EXPANSION OF BRISTOL AIRPORT TO 12MPPA

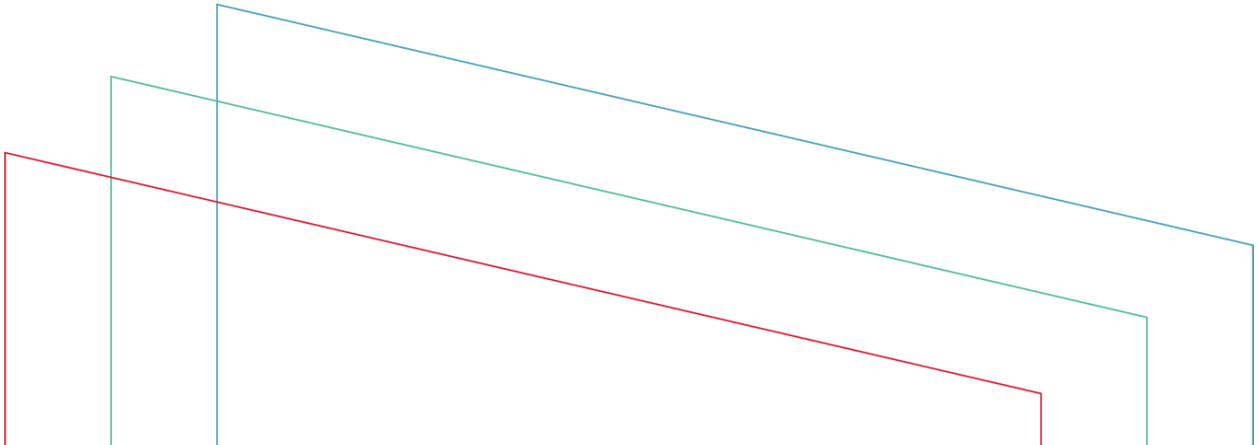
PINS REF APP/D0121/W/20/3259234

PLANNING APPLICATION REF: 18/P/5118/OUT

# PROOF OF EVIDENCE OF DR ALEX CHAPMAN

# ECONOMIC IMPACTS

**New Economics Foundation**



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# 1. INTRODUCTION

## 1.1. Personal details

1.1.1. Dr Alex Chapman is a specialist in policy impact analysis and evaluation. He has a BSc in Environmental Economics from the University of York and a PhD from the University of Southampton focused on the socioeconomic evaluation of infrastructure proposals and their climate impacts.

1.1.2. Alex works as a Senior Researcher in the Environment and Green Transition team at the New Economics Foundation (NEF). In this role Alex leads a portfolio of aviation sector work, this includes airport expansion appraisal, aviation tax policy, and jobs and just transition in aviation.

1.1.3. For the past five years Alex has also been an international consultant for the Asian Development Bank and World Bank working in the area of climate risk assessment, and appraising the alignment of infrastructure pipelines with the Paris Climate Agreement.

1.1.4. Alex's other recent projects include: acting as independent reviewer (through NEF Consulting) of the climate change aspects of the proposal to expand Southampton Airport for Eastleigh Borough Council; evaluating the business case for the proposed extension to the M4 motorway for the Future Generations Commissioner for Wales; evaluating the application to expand Leeds Bradford Airport for the Group for Action on Leeds Bradford Airport; and assessing the regional impacts of expanding Heathrow Airport for the No Third Runway Coalition.

## 1.2. Additional background

1.2.1. NEF Consulting is a wholly owned subsidiary of the New Economics Foundation. NEF Consulting were previously commissioned by the Campaign to Protect Rural England (CPRE) to review the Airport's socioeconomic case for expansion. Our report titled *Evaluating the Case for Expansion of Bristol Airport* was published in July 2019 and submitted via North Somerset Council's planning portal (CD11.12).

1.2.2. In January 2021 NEF submitted a follow up to our initial report, updated to consider addendums submitted by The Appellant for its appeal and new issues which have arisen in the intervening period since BAL's initial application was rejected (CD11.13). Our aim was to independently assess the costs and benefits of the proposed scheme. In particular, we identify, and where necessary fill in, the gaps in The Appellant's assessment with regard to the net costs and benefits of the scheme to the public including, but not limited to, its GDP impact.

1.2.3. This proof of evidence, as with our January 2021 consultation response, was commissioned by the Parish Councils Airports Association (PCAA). Additional funding to support the underpinning research described in these submissions was received in the form of a grant from the Network for Social Change Charitable Trust.

## 1.3. Scope of evidence

1.3.1. This proof of evidence covers the economic, employment, and monetised social and environmental impacts associated with the proposed expansion of Bristol Airport.

1.3.2. This proof covers evidence put forward by the Appellant in Chapter 8: Socio-economics of the Environmental Statement Addendum – Main Report (ESA),[1] and

[1] CD2.20.1. Bristol Airport Limited (2020) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum. Environmental Statement Addendum

the Economic Impact Assessment Addendum[2] (EIAA), both submitted in November 2020. Additional evidence from other chapters of the ESA and other addendums is also referenced.

1.3.3. In this Proof of Evidence, I contend that the Appellant's socioeconomic assessment of the proposed scheme contains substantial defects, omissions, and misleading outputs which make it unsuitable for consideration by Local Authorities or the Planning Inspector.

1.3.4. Furthermore, I argue that a more holistic assessment of the spectrum of future scenarios, costs and benefits, and their modelling sensitivities would highlight very significant socioeconomic risks presented by the proposed scheme. I conclude that the range and level of these risks are of a magnitude sufficient to determine that North Somerset Council's decision to refuse planning permission was responsible and legally robust.

1.3.5. In order to evidence the above contentions I assess the approaches taken by The Appellant to key economic topics and, using The Appellant's information, I am able to suggest improved approaches and 're-model' The Appellant's estimates to provide new outputs. These outputs should be considered indicative, and are designed to evidence the sensitivities contained within The Appellant's submission.

