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UK aviation emissions

Did the UK aviation sector build back 'greener'?

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Further information
Anna Krajinska
UK director
T&E
anna.krajinska@transportenvironment.org

www.transportenvironment.org | BlueSky | LinkedIn

To consult the European numbers and methodological note, please click here.

Acknowledgements

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Executive summary

In 2024, **UK aviation** traffic and emissions **made a near-complete recovery** to pre-pandemic levels. **Close to one million flights departed** from UK airports last year and **produced 34.1 million tonnes (Mt) of CO_2**— that's a **6.2% increase in emissions and a 4.1% rise in flight numbers compared to 2023.**

For flights departing the UK, British Airways was the top polluting airline - emitting 7.8 Mt of CO_2 last year. In Europe as a whole, similarly to previous years, Ryanair continued to be the largest emitter among airlines operating flights in Europe, responsible for 16.2 Mt of CO_2 in 2024—an increase of 9% from the year before and 34% above its 2019 level. **British Airways was the third most polluting European airline emitting 8.9 Mt of CO_2.** Altogether, the ten most polluting airlines emitted 74 Mt of CO_2, accounting for 40% of the sector's total European emissions.

Although the UK has made a series of climate commitments, its **existing policies have not done enough to curb the aviation sector's projected growth. With greenlit expansion at Heathrow and Luton airports and expansion at Gatwick likely, aviation's climate impact is only set to grow.**

Emissions are on the rise and right now, the UK Emissions Trading System (UK ETS) for aviation only prices emissions from domestic flights and flights to the European Economic Area (EEA) and Switzerland. **As a result, the majority of emissions (83%) from extra-European flights remain unpriced under the UK ETS.**
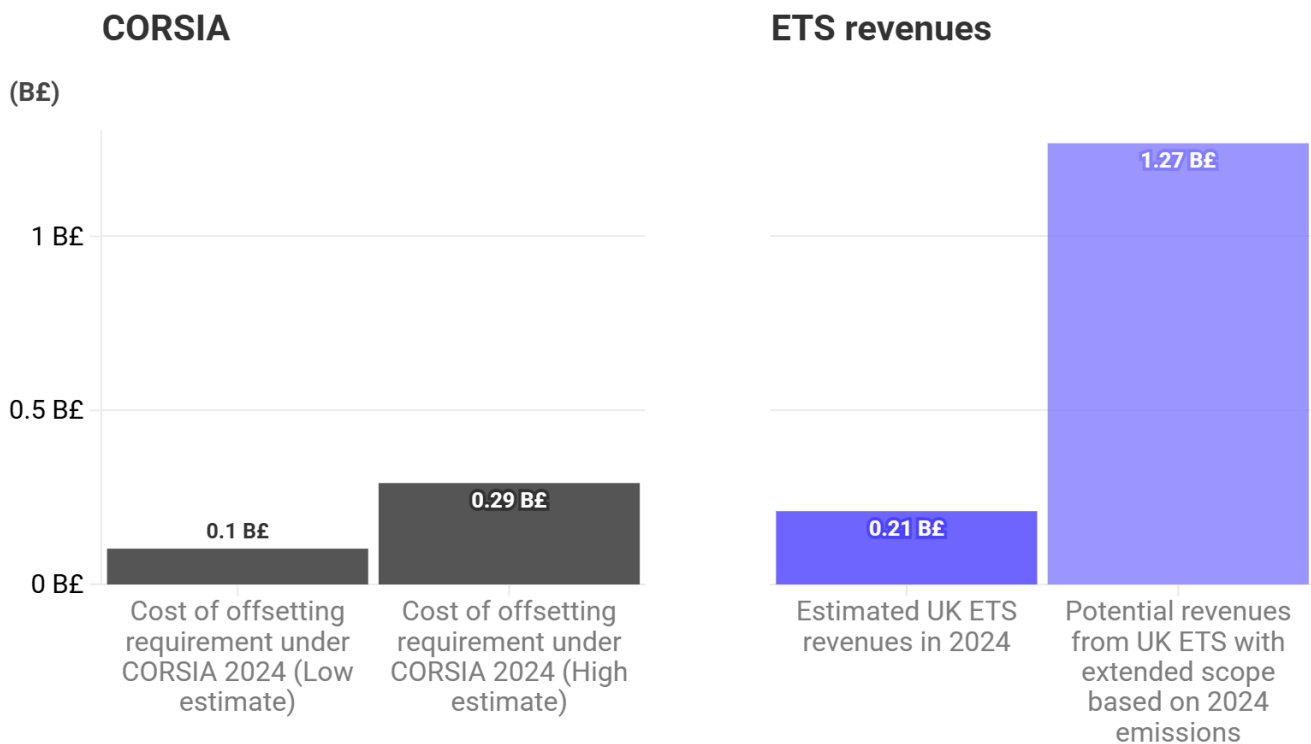
The exclusion of the most polluting long-haul flights is the largest gap in the UK ETS. Among them, the top polluting European route was the London–New York route, which alone emitted over 1.4 million tonnes of CO_2 in one direction.

