

HEATHROW EXPANSION BENEFITS

EXECUTIVE SUMMARY

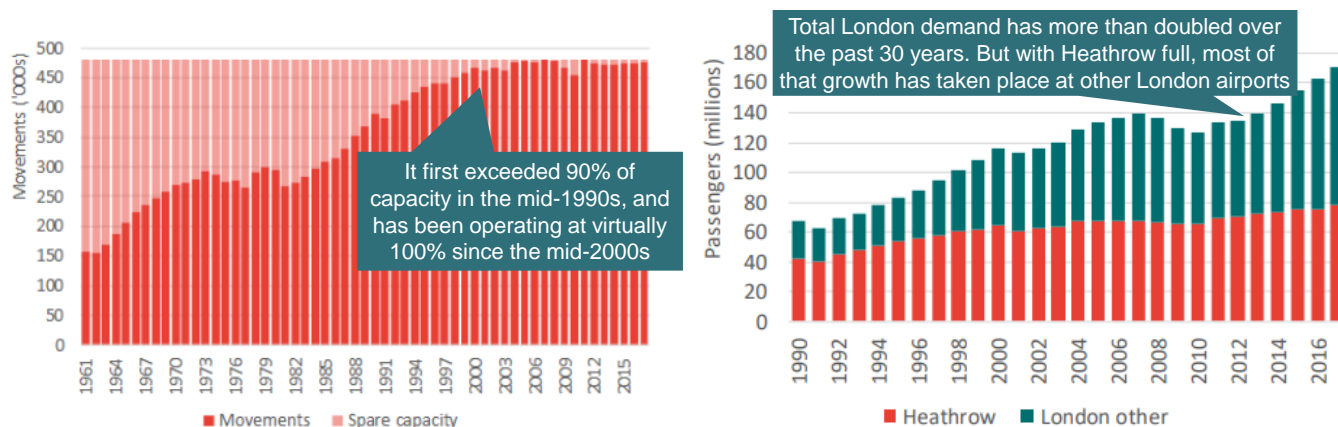
29 JANUARY 2025



Background

Heathrow has two runways and is limited to 480,000 flights per annum.¹ Prior to the pandemic, it had been operating at virtually full capacity for over 20 years. And it has since returned back to pre-pandemic levels, with a record 83.9m passengers flying in 2024.²

Figure 1 Heathrow is full



Source: Frontier analysis based on CAA data

Looking forward, the DfT forecasts that 'unconstrained' aviation demand in the UK will continue to grow with the economy. But, with Heathrow full (and with other airports forecast to also become capacity constrained in the coming years), the DfT forecasts that much of this extra demand may not be met – with as many as 100 million passengers per annum in the UK not able to fly by 2050.³

In 2012, the UK government set up the Airports Commission (AC) to explore the topic of airport expansion in the South East of England.⁴ In 2015, the AC published its Final Report. It noted the unique role that Heathrow plays in the UK: "Heathrow is best-placed to provide the type of capacity which is most urgently required: long haul destinations to new markets. It provides the greatest benefits for business passengers, freight operators and the broader economy." It also highlighted that spare capacity at other London airports was not a viable alternative: "There is still spare capacity elsewhere in the South East for point-to-point and especially low-

¹ This is a planning restriction introduced in 2008 as a planning condition for the development of Terminal 5. Technically, Heathrow could handle more than this cap.

² <https://mediacentre.heathrow.com/pressrelease/detail/21683>

³ <https://assets.publishing.service.gov.uk/media/5e8dec2786650c18c9666633/uk-aviation-forecasts-2017.pdf>

⁴ Even before the AC, the topic of expanding Heathrow has been discussed by UK government for over 50 years. The Roskill Commission in the late 1960s / early 1970s was tasked with exploring whether an extra runway was needed to serve London demand. In 1990, the UK government commissioned the 'Runway Capacity in the South East Study' (RUCATSE) which found that Heathrow expansion "would afford the greatest benefits." In 2003, the Air Transport White Paper supported a third runway at Heathrow. In 2006, the Government confirmed its commitment to Heathrow expansion, which it repeated in 2009, before reversing its decision in 2010.

cost flights, but with no availability at its main hub airport London is beginning to find that new routes to important long-haul destinations are set up elsewhere in Europe rather than in the UK.” And ultimately it made a recommendation that Heathrow should be expanded: “At the end of this extensive work programme our conclusions are clear and unanimous... We have concluded that the best answer is to expand Heathrow’s runway capacity”.⁵ As part of this work, the AC carried out detailed cost benefit analysis (CBA) where it considered a wide range of different cost and benefit types, and also a number of different appraisal methods.

