCCA) are responsible for setting the city's high-level climate change targets – these are contained within The Manchester Climate Change Framework 2020-25, and its 2022 Update, which can be found at: www.manchesterclimate.com/content/2022-update

MCCP and MCCA are also responsible for tracking the city's progress towards these targets in Emissions Reports (see reports going back to 2013 here: www.manchesterclimate.com/annual-emissions).

This year's Aviation emissions are reported separately and are due to be published in January 2024.

Background

Whilst aviation emissions, i.e., emissions from aircraft, are not part of Manchester's carbon budget, it is recognised that aviation emissions must be tackled as part of ensuring that the city, and the UK overall, play their full part in delivering the Paris Agreement on climate change.

To support the common aim of establishing Manchester Airport, and the city of Manchester, as a national and international leader in sustainable aviation, M CCP has worked together to develop and commit to the following agreement published in the 2022 Update to the Manchester Climate Change Framework:

“To work with the UK Government and other stakeholders to ensure that emissions from flights are kept within a carbon budget for UK aviation that is fully aligned with the Tyndall budget and the Paris Agreement (the “UK Aviation Budget”). This includes flights by Manchester citizens, businesses and other organisations, and all flights from airports in which the city has a stake.”

As with the Manchester Climate Change Framework as a whole, the following principles underpin our approach to aviation:

- The principle of urgency, to ensure that high impact actions are taken in the short term to minimise cumulative emissions and their climate effects.
- The precautionary principle, to ensure that we are confident of remaining within the UK Aviation Budget by only adopting proven measures, while also supporting research into innovative approaches.
- The principle of equity, to ensure fair access to transport and an equitable distribution of the remaining global carbon budget.

To meet this sub-objective, the 2022 Update to the Manchester Climate Change Framework recommended the following actions:

- Empower citizens, businesses, and other organisations to understand the climate impact of their aviation practices and take action to reduce it.
- Engage and collaborate with national government, regulatory agencies, other cities, and the industry to ensure aviation emissions remain within the UK Aviation Budget.
- Monitor progress through emissions reporting and budgeting, track the contribution of mitigation measures, and periodically review the underpinning science.
- Recommend actions to ensure that the city plays its fair part in keeping aviation emissions within the UK Aviation Budget, while mitigating the risk of redistributing flights, emissions and associated social and economic benefits.

The reporting of aviation emissions by M CCP/MCCA is an integral part of fulfilling the objectives outlined in the third action item.

National Aviation Emissions

The UK is mandated by the Climate Change Act 2008 to achieve net-zero greenhouse gas emissions by 2050.

UK aviation greenhouse gas emissions include domestic flights, which fall under national reduction targets, and international flights departing from the UK. The UK's sixth carbon budget (2033-2037) includes international aviation emissions for the first time.

The Climate Change Committee (CCC) recommends capping the growth in demand for international flights at 25% and avoiding net expansion of UK airport capacity. The approach suggests enhancing efficiency and transitioning to alternative fuels.

UK Government Strategy 'Jet Zero by 2050' sets a goal to achieve net zero UK aviation emissions by 2050. This includes a CO₂ emissions reduction trajectory from 2025 to 2050, setting ambitious in-sector targets of 35.4m tCO₂e in 2030, 28.4m tCO₂e in 2040, and 19.3m tCO₂e in 2050.

Department for Energy Security and Net Zero (DESNZ) reports UK aviation emissions with a 2-year lag, leading to projections for 2022. Using 2019 data updated to 2022, factoring in pandemic-related passenger number changes, UK-wide aviation emissions from departing passenger flights are projected to surge by 216% to 28.5m tCO₂ in 2022 from 13.2m tCO₂ in 2021.

Approximately 10.7% of UK aviation emissions in 2022 are estimated from non-chartered passenger flights departing Manchester Airport.

Manchester's Aviation Emissions for 2022

Aviation emissions for Manchester are based on a methodology developed by the aviation subgroup of the MCCP's independent Zero Carbon Advisory Group.

All data contained in this report should be considered an estimate as it is based on some extrapolation due to some more specific datasets being unavailable for this study (for instance, the exact amount of fuel used for a given flight). There is also a time lag on national-level data, for which the report represents emissions for 2021 and provides a projection for 2022.

Manchester's aviation emissions cover:

- Emissions from non-chartered departing passenger flights from Manchester Airport.
- Emissions from flights taken by Manchester residents, regardless of the UK airport they depart from.
- UK aviation emissions stemming from departing passenger flights across all airports, with a specific focus on the Manchester contribution.