In 2024, airlines paid around £210 million under the UK ETS. If the scope of the legislation covered all departing flights, this amount could increase to more than £1.2 billion, meaning that the government missed out on £1 billion of revenue last year. This could support general government spending. The UK could also use part of these revenues to kickstart its domestic e-SAF industry, supporting the government's clean energy mission by powering aviation with domestic renewables rather than imported fossil fuels while delivering growth and high quality green jobs.

However, unlike the EU, the **UK has no plans to revise the scope of the ETS.** In the EU, there is a scheduled review of the legislation in 2026, with the opportunity to expand the scope to all departing flights and therefore apply carbon pricing to a larger portion of European aviation emissions. **The UK should consider a similar revision.** This would not impact flights inside Europe - for families taking an annual holiday - but would impact prices on travel to destinations outside of Europe.

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At the moment the UK relies on CORSIA—the international offsetting scheme— which is a far less effective framework than inclusion of all of the UK's departing flights in the UK ETS. Its carbon prices are significantly lower, it lacks enforcement mechanisms, and it permits emissions growth above a lenient baseline. **Crucially, the UK misses out on significant revenue.**

CORSIA vs extended ETS: Relying on CORSIA for international flights would cost UK millions in lost revenue

CORSIA

ETS revenues

(B£)

- 1 B£
- 0.5 B£
- 0 B£

0.1 B£ — Cost of offsetting requirement under CORSIA 2024 (Low estimate)

0.29 B£ — Cost of offsetting requirement under CORSIA 2024 (High estimate)

0.21 B£ — Estimated UK ETS revenues in 2024

1.27 B£ — Potential revenues from UK ETS with extended scope based on 2024 emissions

Source: T&E modeling based on OAG data and Eurocontrol method; ICAP; MSCI carbon markets • Departing flights from UK. Potential revenues from ETS scope extension were calculated without taking into account the effect of pricing on passenger demand

Beyond CO_2, aviation's full climate impact includes non-CO_2 effects such as contrails, of which the warming impact is at least equal to that of CO_2. Unlike the EU, the UK has no legislation to address these effects. **Including these emissions in the UK ETS is essential to align with climate goals and capture the full picture of aviation's environmental impact.**

To meet these challenges, **T&E recommends that:**
- **The UK extends its ETS to all departing flights** which has the potential to generate significant revenue for the treasury.
- **Non-CO_2 effects should also be integrated into the UK ETS scheme,** including full monitoring.
- The UK should put an **end to airport expansion** to prevent further growth in aviation emissions and **increase the Air Passenger Duty (APD).**
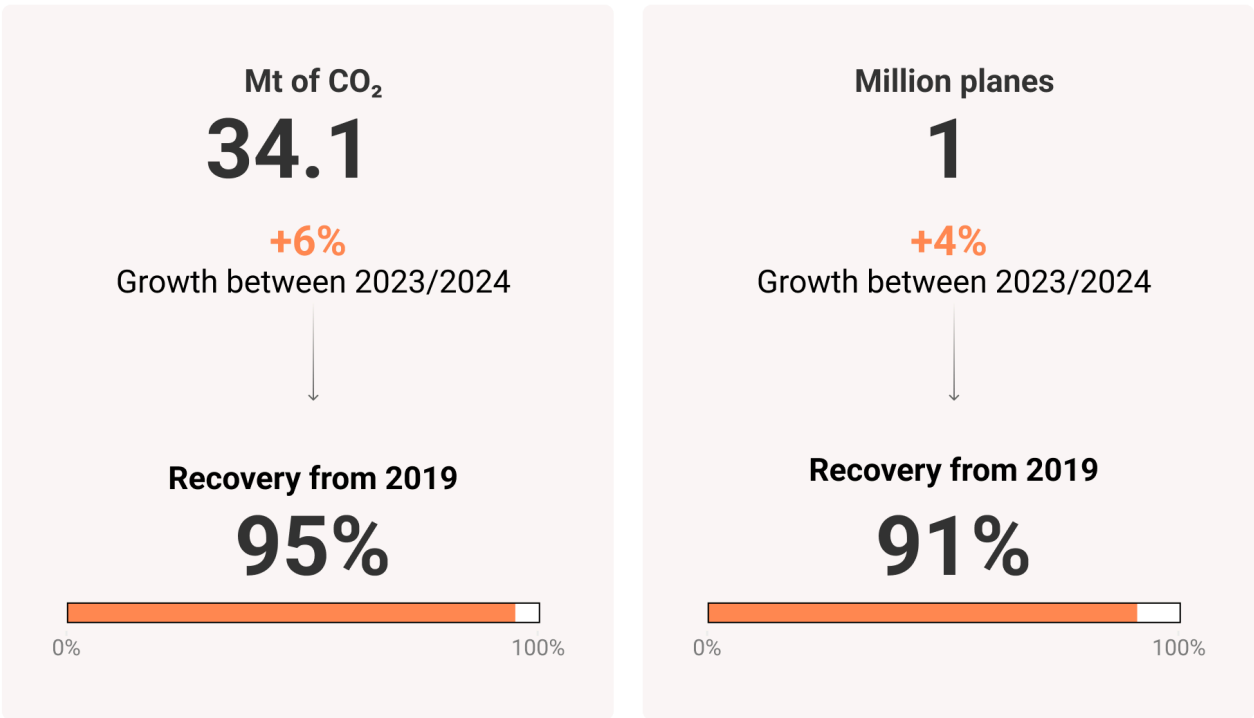
Introduction