1.3.6. The Appellant's economic case is structured around the following elements:

- Economic Footprint: an analysis of employment and 'value added', looking at Bristol Airport's direct employment, the supply chain effect, and 'induced' spending (spending that occurs as a result of higher wages).
- Wider Economic Benefits: this includes an analysis of employment and GVA as a result of potential productivity gains that occur as a consequence of business travel or freight movement, and an analysis of the relationship between passenger numbers and inbound tourists.
- Socioeconomic Cost Benefit Analysis: An assessment that presents the output of travel models, with the purpose of allowing for consideration of broader economic welfare changes, reflecting whether expansion of Bristol Airport will cause key stakeholders to be better or worse off.

1.3.7. However, for simplicity the evidence supplied in this proof is broken down into:

- Economic appraisal methodology
- Sensitivity testing
- Appraisal geography
- Displacement
- Employment
- Business productivity
- Tourism
- Climate and other environmental impacts (monetised)

[2] CD2.22. York Aviation (2020). Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment Addendum

# 2. ECONOMIC APPRAISAL METHODOLOGY

## 2.1. What and when should government economic appraisal guidance be used?

2.1.1. HM Treasury's Green Book[3] provides a succinct description of economic appraisal, summarising the purpose as being to "provide objective analysis to support decision making". Green Book guided economic appraisal is mandatory for the use of significant public resources. In addition, the Green Book directs readers to further supplementary and departmental guidance on appraisal which covers greater detail and specific issues and methods which are also mandatory for the appraisal of government policies, programmes, and projects.

2.1.2. In the case of airport expansion, the relevant departmental guidance is the Department for Transport's (DfT) Transport Analysis Guidance (TAG). In relation to when TAG should be used the DfT state:

*Projects or studies that require government approval are expected to make use of this guidance in a manner appropriate for that project or study. For projects or studies that do not require government approval, TAG should serve as a best practice guide.*[4]

2.1.3. In addition to the core TAG documents, scheme appraisers should also take note of additional guidance released by the DfT in the interim between revisions to core documents. These releases advise scheme promoters of upcoming changes to guidance, and support promoters in ensuring their appraisals deal adequately with unexpected or unprecedented world events.

## 2.2. Why are economic appraisal techniques suitable for this decision?

2.2.1. Typically, a planning application by a private sector business would not fall under the remit of the Green Book and TAG guidance. However, in my opinion there are compelling reasons why this decision, to approve or reject Bristol Airport's application, does fall within the area where Green Book and TAG appraisal is not just desirable but is critical to making a public decision.

2.2.2. The proposed expansion of Bristol Airport initially required local government approval, and effectively requires central government approval via the appeals process. As such a TAG assessment is the appropriate methodology based on the DfT quote provided above.

2.2.3. In addition, while most public guidance (the Green Book, supplementary guidance, and data books) is focused on public spending decisions the actual techniques and methods that are recommended are typically best practice for assessment within their respective topic area, and the guidance on how to treat the results is often

[3] CD16.2. HM Treasury (2020) Green Book: Central government Guidance on appraisal and evaluation.
[4] CD5.30. DfT (2020) Transport Analysis Guidance. Department for Transport. Retrieved from: https://www.gov.uk/guidance/transport-analysis-guidance-tag [accessed 25/03/2021]

highly applicable, particularly for a large project such as this. This is particularly relevant where there will be the need for public spending to enable the infrastructure to operate, such as investment in surface access. This expansion is no different as money will need to be invested in the road network plus any other forms of public transport to make expansion viable.

2.2.4. TAG Unit A5-2 Aviation Appraisal[5] contains detailed guidance on the impacts that should be included in such an assessment and in turn refers readers to other sections of the TAG guidance. TAG Unit A5-2 explicitly recognises that aviation schemes are "most commonly paid for by the private sector" (p.6), the guidance is set out as "best practice for the appraisal of aviation interventions" (p.3) and its use is not limited to the Department for Transport. TAG A5-2 provides a framework for the impact appraisal of airport planning applications, from which assessments should build.

## 2.3. Why does this matter?

2.3.1. In May 2019 the UK Government declared a climate emergency. In this context it is critical that all proposals with the potential to impact on the global climate are subjected to the highest standards of appraisal. It is the government's view that a complete TAG assessment represents the highest standard.

2.3.2. In the following sections I will present evidence that the Appellant has persistently failed to meet the appraisal standards set out in the Green Book and TAG thereby leaving decision makers with an inadequate evidence base upon which to make their determination.

## 2.4. How should regional airport expansion appraisal be approached

2.4.1. In 2018 the Department for Transport commissioned and took receipt of a report called *Wider Economic Impacts of Regional Air Connectivity* by Peak Economics.[6] The commissioned report provides guidance to the DfT on how regional aviation appraisal should be approach. The report sets out three diagnostic tests which are essential to determine how an increase in regional air connectivity will impact on the economy. These are:

i. Is the traffic likely to be diverted from land modes, other air routes or generated? If generated, is it displaced from elsewhere in the UK?
ii. Is the air service under consideration likely to generate additional business travel from the region?
iii. Is it likely to generate net positive tourism to the region (i.e. the increase in tourism to the region more than compensates for any increase in outbound tourism)?

2.4.2. Through this evidence I will demonstrate the Appellant's failure to adequately examine their proposed scheme in these areas, and the likely poor performance of the scheme against this diagnostic test.

[5] CD5.30. Department for Transport (2018) TAG Unit A5-2 Aviation Appraisal
[6] Peak Economics (2018) *Wider Economic Impacts of Regional Air Connectivity*. Report to the Department for Transport. CD11.46

# 3. SENSITIVITY TESTING

## 3.1. Why is sensitivity testing important?

3.1.1. All transport infrastructure schemes and economic interventions are subject to uncertainty about future trends and are limited by current knowledge in socio-economic and environmental systems. Models and forecasts will inevitably be biased by the assumptions made when selecting model inputs.

3.1.2. An unusually uncertain environment faces the aviation sector at the present moment. Both the unprecedented global pandemic and the climate crisis amplify both the risk that past trends are not adequate proxies for future trends, and that future policy decisions will have material impacts on the functioning of the aviation industry.