In 2018, the UK government published its Airports National Policy Statement (ANPS) which set out its policy on airport expansion, which included supporting a new third runway at Heathrow. The ANPS was challenged in the courts, but was subsequently confirmed by a Supreme Court ruling, meaning that the ANPS remains official government policy. The next step is for Heathrow to bring forward detailed proposals for a Development Consent Order (DCO).

Heathrow has been exploring different expansion capacity growth scenarios:

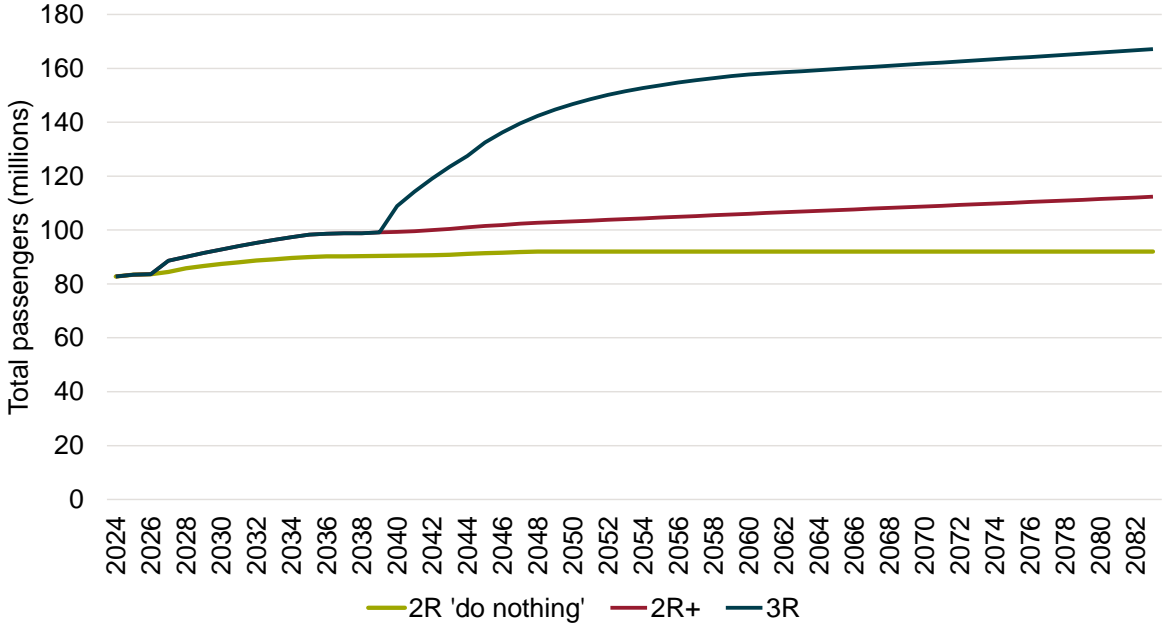
- 2R+: An expansion scenario which involves increasing airport capacity but still within a two runway (2R) airport – i.e. a new runway is not added. This involves renovating and reconfiguring existing infrastructure to help free up extra capacity. Under this scenario, the total number of flights at Heathrow does not increase, but more passengers can be accommodated; and
- 3R: An expansion scenario where a third runway (‘3R’) is added, in addition to the infrastructure upgrades under the 2R+ scenario.

The chart below – based on June 2024 data provided by Heathrow – shows the passenger forecasts for each scenario, relative to the 2R ‘do nothing’ scenario.⁶ Under the 2R+ scenario, extra capacity is assumed to come into operation within a few years.

⁵ <https://assets.publishing.service.gov.uk/media/5a808ab4e5274a2e8ab50bd4/airports-commission-final-report.pdf>

⁶ Note that passenger numbers still continue to rise under the ‘do nothing’ scenario, albeit slowly. In this constrained world, movements are not forecast to increase, but airlines are able to increase volumes by increasing average aircraft size and increasing load factors.

Figure 2 Passenger forecasts



Source: Frontier economics analysis of Heathrow data

We have been commissioned by Heathrow to consider the overall net benefits of these different expansion scenarios.

Our starting point was to review the AC’s CBA, which is a substantial piece of analysis and the most comprehensive attempt at analysing the various environmental, economic and social impacts of capacity growth at Heathrow. The AC identified an overall net benefit of £12bn from the expansion of Heathrow. The AC’s CBA was subsequently updated by the DfT in 2018 when it produced updated UK aviation demand forecasts. Both the AC and DfT analyses found that expansion at Heathrow would lead to positive net benefits for the UK.