In 2024, **close to 1 million flights (978,000 flights) departed** from UK airports, **generating 34.1 Mt of CO_2**. This marks a 4% increase in flight numbers and a 6% rise in CO_2 emissions compared to 2023. **The UK aviation sector has almost fully bounced back to pre-COVID levels**, reaching 91% of 2019 flight numbers and 95% of emissions of that year. Domestic flight emissions increased in 2024, compared to 2023 - totalling 1.1 Mt of CO_2 - but are still below 2019 levels. Flights to destinations outside of Europe still represent the largest chunk of emissions (68% or 23 Mt of CO_2) from UK aviation. These numbers contradict the pledges made by the government that the sector would build back better and greener after COVID.

The trends witnessed in the UK are similar to what is happening in Europe as a whole. In 2024, **over 8.4 million flights departed** from European airports, **generating 187.6 Mt of CO_2**. This represents a 5% increase in flight numbers and a 8% rise in CO_2 emissions compared to 2023. **The European aviation sector has almost fully bounced back to pre-COVID levels**, reaching 96% of 2019 flight numbers and 98% of emissions of that year.

UK aviation bounces back after COVID

But does not grow back greener

Mt of CO_2	Million planes
34.1	**1**
+6%	**+4%**
Growth between 2023/2024	Growth between 2023/2024
↓	↓
Recovery from 2019	**Recovery from 2019**
95%	**91%**

Source: T&E modeling based on OAG data and Eurocontrol method

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These numbers paint a bleak picture: Not only is the sector flying and polluting almost as much as in pre-COVID times, but continued growth in air traffic is on the cards. The government has recently green lit the expansion of Heathrow and Luton Airport and the approval of Gatwick expansion seems likely. This risks locking the UK into sky-high emissions from aviation, as there are not currently the right regulatory measures to keep the sector in check. As captured in

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T&E's *Down to Earth* report, passenger traffic at European airports could more than double by 2050. **Robust and effective climate policies are crucial to keep aviation on the right flightpath.** These are explored in this report.

2. Analysis

2.1. Airline emissions: British Airways among the top polluters

The top polluting airline for flights departing from the UK in 2024 was British Airways, emitting a total of 7.8 Mt of CO_2. Other top polluting airlines in the UK include Ryanair, easyJet and Virgin Atlantic Airways. The three big low-cost airlines, Ryanair, easyJet and Wizz Air are all far above their 2019 emissions levels. Interestingly, Jet2 increased their traffic by 14% in 2024 compared to 2023 - this is the highest growth from the UK's top 10 airlines.

British Airways is not only a top polluter in the UK, but in Europe as a whole. The graph below presents the top 10 most polluting airlines departing from Europe in 2024, along with their evolution compared to 2023 levels.

Ryanair is the most polluting airline in Europe

Most polluting airlines in 2024

Ranking	Airline	CO_2 emissions 2024 (MtCO$_2$)	CO_2 emissions growth 2023 - 2024 (%)
1	Ryanair	16.2	↑ 9%
2	Deutsche Lufthansa AG	10	↑ 6%
3	British Airways	8.9	↑ 3%
4	Air France	8.2	↓ -1%
5	easyJet	7.7	↑ 6%
6	Emirates	5.5	↑ 5%
7	KLM	5.5	↑ 3%
8	Wizz Air	4.6	↑ 1%
9	Iberia	4	↑ 10%
10	United Airlines	3.6	↑ 2%

Source: T&E modeling based on OAG data and Eurocontrol method • Departing flights from Europe

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Consistent with previous years, **Ryanair remains Europe's top polluting airline**, with 16.2 Mt of CO_2 emitted from its departing flights—**9% higher than last year and 1.3 times the 2019 figure**.