3.1.3. Across research and practice one of the key tools established to support decision making in contexts of high uncertainty is sensitivity analysis. The Green Book advises:

*At a minimum sensitivity analysis and the identification of switching values should be carried out on the preferred option from the shortlist appraisal. These results must form part of the presentation of results. If the costs and benefits of the preferred option are highly sensitive to certain values or input variables, sensitivity analysis will probably be required for other options in the shortlist.*[7]

In this case we are only presented with two options, development or no development.

3.1.4. In addition, TAG Unit M4 states:

*The modeller must establish that the core scenario is robust to the key model uncertainties (model sensitivity analysis) that have been listed in the uncertainty log. This will demonstrate that the core scenario model results are significant given the model sensitivity tests, and the approach appropriate. (p.6)*

3.1.5. Further:

*There are two sources of forecast error: uncertainty in the inputs (such as size of new housing development) and error in the model parameters and specification (how these inputs propagate through the model). The practitioner should summarise all known assumptions and uncertainties in the modelling and forecasting approach in an uncertainty log. The uncertainty log will also be the basis for developing a set of alternative scenarios. The alternative scenario is used to understand the possible impact of an error in assumptions on the model forecasts. (p.2)*

[7] CD16.2. HM Treasury (2020) Green Book: Central government Guidance on appraisal and evaluation.

3.1.6. In addition to the above guidance, the DfT has released recent advice which takes into consideration the impacts of the pandemic. This advice further underscores the importance of sensitivity testing:

*Sensitivity testing is a useful way of providing insight on the potential impacts of emerging evidence, so that decision makers can have a wider sense of the potential impact of change on their considerations. As well as taking into account new evidence on long-term economic growth and carbon values, scheme promoters may wish to work with their scheme sponsors to develop their own sensitivity tests, to account for the likely impact of potential changes that may occur in the future that may be important to examine at certain stages of business case development.*[8]

## 3.2. To what extent has sensitivity testing been incorporated?

3.2.1. The EIAA cites one sensitivity test, the rate of passenger demand growth. Faster and slower rates of growth are tested. Full details of this test are set out in the Forecast Report.[9] In the EIAA the growth sensitivity scenarios are only "dealt with qualitatively" (p.3).[10]

3.2.2. The ESA also reports on a sensitivity test performed on future rates of fuel efficiency improvement.[11] This impacts on the greenhouse gas emissions of the proposed scheme. This test is detailed in Appendix 10A of the ESA,[12] but does not appear to filter through into the socioeconomic analysis in any way, primarily because carbon costs are given only a cursory assessment.

3.2.3. At one point on page 16, the EIAA refers to the application of displacement (discussed later in this evidence) as a sensitivity test.[13] Applying displacement is typically a core step in the modelling process, not a sensitivity test, as such I regard this to be a misnomer.

3.2.4. In my opinion, from the perspective of public risk and protecting the public interest, the demand growth parameter which is qualitatively tested in the EIAA is of lesser relevance to a socio-economic impact assessment. Weaker or stronger rates of passenger growth will, broadly speaking, amplify both the scheme costs and benefits equally. For example, greater numbers of air traffic movements increase the magnitude of negative impacts such as on carbon, noise and air quality, but also increase the scope for positive impacts such as inbound tourism.

[8] DfT (2020) Appraisal and modelling strategy: A route map for updating TAG during uncertain times. Department for Transport.
[9] CD2.21. York Aviation (2020) Passenger Traffic Forecasts for Bristol Airport to Inform the Proposed Development to 12 mppa
[10] CD2.22. York Aviation (2020). Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment Addendum
[11] CD2.20.1. Bristol Airport Limited (2020) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum. Environmental Statement Addendum
[12] CD2.20.6. Bristol Airport Limited (2020) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum. Environmental Statement Addendum Volume 2: Technical Appendices 10A-10C
[13] CD2.22. York Aviation (2020). Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment Addendum

3.2.5. What is of concern to the public is the relative magnitude of the costs compared to the benefits of each additional air traffic movement, and each additional passenger. Effectively none of the parameters to which these outputs are highly sensitive have been subjected to any testing.

3.2.6. Overall there has been a critical failure to apply proper sensitivity testing in the appraisal process and in this regard the Appellant fails to meet government guidance.

## 3.3. What is missing?

3.3.1. In my experience, there are four impact areas which the relative merits of airport expansion as most sensitive to: job creation potential, carbon costs, business productivity, and tourism impacts. All of these outputs are subject to either high policy uncertainty or forecast uncertainty beyond just passenger growth. All of these outputs are also highly influential in the overall picture of the scheme's costs and benefits.

3.3.2. All four of these parameters have been significantly impacted by the Covid-19 pandemic, as I will set out in detail below. In my opinion, it is necessary to subject the model parameters underpinning these outcomes to sensitivity or scenario analysis.

3.3.3. So significant have been the recent changes in some of these areas that it may also be necessary to update the parameters which produce the core scenario used in the Appellant's case.

3.3.4. Without sensitivity testing I regard the proposals as holding very significant un-explored socioeconomic risk to the UK public. These risks include:

- That the proposed scheme will have a net-negative impact on the number of jobs in the local, regional, and national economy, leading to the hardships of unemployment.
- That the proposed scheme will do inordinate and disproportionate damage to the climate leading directly to social costs in the form of either (i) the social damage of climate breakdown including flooding, heatwave, agricultural losses, and health impacts, or (ii) excessive decarbonisation costs to government, regions and sectors in order to compensate for the carbon 'overspend' at Bristol Airport.
- That the proposed scheme will produce no business productivity benefits at all, potentially resulting in a benefit-cost ratio less than 1.0 and a negative net present value to the public.
- That the proposed scheme will damage the health of the local economy of Bristol and North Somerset by increasing cash flows out of the area.

# 4. APPRAISAL GEOGRAPHY

## 4.1. What is an appropriate appraisal geography?

4.1.1. Throughout the analysis, the report uses three key study areas, corresponding to the immediate area of the airport in North Somerset, the West of England, and a wider area of the South West & South Wales. As Bristol Airport represents core national transport infrastructure, this analysis should have incorporated a national-level study area.