Our Analysis

The modelling was guided by HMT's 'Green Book' and the DfT's 'WebTAG' which set out best practice for carrying out appraisals. However, these documents are intended to provide guiding principles on how to carry out CBA, and understandably they do not provide a detailed step by step guide on how to carry out CBA for every conceivable type of investment, each with their own subtle nuances. The AC noted that it needed to develop new and novel approaches to assess the net benefits of airport expansion. Having reviewed the analyses, we agree that there are number of challenging methodological issues with carrying out CBA in the context of airport expansion. In particular:

- What is an appropriate appraisal metric? We agree with the AC and the DfT that a range of different appraisal metrics should be considered to help assess the business case of expansion from different angles.
- Many impacts are difficult to estimate robustly, and as such they tend to simply be excluded from the analysis. For instance:
 - Business travel: Expansion can lead to more business travel and help facilitate more trade and investment, which in turn can help boost productivity and GDP in the UK. However, there is no consensus on how these impacts should be estimated, and the science continues to evolve. The DfT estimated that these benefits could even be as high as £130 billion (in NPV terms over a 60 year period) but ultimately it decided to exclude them from its analysis entirely due to a risk of 'double counting' with ticket price savings. These benefits are challenging to quantify, but they are one of the main reasons for expansion in the first place and so are included in our analysis.
 - Wellbeing: Expansion would result in more passengers flying for leisure and to visit friends and relatives, which, as noted by the DfT, can boost wellbeing and life satisfaction. But these benefits are not included in the AC and DfT analyses. We recognise that they are challenging to estimate, but they are attracting increasing attention from academics who consider that pure 'economic' measures (such as consumer surplus) do not fully capture the benefits. Excluding these benefits sets a higher bar for expansion to have a positive business case.
- Environmental costs: The AC and the DfT estimated the environmental cost of expansion in terms of the impact on air quality and noise, as well as carbon. However, it did not include the impact of non-carbon gases on the environment, where the science continues to evolve. All relevant impacts would need to be captured and appropriately costed in the analysis.

In terms of the analysis that we have carried out, in line with the approach taken by the AC, our analysis is split into two main parts, a bottom up analysis that corresponds more closely to the approach taken by the AC and DfT, and an approach based on a Computable General

Equilibrium (CGE) approach, which attempts to model the whole economy effects of the investment at Heathrow.

For clarity, all our estimates here are based on a timetable for expansion that assumes no reform to the current planning, regulatory or airspace regimes.

Bottom Up Approach

First, like the AC and the DfT, we have estimated a number of different benefit types individually and in isolation from each other and then combined them to produce a ‘bottom up’ CBA. This is not a formal update of the AC / DfT analysis – especially since many of the models underpinning that analysis are not publicly available. We have estimated certain benefit types, and have compared them to the financial costs of the expansion options. For other effects that we have not estimated, we have taken the previous AC / DfT results and carried out high level extrapolations. Further work would be needed to update these other estimates more robustly. We estimate that over a 60 year appraisal period, both expansion options deliver significant benefits.

Figure 3 Overview of our ‘bottom up’ net benefit results (2024 prices)

	2R+ scenario	3R scenario
Private Sector	£5.4 billion	£17.8 billion
Environment	-£2.5 billion	-£7.5 billion
HMT	£3.7 billion	£14.4 billion
Total	£6.6 billion	£24.7 billion

Source: Frontier analysis
 Note: NPV over the period 2024-2083.

Under both scenarios, the largest driver of economic benefit is the ticket price savings resulting from lifting the capacity constraint at Heathrow. Private sector benefits also include the wider economic “catalytic” impacts resulting from expansion, i.e. the increase in GDP brought about by the increase in productivity from extra trade and investment.

However, we note that our approach to estimating carbon, noise and air quality costs is simple, and only a high level extrapolation of the DfT's estimates.⁷ Further work would be needed to produce more robust estimates. viewed in a different light, our results suggest that under both expansion options there is a significant positive 'margin' of private net benefits to cover environmental costs.

The benefits to the public purse (HMT) primarily arise from increased revenue from APD.

CGE Modelling

Our second approach to assessing the net benefits of Heathrow expansion was to employ a CGE modelling approach (in partnership with Centre of Policy Studies (CoPS), Victoria University Melbourne).

This approach does not follow the approach Green Book / WebTAG approach, but rather uses a computer model of the whole economy to assess more holistically the impact of expansion at Heathrow on the UK economy, as a whole.