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Emissions of other carriers in the top 10 also kept growing at varying rates, between 3% (British Airways) and 10% (Iberia), both part of the IAG Group. However, looking at their post-COVID recovery, low-cost carriers significantly outperformed their legacy peers. Ryanair and Wizz Air have not only recovered but realized a significant increase at 34 and 44% respectively above their 2019 levels, whereas legacy airlines are still somewhat below their pre-pandemic emission levels (Lufthansa 77%, British Airways 83%, Air France 85%).

The **airlines in the top 10 emitted a total of 74.3Mt of CO$_2$** last year, that equals to **40% of the emissions from all flights departing Europe**. Ryanair's emissions alone make up 9% of those.

2.2. London: a hub for pollution

The chart below shows the most polluting flights by city pairs with their emissions in 2024.

London-New York is Europe's most polluting route

CO$_2$ emissions per city pairs (only departing flights)
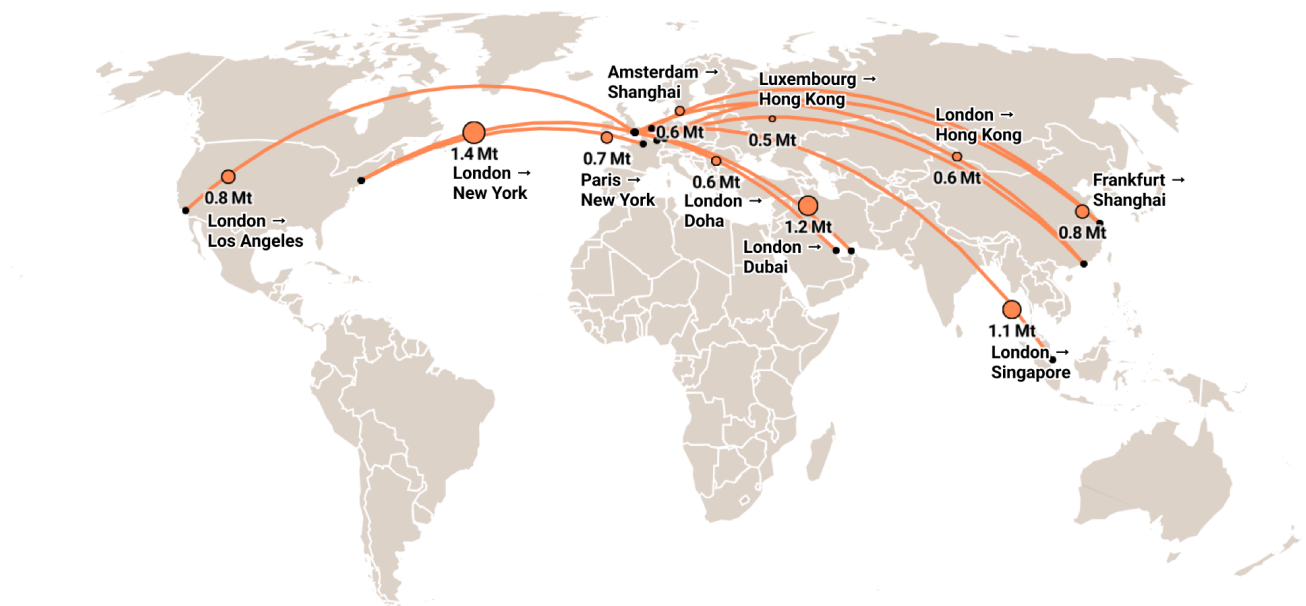
Source: T&E modeling based on OAG data and Eurocontrol method • Departing flights from Europe

Six out of 10 of Europe's most polluting routes depart from London, with London-New York topping the list and releasing over 1.4 Mt of CO$_2$ per flight. Unsurprisingly, the most polluting flights departing from Europe in 2024 were all long-haul.

The most polluting flight that is included in the current scope of the UK ETS, Barcelona-London, would land as the 134th on the ranking, with 0.15 Mt of CO$_2$ for a one-way journey.

This perfectly illustrates the existing loophole in the UK carbon market: **the most polluting routes in 2024 were all intercontinental and were not covered by the UK carbon market.**

Indeed, T&E calculations suggest that as much as 83% of CO$_2$ emissions from UK aviation remained unpriced in 2024, as detailed in the next section.

2.3. Shortcomings of the UK ETS scope: 83% of CO$_2$ emissions remained unpriced

Aviation was integrated into the UK's carbon market– the UK Emissions Trading System (UK ETS)– in 2021- due to Brexit. Prior to that UK aviation emissions were included in the EU ETS. Every year, polluters must surrender permits equal to their CO$_2$ emissions from the previous year, which they acquire through an annual allocation process. If polluters don't have enough allowances to cover these emissions, they can purchase additional permits at auction or from other companies with a surplus. The UK imposes a cap on CO$_2$ emissions by limiting the number of permits available in the market. As the cap is progressively reduced and permits become scarcer, the expectation is that the price of permits rises, creating an incentive for emitters to cut emissions when it's more cost-effective than buying permits.