4.1.2. A national study area would align with Department for Transport's Transport Analysis Guidance (TAG) which states:

*When estimating the complete extent of additionality, scheme promoters should consider a large enough geographical area to capture fully the behavioural responses of households and firms at the national level*[14]

4.1.3. While the decision not to conduct a national impact assessment is not justified by The Appellant in this Addendum, the original Economic Impact Assessment[15] stated that the majority (93%) of passengers departing from the airport live/originate from the South West Region and South Wales (p.4). While this may appropriately reflect the boundary within which the majority of airport users reside, it is not necessarily reflective of the extent of behavioural response impacts.

4.1.4. A significant number of residents of the South West and South Wales utilise airports outside of the region, particularly in the London Airport System. Indeed, page 6 of the original Economic Impact Assessment suggests that well over 50% of the short-haul flights which do not currently depart from Bristol Airport presently depart from London airports.[16] The Appellant has a stated aim of "clawing back leakage of passengers from London airports" (ESA, p.19).

4.1.5. I will later highlight that out of 2 million new passengers using the airport, The Appellant expects around 700,000 (34%) to be displaced from airports outside of the currently used study area. In my opinion, the chosen maximum appraisal geography therefore does not fully capture the behavioural responses of households and firms at the national level, as required by TAG.

4.1.6. Furthermore, Peak Economics, in their advice to the DfT states the following, in their recommendations on appraisal.[17]

*"If the regional activity is displaced then we are interested in both regional effects (as part of the re-balancing arguments) and net effects." (p.16)*

Peak Economics are clear that 'net effects' should be considered. For net effects to be analysed a larger study area is required.

4.1.7. An additional issue is that the carbon emissions of the national air travel system, their regional distribution and maximum levels, can only be co-ordinated through assessment at the national level.

4.1.8. Rather than look at the widest geographic scope, the economic assessments approach Bristol Airport's expansion as though it were a regional intervention – targeted at the West of England, and the wider South West. In my opinion this view, and the fact that the original application was considered by a local authority, does not preclude a national assessment area.

[14] CD5.30 Department for Transport. (2018). Transport Analysis Guidance (TAG) Unit A2.1 'Wider Economic Impacts Appraisal.
[15] CD2.8. York Aviation (2018) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment
[16] CD2.8. York Aviation (2018) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment
[17] Peak Economics (2018) Wider Economic Impacts of Regional Air Connectivity. Report to the Department for Transport.

4.1.9. The assessment of a regional economic intervention should typically consider the following factors:

- **Leakage** – effects outside of the target area. By choosing the study area based on capturing the majority of staff origins, the assessment is able to claim employment leakage levels at or below 1%.
- **Displacement and diversion** – where increases are offset by reductions elsewhere. The previous assessment had indicated that displacement will be a minor issue. However, following prior representations by NEF, the ESA includes a new, more developed model of passenger allocation which implies greater displacement effects. These are useful, but again are inconsistently applied in the report. I will detail a series of failures to correctly apply displacement in subsequent sections on displacement, jobs, business productivity, and tourism.
- **Deadweight/counterfactual/do-nothing scenario** – what would have happened regardless. By conducting a baseline assessment and projecting forward, there is a deadweight level to which the scheme can be compared. The assessment compares the construction of the scheme against no project going forward; however, for impacts such as aviation-associated spending it would be appropriate to consider what spending would have occurred, in other industries, if the project hadn't gone forward. This is entirely missing from the EIAA and leads to overstatement of the scheme's net job creation potential.

4.1.10. In my opinion, the geographic scope of the assessment appears chosen so as to maximise the perceived benefits of the scheme (minimising leakage, for example), while excluding key aspects from consideration (such as the displacement of employment from airports outside of the geographic scope). In addition, as mentioned above, by focusing on changes in aviation employment the assessment also excludes key deadweight comparisons, such as the indirect and induced employment effects that would result in the absence of the proposed scheme. I will discuss these issues further in the subsequent sections on displacement and jobs.

4.1.11. Failing to analyse a scheme with significant impacts on the global climate at the national level risks, in economic terms, a 'tragedy of the commons'. Local bodies eager to maximise local returns will ramp up their exploitation of a globally shared resource (in this case the earth's climate) leading ultimately to the collapse of that resource to the detriment of all in society.

4.1.12. The 'tragedy of the commons' is the primary reason why it is not appropriate for the local authority to be the single final decision maker on a scheme with a major negative impact on a globally shared resource (the climate) when there is no enforced framework on the impact pathway (the emissions). There is currently no legal framework in place which could prevent any level of emissions being deemed so high as to render the project unacceptable in the eyes of the government.

4.1.13. It is true that in the case of a scheme with extreme levels of emissions, the Secretary of State may call in the application for central government review. But this does not constitute an adequate framework for decision making. A local authority might face a planning application with £1,000 of local economic benefit, which emits 1,000 tonnes of $CO_2$, such a scheme would be very unlikely to attract the attention

of the Secretary of State due to its small scale, but common sense would suggest the local authority should refuse such an application. In doing so they would make reference to no established framework, as such as framework is absent, they would pass judgement purely based on their own sound reasoning and in the public interest.

4.1.14. In the absence of such a framework, the local authority is left to their own judgement. But there is nothing in planning legislation which precludes that authority from taking a national/international perspective, and assessing the project's impact in those terms. Indeed, it would be the responsible thing to do. This scheme's true value to the UK public can only truly be understood through assessing its impact at a national study extent. This example also highlights the importance of monetising emissions impacts, a process which allows some assessment of proportionality.

# 5. DISPLACEMENT

## 5.1. How should displacement be approached?

5.1.1. A critical issue to understand when assessing economic impacts is that of displacement. Displacement is a particularly significant issue where transport infrastructure is concerned. An economic impact assessment that makes claims to scheme benefits must demonstrate how and why they believe that these benefits will be truly 'additional' as opposed to just involving the relocation of a good or service from one place to another. A scheme's 'true' impact is its net impact after displacement of both costs and benefits is considered - this extends to the non-economic factors as well.