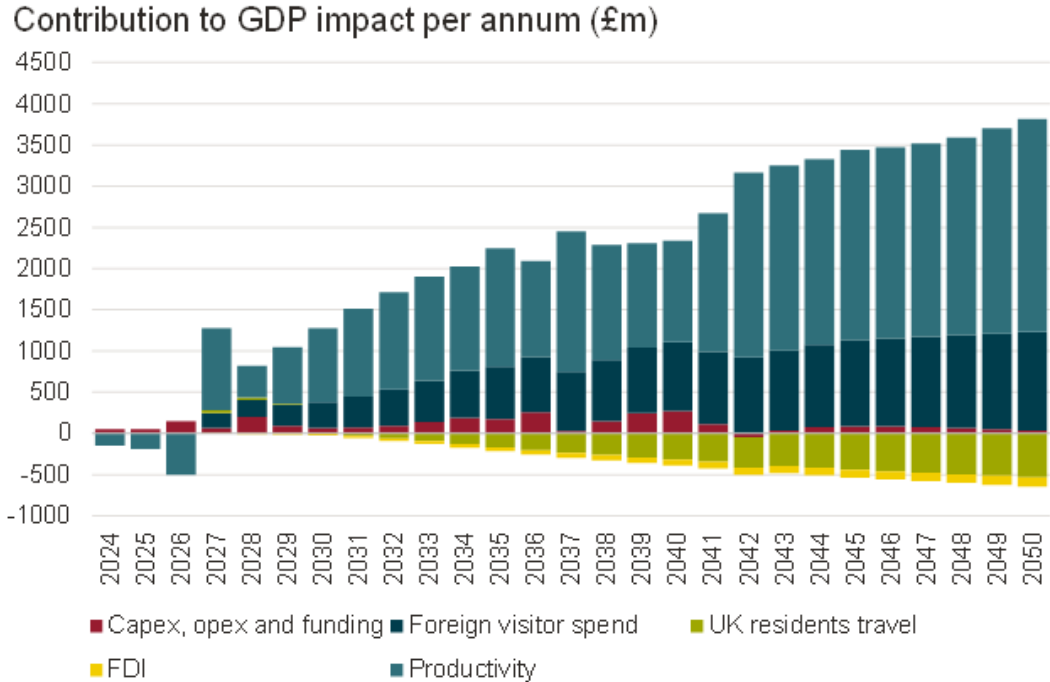
This modelling takes into account that the economy is made up of a number of interconnected sectors, and how expansion in one sector impacts on others, with a number of first-, second- and third-order impacts. Expansion is modelled as a 'shock' to the economy, leading to positive impacts in some sectors ('crowding in') but also leading to negative impacts in other ('crowding out') – e.g. expansion drives up demand for certain factors of production, which are scarce, which increases costs for other sectors. The chart below provides an overview of the results for the different growth scenarios.

The AC also looked at a CGE approach to estimating the net benefits of expansion. and cited these results as separate and complementary to the standard bottom up approach. For this reason few have taken the same approach.

The annual effects of Heathrow expansion as identified by the CGE model are illustrated in the figures below.

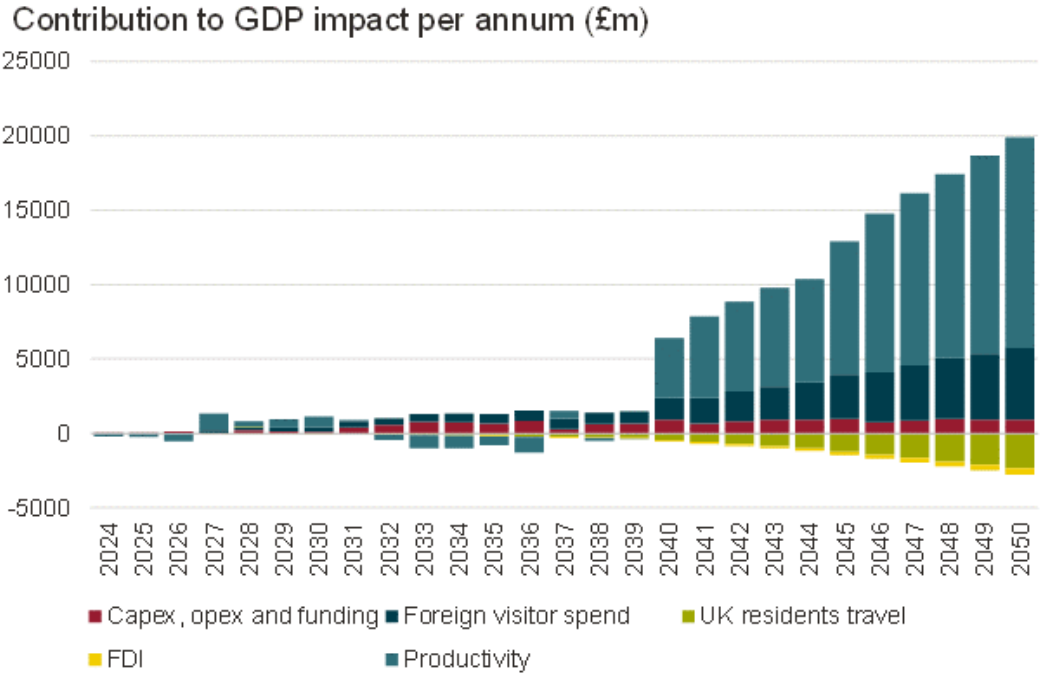
⁷ For the 3R scenario, we have conservatively decided to take the DfT's original estimates (uplifted to 2024 prices) and multiple them by x2.5. This captures that the UK government's carbon values are now around 2-3 times greater than the older values assumed in the DfT's analysis. We consider this approach to be conservative, because (i) the DfT's passenger forecast (and therefore associated environmental impacts) was significantly higher than the forecasts currently being considered by Heathrow; and (ii) we have applied this uplift not just to carbon costs, but also to the DfT's estimates of noise and air quality too, as a broad proxy for other impacts. For the 2R+ scenario, we note that the size of the expansion is significantly lower than under the 3R scenario. And therefore the associated impacts would also be lower. We have taken the figure estimated for the 3R scenario and multiplied by 33% - reflecting the lower scale of the expansion option. However, further work would be needed to produce more robust estimates.