However, unlike in the EU where free allowances for aviation have started a gradual phasing out, the **UK ETS will only phase out free allocations by 2026**. In the EU, for comparison, in 2024, free allocation decreased by 25% and in 2025 it will continue to do so by 50% to complete the phase-out by 2026. The eventual phase out of free allowances in the UK and EU is a much welcomed and long awaited measure, putting an unjustified benefit to an end.

As previously mentioned, a major shortcoming of the UK carbon market for aviation is that it does not include long-haul flights in the pricing scheme. As a result of these highly polluting routes evading the scheme, **less than a quarter of emissions (17%) were priced** under the UK carbon market in 2024.

The **UK ETS system** alone covered nearly 9.8 Mt of CO$_2$ emissions from aviation last year. If the UK ETS were applied to all departing flights, more than 24.2 Mt of additional CO$_2$ emissions would have been covered. Taking this and free allowances into account (free allowances for 4.2 Mt of CO$_2$ in 2024), **83% of CO$_2$ emissions were not covered by the UK ETS**.
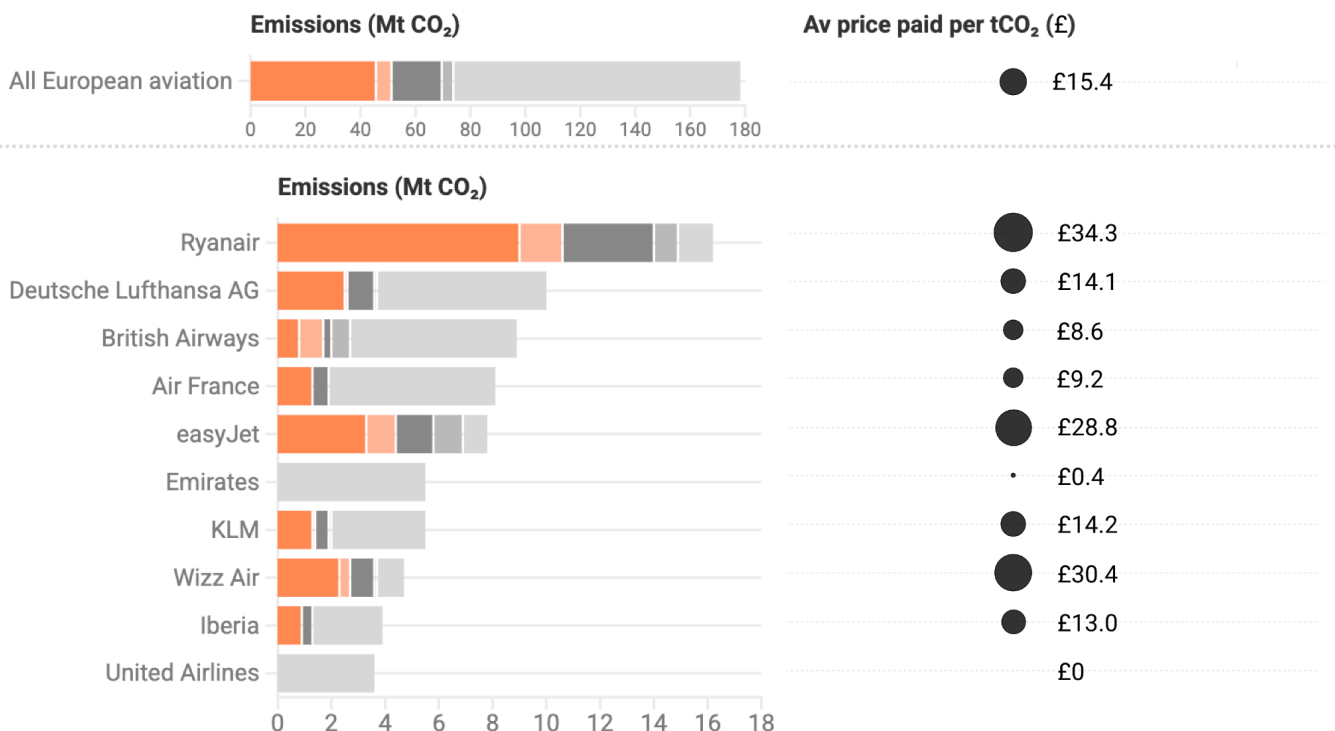
The estimated effective **price for a tonne of CO$_2$ within the UK ETS** (*i.e.* the price of a tonne of CO$_2$ by accounting for free allowances and unpriced emissions) **was slightly lower than in 2023 – £6.2 per ton in 2024 (compared to £8.5 the year before) - which remains negligible compared to the average UK ETS credit price of £37.**

Based on an average carbon price of the EU ETS and the UK ETS (£55.3 and £37.5 or €64.4 and €43.7, based on ICAP data), T&E calculated the average price paid per tonne of carbon by the 10 highest-emitting airlines in Europe in 2024 as seen in the chart below. The data combines both UK and EU ETS to give a representative European average.