Flights and passenger numbers have rebounded in 2022 as the economy recovers from the COVID-19 pandemic with emissions at 86.9% of 2019 levels. The year 2019 has been used as the most reflective year for comparison of emissions throughout the report to account for the drop in travel due to the pandemic.

In 2022, emissions from non-chartered passenger flights departing from Manchester Airport are estimated to be around 3.05m tCO₂, more than a three-fold increase against 2021 levels as passengers returned to the airport, see figure 1.

Figure 1: Manchester Airport, Carbon Footprint of Departing Flights 2014-2022

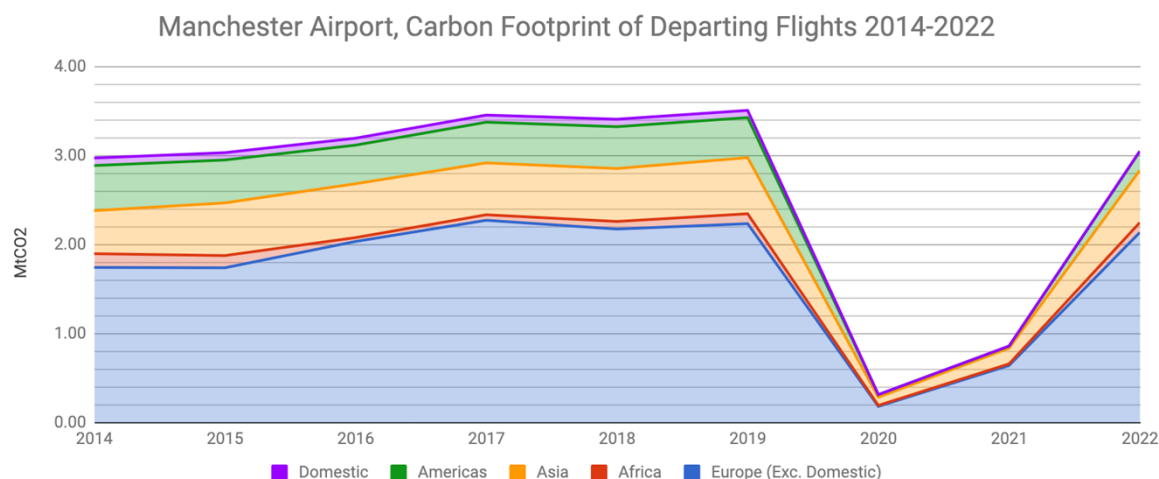


Figure 1: Estimate of Emissions from non-chartered passenger flights departing Manchester Airport between 2014-2022 (m tCO₂)

Domestic flights have nearly returned to pre-pandemic levels, with only a 4.4% difference, while flights to the Americas remain at approximately 44.5% of pre-pandemic levels. It is important to note that these figures contribute to a minor portion of emissions from flights departing Manchester Airport, as the majority, 70.0% in 2022, comes from European flights (compared to 63.7% in 2019).

To determine emissions from Manchester residents departing from both UK and Manchester airports, we rely on national trends and a 2017 study conducted by John Broderick for MCCA. The study indicates that 0.52% of flights from UK airports originated from Manchester residents.

Across all UK airports, the estimated emissions from Manchester residents total 0.15m tCO₂. This figure has more than doubled since 2021 (0.07m tCO₂), aligning with the industry's recovery from the COVID-19 pandemic, resulting in increased flights and passenger numbers.

Approximately 88% of all aviation emissions from Manchester residents are attributed to flights departing Manchester Airport.

Emissions from flights by Manchester residents departing specifically from Manchester Airport are approximated at 0.13m tCO₂.

Improvements proposed for future aviation emissions reports

Discrepancies between the work presented here (by UoM for MCCA) and internal reporting by MAG have been identified and discussed. Notably the analysis undertaken by UoM is based upon fleet assumptions developed in 2016 and aircraft fuel burn data from 2015. It was noted that UoM estimates were higher than MAG's internal reporting for emissions from flights departing Manchester Airport. Despite these differences, the overall trends of these datasets remain broadly in line with each other. All parties have agreed to work to close this gap in reporting in subsequent years.

MCCA, UoM and MAG have identified opportunities for improved data accuracy and streamlining of methodologies that will be explored in 2024. This will include more accurate information on

aircraft in operation at Manchester Airport. MAG's environmental reporting¹, which is aligned with their financial years and based on specific aircraft operating at the airport along with their flight distances and durations², is available on their website.

¹ <https://www.magairports.com/>

² See the following link for their methodology: https://www.magairports.com/media/1862/mag-emissions-report-_22_23_final.pdf