5.1.2. A worst-case approach to displacement in each topic would mean assuming no displacement of negative impacts and total displacement of positive impacts. In my opinion, this approach is likely too pessimistic so determining an appropriate level of displacement is essential in order to claim benefits. In fact, DfT guidance on assessing non-transformative transportation schemes suggests that a scheme promoter should present credible evidence in order to claim anything other than 100% displacement at the appropriate geographical assessment area.

5.1.3. Transport Analysis Guidance (TAG) states:[18]

*With respect to supply-side effects of non-transport factors of production, the default assumption is 100% displacement; this applies for all types of economic modelling. The onus is on the scheme promoter to present credible evidence that the particular transport investment will affect a non-transport factor of production. If the scheme promoter is unable to present credible evidence of additionality, the particular economic impacts will be considered displaced from elsewhere. (TAG: p.4)*

5.1.4. The key non-transport factors of production described in the EIAA relate to job creation, business productivity, and tourism. The onus is on the Appellant to

[18] CD5.30. Department for Transport (2018) Transport Analysis Guidance (TAG) Unit A2.1 'Wider Economic Impacts Appraisal

demonstrate that any value created in these areas is not subject to 100% displacement.

5.1.5. In my view the Appellant has failed to meet this test, and has laid claim to creation of benefits which in fact are likely to be primarily displaced and not additional.

## 5.2. What approach has the appellant taken?

5.2.1. Product displacement is where the proposed scheme results in taking market share away from other firms or organisations within the study area. The language used by the Appellant in the EIAA indicates a somewhat backwards approach, with the expansion of the airport seeming to be considered the base case, and an assessment made of the displacement that would occur were the airport to be constrained to 10 million. Despite this, the numbers do seem more reasonable than those presented in the original planning application.

5.2.2. The ESA states:

*8.3.3 ...72% of the growth in passenger demand that would have occurred if 12 mppa was consented at Bristol Airport is estimated to be displaced to airports outside the region (such as Heathrow), or chooses [sic] not to fly. 28% is estimated to be displaced to airports in the region.* (p.117)

5.2.3. This can be more accurately stated as: "If 12 mppa is consented, then 28% of the growth will be displaced from regional airports, and up to 72% will be displaced from other airports."

5.2.4. The ambiguity is unfortunate as it once again leaves open that, at the national level, up to 100% of the growth is displaced. However, the displacement modelling, reported in the EIAA indicates that the total level of displacement from other airports is 62%, giving us a split of passengers (Table 1).

*A significant majority of passengers that cannot use Bristol Airport if it were constrained to 10 mppa (around 62%) would travel via another airport* (EIAA: p34)

*Table 1: Displaced and additional passengers* [19]

| | Proportion | Passengers (Annual) |
|---|---|---|
| Displaced from in-region airports | 28% | 560,000 |
| Displaced from out-of-region airports | 34% | 680,000 |
| Additional 'new' passengers | 38% | 760,000 |

5.2.5. With the displacement rates shown in Table 1 it is possible to assess net impacts at the regional and national levels.

5.2.6. The Appellant also has access to data deriving from a more granular assessment of the different regions and airports which are likely to lose out (as shown in Table 2). This data is presented by the Appellant in Appendix 10B to the ESA.

[19] BAL statements and NEF calculations

*Table 2: Displaced passengers in 2030*[20]

| Pax, nearest 1,000 | Passenger change (Annual) | Proportion of all displaced passengers |
|---|---|---|
| Bristol | 2,000,000 | n/a |
| Cardiff Airport | -291,000 | 23.5% |
| Newquay Airport | -42,000 | 3.4% |
| Exeter Airport | -178,000 | 14.3% |
| Bournemouth Airport | -27,000 | 2.2% |
| Heathrow Airport | -154,000 | 12.4% |
| Gatwick Airport | -108,000 | 8.7% |
| Birmingham Airport | -178,000 | 14.4% |
| Luton Airport | -74,000 | 5.9% |
| Stansted Airport | -37,000 | 3.0% |
| Undefined out-of-region airports[21] | -151,000 | 13.9% |

## 5.3. Issues with the Appellant's approach

5.3.1. The figures in Table 2 allow a far more granular assessment of displacement, rather than applying a simple factor to the outputs - with this data we can understand the distributional impacts of the expansion as well.

5.3.2. Distributional impact analysis is described as a "mandatory" component of transport appraisal in TAG Unit A4.2 (p.4).[22] As such it is essential that the Appellant conduct this analysis.

5.3.3. The Appellant has not conducted any distributional analysis. Nor has the appellant carried through the data they hold on granular displacement into the core outputs of the EIAA, notably aviation jobs and GVA, as well as tourism impacts. Yet the impact of each passenger gained/lost is different in different UK regions and at different UK airports, this must be considered in order to achieve a reasonable forecast of aviation job impacts.

## 5.4. Re-modelling displacement

5.4.1. In order to highlight the issues with the Appellant's failures in this regard we have conducted our own indicative assessment. We have taken the Appellant's estimates of changes in passenger numbers at airports across the UK (shown in Table 2) and multiplied these by the best available estimate of the number of jobs per passenger at each airport and the GVA per job at each airport. We considered it disproportionate to attempt to construct localised GVA multipliers for each airport for the conversion of GVA footprint into total GVA, so have used the simplified assumption that such multipliers will be equivalent to those presented for Bristol Airport.

[20] Data from CD2.20.6. Bristol Airport Limited (2020) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum. Environmental Statement Addendum Volume 2: Technical Appendices 10A-10C, Table 10B.1

[21] The reporting of the displacement data leaves approximately 8% of passengers unaccounted for, mostly from non-regional airports.

[22] CD5.30. Department for Transport (2020) Transport Analysis Guidance (TAG) Unit A4.2: Distributional Impact Appraisal

5.4.2. Our results, shown in  This feature emerges because other airports in the region, such as Cardiff airport, produce far more jobs per passenger than Bristol, and these airports are set to lose out on passengers as a result of the proposed scheme.