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Price of CO$_2$ paid by top 10 most polluting airlines in 2024

Paid emissions and free emissions

■ Emissions priced under EU and Swiss ETS　■ Emissions priced under UK ETS　■ Free allowances EU and Swiss ETS
■ Free allowances UK ETS　■ Emissions out of ETS scope　● Average price paid per CO$_2$ (£)

Emissions (Mt CO$_2$)	Av price paid per tCO$_2$ (£)
All European aviation	● £15.4

Emissions (Mt CO$_2$)

Airline	Av price paid per tCO$_2$ (£)
Ryanair	● £34.3
Deutsche Lufthansa AG	● £14.1
British Airways	● £8.6
Air France	● £9.2
easyJet	● £28.8
Emirates	· £0.4
KLM	● £14.2
Wizz Air	● £30.4
Iberia	● £13.0
United Airlines	£0

Source: T&E modeling based on OAG data and Eurocontrol method; European Union Registry Public Website; Swiss Emissions Trading Registry; ICAP • Departing flights from Europe

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In 2024, airlines operating in the UK paid £210 million for UK ETS allowances. However, they did not pay an estimated £1 billion for their emissions due to free allowances and emissions not covered by the carbon market. The breakdown by airline shows how little some carriers contributed to their European emissions costs last year.

In Europe as a whole, airlines did not pay an estimated £6.5 billion (€7.5 billion) for their emissions due to free allowances and emissions not covered by the carbon market. The breakdown by airline shows how little some carriers contributed to their emissions costs last year.
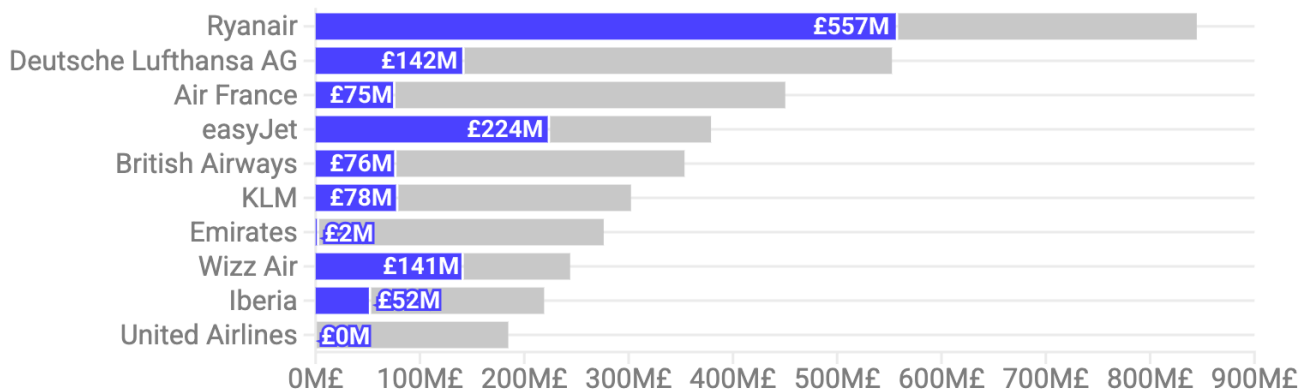
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How much airlines paid (or not) for their emissions in 2024

● Revenues from priced emissions (M£)   ● Lost revenues from unpriced emissions (M£)

ETS revenues from 2024 European departing emissions: actual vs. lost revenues

Europe ████ £2,736M ████████████████████

0M£   2000M£   4000M£   6000M£   8000M£   10,000M£
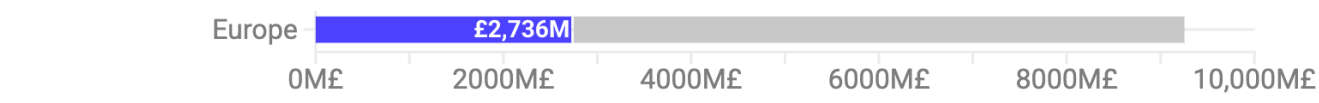
ETS revenues from Europe's top 10 most polluting airlines in 2024: actual vs. lost revenues

Airline	Revenue
Ryanair	£557M
Deutsche Lufthansa AG	£142M
Air France	£75M
easyJet	£224M
British Airways	£76M
KLM	£78M
Emirates	£2M
Wizz Air	£141M
Iberia	£52M
United Airlines	£0M