Figure 4 Contributions to GDP impacts under the 2R+ scenario



Source: Frontier analysis

Figure 5 Contributions to GDP impacts under the 3R scenario



Source: Frontier analysis

The CGE modelling provides significantly larger estimates of the economic benefits of Heathrow expansion. **The GDP impact of the 2R+ scenario is estimated as +£51 billion (in NPV terms over a 60 year period), while the 3R scenario yields net benefits of +£184 billion. Figure 5 above shows that the benefits of the 3R scenario mount rapidly after 2040, reaching close to £17.1 billion per annum by 2050 (0.43% of GDP).**

These numbers are broadly in line with the AC's CGE analysis of the third runway (£127-£247 billion in 2024 prices). Importantly, CGE modelling focuses on economic / market effects only, and does not take into account environmental or social impacts. However, using our high level estimate of environmental, noise and air quality impacts, described above (i.e. £2.5 billion for the 2R+ scenario and £7.5 billion for the 3R scenario), we still see very positive net impacts overall. We have also sought to break the results down by UK region. As reported in the table below, expansion benefits all regions, albeit to varying degrees. The biggest gains are reported for London and the South East.

Table 1 Regional growth effects

	Cumulative net impacts 2024-2050, £m NPV		Cumulative net impacts 2024-2050, per head of population (£)		Share of cumulative impact		Annual impacts in 2050, £m	
	2R+	3R	2R+	3R	2R+	3R	2R+	3R
North-East England	544	1,259	201	464	3%	2%	67	384
North-West England	1,985	4,522	261	595	9%	9%	244	1,357
Yorkshire & the Humber	1,524	3,445	273	616	7%	7%	181	994
East Midlands	1,479	3,304	296	662	7%	6%	175	959
West Midlands	1,771	3,982	291	654	8%	8%	213	1,169
East of England	2,163	4,972	334	769	10%	10%	249	1,380
South-East England	3,386	7,688	357	811	16%	15%	399	2,208
South-West England	1,527	3,486	263	600	7%	7%	187	1,035
Wales	652	1,498	206	473	3%	3%	80	440
Scotland	1,407	3,212	258	590	7%	6%	171	935
Northern Ireland	373	834	195	437	2%	2%	46	257
Greater London	4,625	13,586	517	1,519	22%	26%	471	3,165

Source: Frontier analysis

The effects on productivity are the main reason why all regions benefit. Increased openness to trade encourages greater specialisation and scale. While this takes place to a greater extent

in some regions than in others, greater productivity stimulates growth which then has knock-on effects through all regions because of interlinkages. This suggests that while London and the South East are most likely to see the direct benefit of expansion, other regions in the UK also benefit.

Taken together, both pieces of analysis – the bottom up approach and the CGE analysis – suggest that both expansion options would have a very large net positive impact on society.



Frontier Economics Ltd is a member of the Frontier Economics network, which consists of two separate companies based in Europe (Frontier Economics Ltd) and Australia (Frontier Economics Pty Ltd). Both companies are independently owned, and legal commitments entered into by one company do not impose any obligations on the other company in the network. All views expressed in this document are the views of Frontier Economics Ltd.