5.4.3. Our calculations suggest that the proposed scheme would produce only 24 direct aviation jobs and only 162 total aviation-related jobs if assessed at the national extent, also shown in Table 3. This figure is low because many of the out-of-region airports impacted by the scheme also produce more jobs per passenger than Bristol. These figures do not include jobs lost outside of aviation as a result of diversion of spending away from non-aviation sectors.

5.4.4. In the subsequent jobs section of this proof I will discuss additional issues with the Appellant's jobs estimates which further reduce their likely magnitude.

5.4.5. Table 3, demonstrate that a proper implementation of the Appellant's own displacement figures would likely significantly reduce the 'after displacement' scheme economic impacts. Our figures imply a 24% reduction in the number of aviation-related jobs created and an 8% reduction in GVA at the South West and South Wales scale. This feature emerges because other airports in the region, such as Cardiff airport, produce far more jobs per passenger than Bristol, and these airports are set to lose out on passengers as a result of the proposed scheme.

5.4.6. Our calculations suggest that the proposed scheme would produce only 24 direct aviation jobs and only 162 total aviation-related jobs if assessed at the national extent, also shown in Table 3. This figure is low because many of the out-of-region airports impacted by the scheme also produce more jobs per passenger than Bristol. These figures do not include jobs lost outside of aviation as a result of diversion of spending away from non-aviation sectors.

5.4.7. In the subsequent jobs section of this proof I will discuss additional issues with the Appellant's jobs estimates which further reduce their likely magnitude.

Table 3*: Disaggregated displacement, BAL and NEF efficiency improvements*

| Airport | Economic Footprint GVA[23] (£m) | Total GVA (£m) | Direct Jobs[24] | Total Jobs | FTEs |
|---|---|---|---|---|---|
| **Bristol** | 150 | 430 | 820 | 5,560 | 4,470 |
| **Cardiff Airport[25]** | -16 | -47 | -249 | -1,686 | -1,356 |
| **Newquay Airport[26]** | -4 | -13 | -37 | -252 | -202 |
| **Exeter Airport** | -26 | -75 | -73 | -492 | -395 |
| **Bournemouth Airport** | -2 | -6 | -11 | -74 | -59 |
| **Net South West and South Wales** | **102** | **289** | **450** | **3,056** | **2,458** |
| **Appellant estimates after displacement (South West and South Wales)** | **110** | **310** | **590** | **4,000** | **3,210** |
| **Change disaggregated approach against Appellant approach** | **-7%** | **-7%** | **-24%** | **-24%** | **-24%** |
| | | | | | |
| **Heathrow Airport[27]** | -12 | -33 | -129 | -874 | -702 |
| **Gatwick Airport[28]** | -13 | -38 | -54 | -364 | -293 |
| **Birmingham Airport[29]** | -24 | -69 | -102 | -692 | -557 |
| **Luton Airport[30]** | -3 | -8 | -64 | -436 | -351 |
| **Stansted Airport** | -3 | -8 | -16 | -110 | -88 |
| **Undefined non-region airports** | -11 | -33 | -62 | -419 | -337 |
| **National aviation sector job impact** | **35** | **101** | **24** | **162** | **130** |

[23] GVA per mppa from Acuity Analysis (2020). Economic and social importance of the UK's regional airports. For Heathrow, Stansted, Bournemouth and undefined airports, a figure £75 million per mppa was used, matching Bristol (and therefore equivalent to the original displacement assumption).
[24] Direct job estimates are from various sources. Where an estimate of direct jobs per mppa figure could not be sourced, the Bristol Airport factor in 2030 (408) was used. Where current estimates could be sourced from third party documents, the same rate of job efficiency improvement as assumed by BAL was applied to applied to future years in order to arrive at a 2030 forecast.
[25] Public Policy Institute for Wales (2016). Maximising the Economic Benefits of the Welsh Government's Investment in Cardiff and St. Athan Airports.
[26] Acuity Analysis (2020). Economic and social importance of the UK's regional airports.
[27] CD11.16. Volterra (2020). Leeds Bradford Airport - Economic Peer Review
[28] Oxford Economics (2016). The Economic Impact of Gatwick Airport (implied GVA per mppa)
[29] CD11.16. Volterra (2020). Leeds Bradford Airport - Economic Peer Review
[30] CD11.16. Volterra (2020). Leeds Bradford Airport - Economic Peer Review

# 6. JOBS

## 6.1. Background

6.1.1. Table 8.8 of the ESA suggests that 35% of the economic benefits of the proposed scheme at the South West England and South Wales level rest on the economic footprint of the scheme. The footprint, direct, indirect and induced impacts are themselves primarily a reflection of the job creation of the proposed scheme. BAL states that they expect their development to create 600 (gross) new direct jobs in 2030 in the West of England, 820 (gross) jobs in South West & South Wales (Table 5).

6.1.2. BAL's assessment of the impact of displacement is also shown. BAL reduce the net jobs at the South West and South Wales level by 28% leading to a net aviation jobs impact of 590. This accounts for jobs lost at other airports in the region. It is these numbers upon which the full analysis of induced and indirect impacts rest.

## 6.2. Issues with the Appellant's approach to jobs

6.2.1. The job estimates shown by BAL represent only the expected changes in aviation sector jobs, not jobs in the whole regional economy. It is the whole-economy jobs impact that public decision makers are tasked with assessing.

6.2.2. The Appellant significant overstates the scheme's net job creation. The Appellant estimates that 38% of new Bristol Airport passengers would not fly in the absence of the scheme. This means at least a proportion of their money would likely be spent in other areas of the regional economy, hence creating jobs elsewhere. The correct displacement rate is between 28% and 66% when modelling the South West and South Wales geography. As such, at this geography the net jobs impact could be as low as 280.

6.2.3. In addition, the aviation jobs produced by the scheme are likely less than the values presented by the Appellant as a result of their incorrect approach to displacement, as discussed in my earlier section on displacement. Once disaggregated displacement is considered, as well as the displacement of jobs from non-aviation sectors, the total job creation at the South West and South Wales level falls to around 150 jobs. At the national level this figure would almost certainly be negative. Table 5 summarises these values.