0M£ 100M£ 200M£ 300M£ 400M£ 500M£ 600M£ 700M£ 800M£ 900M£

Source: T&E modeling based on OAG data and Eurocontrol method; European Union Registry Public Website; Swiss Emissions Trading Registry; ICAP • Departing flights from Europe. Lost revenues were calculated without taking into account the effect of pricing on passenger demand

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Legacy carriers like Lufthansa, Air France and British Airways did not pay for the majority of their emissions – 74%, 83%, and 81% of their emissions, respectively, remained unpriced in 2024 under the UK and EU/Swiss ETS schemes. Meanwhile, third-country airlines such as Emirates and United Airlines, which produce emissions similar to European carriers, paid even less, because most of their emissions are outside the scope of the carbon market. Despite having similar levels of emissions, these non-European airlines are benefiting from lower costs, given that they operate extra-European flights. This highlights the need for the UK to ensure that emissions from third-country airlines are included in the UK ETS to ensure fair competition between UK and non-European carriers.

Due to their Europe-focused geographical market, low-cost carriers paid for a higher share of their emissions, but still a lot remained unaccounted for. For instance, Ryanair did not pay for 35% of its emissions, easyJet for 43%, and Wizz Air for 42% - as their flight activity is increasing for destinations outside of Europe.

## 2.4. Expanding the UK ETS could unlock up to £1 billion in extra revenue

Inclusion of international flights departing from the UK in the **UK carbon market can generate significant revenues for the government which can support general spending. Some of the**

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revenues can also be used to support green growth and jobs via investment support through the National Wealth Fund.

Last year the revenues generated under the UK ETS schemes for aviation totalled just £210 million, as only 17% of emissions were priced.That is only a fraction of the £1.27 billion that could have been generated, had the scheme been applied to all departing flights.

CORSIA is currently considered by the government as an alternative for flights outside the EEA. However, its offsets are much cheaper than UK ETS credits, and their price is highly variable. In a recent report, RICARDO estimates carbon offset prices to range between £2.7 to £4.3 (€3.2 to €5) per ton between 2022 and 2027, while MSCI forecasts that prices may range between £13.5 to £38.2 ($18 to $51) per ton during the first phase of CORSIA. Using the lowest and highest CORSIA offset price estimate from MSCI, the total bill of UK aviation would range from £103 million to £291 million. This is between 4 to 12 times less compared to an UK ETS scope extended for all departing flights, using an average ETS credit price of £37. Moreover, CORSIA revenues would not stay in the UK. Instead airlines will pay global providers to offset their emissions in questionable international projects.

CORSIA vs extended ETS: Relying on CORSIA for international flights would cost UK millions in lost revenue
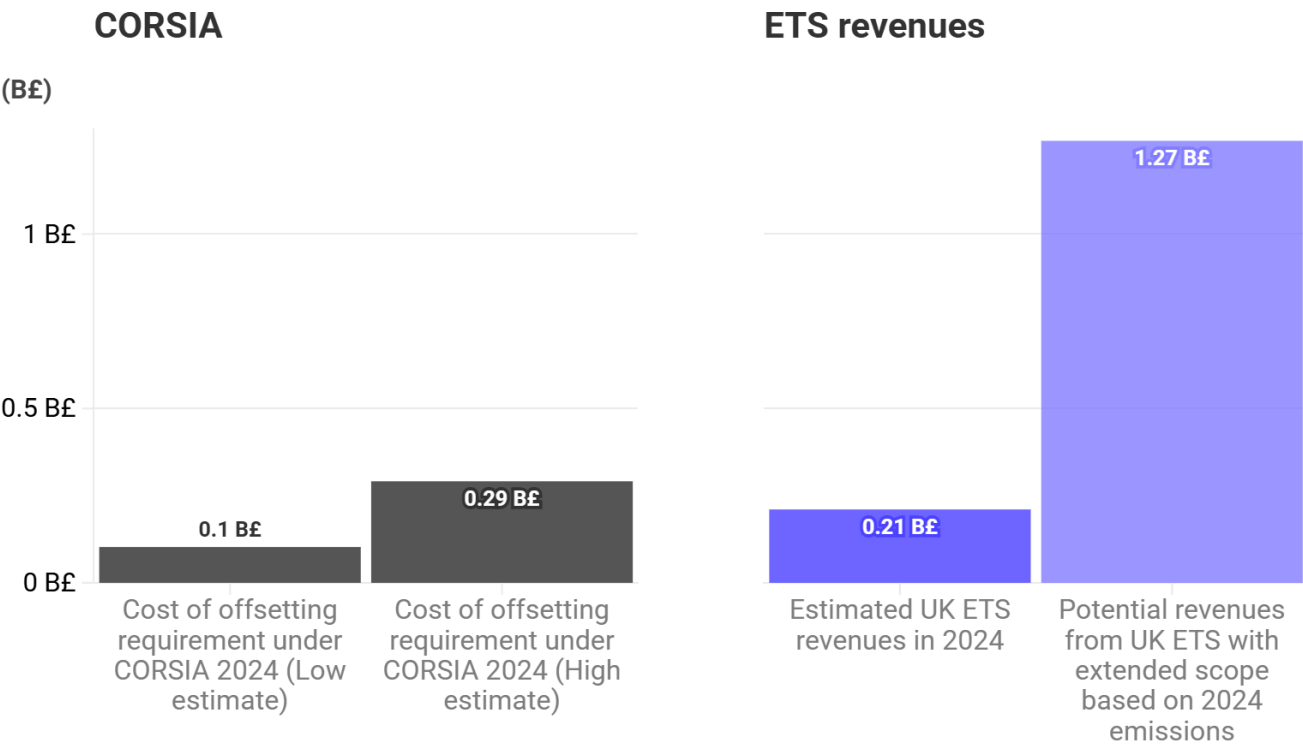
Source: T&E modeling based on OAG data and Eurocontrol method; ICAP; MSCI carbon markets • Departing flights from UK. Potential revenues from ETS scope extension were calculated without taking into account the effect of pricing on passenger demand

2.5. CORSIA: A flawed solution to pricing international aviation emissions

A key argument to maintaining the UK ETS in its current, limited scope for aviation has been the development and launch of ICAO's global offsetting scheme CORSIA.

But is CORSIA a real and efficient alternative for the UK (and EU) carbon pricing scheme for extra-European flights? The following section covers different aspects of the system, focusing on coverage (both geographical and emissions covered), emission reduction incentivization, and revenues, and finds that the **UK carbon market is a much stronger alternative to price departing flights.**

Firstly, the ICAO CORSIA scheme only applies to international flights operated by airlines from countries that participate in the program - on a **voluntary** basis until 2027.

Furthermore, carriers **must only offset emissions above a 2019-2020 baseline** on eligible routes. Previous T&E analysis has shown that, with this 85% baseline, a mere 22% of total international aviation emissions would be covered by the scheme and therefore offset. Unlike the European ETS systems, there is no emissions reduction incorporated in the system, and emissions can continue to grow as long as airlines purchase offsets for the emissions above the baseline.

This leads to the next issue with the scheme. **CORSIA offsets lack credibility** due to the low-quality and inconsistent offset standards, which also makes double counting possible with the country's NDCs.

Another difference between the UK carbon pricing scheme and CORSIA is that unlike the UK ETS, the ICAO has no enforcement power in case of non-compliance.

Last but not least, **revenues from the UK ETS fund UK government spending whereas** in the case of CORSIA, airlines purchase carbon credits from global offset providers or schemes and the UK receives none of the revenues.

3. The importance of non-CO_2 emissions and the need to address aviation's full climate impact

Beyond its limited geographical scope, another shortcoming of the UK emission trading scheme is that it only considers CO_2 emissions. This is despite the fact that there is scientific consensus which confirms that the climate impacts of aviation's non-CO_2 emissions is at least as important as that of its CO_2 emissions.

Unlike in the UK, the EU has already taken first steps to address these emissions. The EU launched a Monitoring, Reporting and Verification (MRV) scheme of aviation's non-CO_2

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emissions in January 2025. The system allows non-CO_2-related data to be gathered. For the first two years it applies to intra-EEA flights only and then will be automatically extended to all flights arriving to or departing from the EEA. This will allow European lawmakers to propose an inclusion of aviation's non-CO_2 emissions in the 2026 EU ETS review. **T&E calls upon the UK to consider similar legislation: the government should set up an MRV system that covers all flights, and propose legislation to mitigate non-CO_2 effects of aviation.** The implementation of the non-CO_2 MRV can boost the understanding of non-CO_2 effects, and inform policymakers and the aviation industry on the best set of policies and incentives for their effective mitigation. The absence or weakening of such an MRV framework would unnecessarily delay action, despite non-CO_2 being recognised as a climate issue for the past decades.

4. Policy recommendations

The analysis in this report shows that UK aviation emissions have bounced back to pre-COVID levels. While emissions from most other sectors are declining, transport— and in particular aviation—continues to be a major and growing source of pollution.

To address this and other matters raised in this report, T&E calls for the following:

Expand the UK Emissions Trading Scheme (UK ETS) to cover all international flights departing from UK airports instead of relying on CORSIA, addressing the current gap that leaves most aviation emissions outside an effective carbon pricing system.

Address aviation's full climate impact by integrating non-CO_2 emissions into the UK's climate objectives and existing policies, creating a comprehensive regulatory framework to drive innovation, improve public health, and enhance sustainability in aviation. Part of it is **the inclusion of those emissions in the UK ETS,** firstly by monitoring them and then coming forward with legislation to address these effects.

Put an **end to airport expansion** to prevent further growth in aviation emissions and **increase the Air Passenger Duty (APD).**