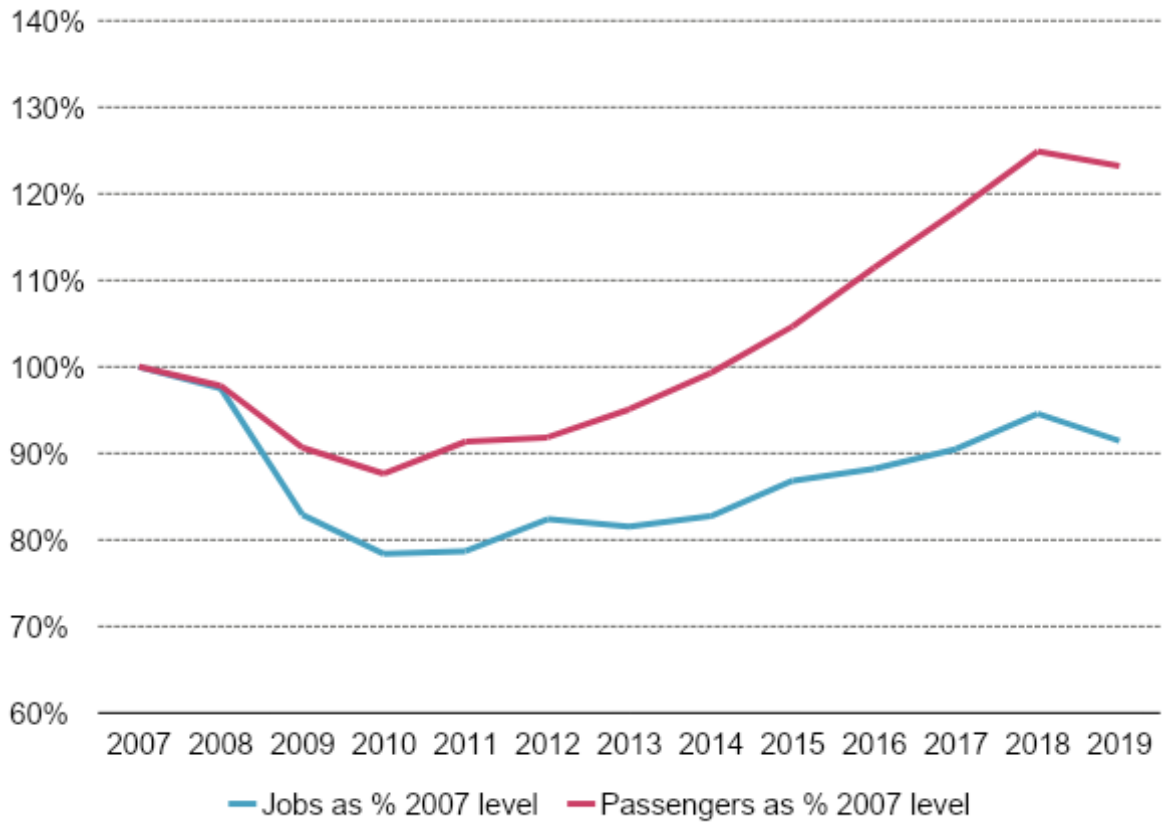
*Table 5: Job numbers projected in the original BAL application documents*

| | 2018 (West of England) | 2018 (South West & South Wales) | 2030 (West of England) | 2030 (South West & South Wales) |
|---|---|---|---|---|
| **Without development** | 2,900 | 3,900 | 3,020 | 4,080 |
| **With development** | | | 3,620 | 4,900 |
| **Change** | | | 600 | 820 |
| **Change, 28% displacement BAL estimate** | | | 600 | 590 |
| **NEF correction for disaggregated displacement** | | | | 450 |
| **NEF correction for non-aviation jobs impact (worst case, i.e. 66% displacement)** | | | | 150 |

6.2.4. Employment in the aviation sector is in flux. Over the past decade the employment intensity of the sector (i.e. the number of jobs per passenger) has been falling consistently over time (Figure 2) as the sector utilises automation and other efficiency improving measures to reduce employment costs. Indeed, the job intensity of the sector fell by around 2.6% per year between 2001 and 2018.[31] In addition, as has been widely reported in the press, airlines and airports have been making significant redundancies and pay cuts through the Covid-19 crisis.

6.2.5. As an airport increases in size, its employment intensity will generally fall as it is able to make efficiency saving on a per-passenger basis. In 2018 Bristol Airport provided 453 jobs per million passengers. The aviation sector at-large provided around 454 jobs per million passengers in 2018 (although this figure may not be directly comparable due to variations in how airports account for direct employment).

*Figure 2: National aviation sector jobs and passengers as a percentage of 2007 levels.*




*Source: Civil Aviation Authority and the ONS Business Register and Employment Survey*

6.2.6. BAL forecast no change in the job intensity of the airport between the 'with' and 'without' development scenarios. Expansion would very likely facilitate greater returns to scale – we would expect to see a difference between these scenarios.

[31] NEF analysis based on BRES employment data and CAA airport data. For more details see: Chapman et al. (2020) Crisis support to aviation and the right to retrain. New Economics Foundation. Available at: https://neweconomics.org/2020/06/crisis-support-to-aviation-and-the-right-to-retrain CD11.47

6.2.7. Further, BAL forecast only a very limited decline in job intensity resulting from automation and efficiency enhancement over time. In the 'without development' case, job intensity falls just 10% between 2018 and 2030. This represents a very optimistic view of future developments in the aviation sector, which as cited above, has seen job intensity declining at 2.6% per year in recent years. This trend has likely increased significantly in the past 12 months as airlines and air support services have consolidated operations through the pandemic. NEF modelling utilising data on recent job trends estimates the likely job intensity at BAL would be 16% lower in 2030 than forecast by The Appellant (Table 6).

6.2.8. As job intensity declines resulting from automation and sector efficiency enhancements apply in both the 'with' and 'without' development cases adjusting for this inconsistency may have a modest impact on the economic footprint. However, what this does imply is that The Appellant is significantly overstating the future economic footprint and job creation potential of the airport as a whole. The Airport's expansion would in fact create very few truly 'new' jobs as the majority of the jobs created would simply offset jobs likely to be lost to automation and efficiency gains.

*Table 6: Different estimates of aviation job intensity based on job creation at the South West England and South Wales geography with and without development*

| | | 2018 | 2030 | Change |
|---|---|---|---|---|
| **Implied by BAL application** | **Without development** | 453 | 408 | -10% |
| | **With development** | 453 | 408 | -10% |
| | **Change** | N/A | 0% | |
| **NEF modelling based on recent sector trends** | **With development** | 453 | 341 | -25% |
| **Change against BAL application 'With Development' scenario** | | N/A | -16% | |

6.2.9. Further uncertainty is created by the pandemic context. According to NEF analysis, in the year between 2008 and 2009, immediately after the financial crisis, the number of jobs per passenger in the UK aviation sector fell by 8.3%.[32] It seems likely that such a trend could be seen again following the Covid-19 pandemic.

6.2.10. For example, on the 18th May 2021, a BBC New television report covering Bristol Airport described the Airport's introduction of cleaning robots referred to as 'Bertie bot'. The aim of this change was to reduce the density of people in the airport, and hence to reduce the virus transmission risk. These robots are a good example of the sorts of automation which might be accelerated by the pandemic.

6.2.11. Given the impact of the pandemic on aviation sector job production, and what appears to be a highly optimistic forecast for job creation from The Appellant, sensitivity scenarios should have been developed and tested to support decision makers in understanding the risks and uncertainties inherent in the business case.

[32] Chapman et al. (2020) Crisis support to aviation and the right to retrain. New Economics Foundation. Available at: https://neweconomics.org/2020/06/crisis-support-to-aviation-and-the-right-to-retrain

# 7. BUSINESS PRODUCTIVITY

## 7.1. Business productivity context

7.1.1. Table 8.8 of the ES Addendum suggests that 45% of all of the scheme benefits at the South West England and South Wales level depend on the business productivity uplift delivered by the expansion.

7.1.2. This is despite the latest data showing that only around 15% of flights departing Bristol Airport are for business purposes. The proportion of travellers flying for business at Bristol Airport has fallen from a high of 24% in the year 2000.[33]

7.1.3. Page 6 of the EIAA recognises that business use of internet communication has increased "massively" during the pandemic, but then makes the unsubstantiated claim that business behaviour will return to the pre-pandemic normal before the time period of the assessment conducted.

7.1.4. The Appellant has not, and likely cannot, substantiate its claim that business behaviour will return to a pre-pandemic baseline. This is due to the unprecedented nature of the crisis and the novel nature of the technologies which have gained popularity.

7.1.5. McKinsey note in a recent report that business air travel in the UK has never recovered to its level prior to the 2008 global financial crisis.[34] The present crisis has features which are more likely to drive businesses away from air travel than the crisis seen in 2008 did. It is also worth noting that this same report from McKinsey calls for the sector to "revisit flight economics".

7.1.6. Many sources suggest remote working is here to stay.[35] [36] [37] Airline executives, such as at Star Alliance,[38] Delta,[39] and Lufthansa[40] have stated their expectation that the business travel market segment will shrink permanently by between 10% and 30%. Aviation sector consultancy IdeaWorks have released a report projecting a 19% to 36% decline in the size of the business air travel segment.[41] Furthermore, a report by McKinsey reviewing the vulnerability of the business air travel sectors of different developed nations suggests the UK's sector is the most vulnerable of all 10

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[33] Data from the Civil Aviation Authority Passenger Surveys. https://www.caa.co.uk/data-and-analysis/uk-aviation-market/consumer-research/departing-passenger-survey/survey-reports/

[34] https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/back-to-the-future-airline-sector-poised-for-change-post-covid-19

[35] The Wall Street Journal (2020), Remote Work is Here to Stay. Bosses Better Adjust. Available at: https://www.wsj.com/articles/remote-work-is-here-to-stay-bosses-better-adjust-11596395367 [Accessed on 04/01/2021]

[36] Institute of Directors (2020) Home-working is here to stay, new IoD figures suggest. Available at: https://www.iod.com/news-campaigns/news/articles/Home-working-here-to-stay-new-IoD-figures-suggest [Accessed on 04/01/2021]

[37] McKinsey & Company (2020) What's next for remote work. Available at: https://www.mckinsey.com/featured-insights/future-of-work/whats-next-for-remote-work-an-analysis-of-2000-tasks-800-jobs-and-nine-countries [Accessed on 04/01/2021]

[38] https://www.ft.com/content/867a5342-c94c-43f6-9783-a817443c9471

[39] https://www.wsj.com/articles/covid-19-pandemics-impact-on-business-travel-hitting-local-economies-11610879401

[40] https://www.flightglobal.com/strategy/lufthansa-chief-says-fleet-and-failures-can-offset-corporate-travel-slump/142730.article

[41] IdeaWorks (2020) The Journey Ahead: How the pandemic and technology will change airline business travel. December 2020

nations assessed, with only 23% of the UK's business travel market categorised in its 'early rebounders' group, and 49% in the 'longer-term disrupted' group.[42]

## 7.2. Issues with the Appellant's approach to business productivity

7.2.1. Given the exceptional reliance of the scheme benefits on the business productivity parameter, and the very high uncertainty introduced by the pandemic, this component should be subjected to sensitivity testing.

7.2.2. Bristol Airport's method for modelling the business productivity benefits was reported in the airport's original application but could not be located in the appeal documentation. We assume that the method used in compiling the appeal documentation is the same. BAL stated:

*These impacts have been calculated using a statistical relationship originally developed by Oxford Economics as part of research undertaken for Transport for London around the Airports Commission process. This relationship correlates the level of business air travel and air freight from an area to total factor productivity in the economy. It identified an econometric relationship whereby a 10% increase in combined business air travel and air freight would result in a 0.5% increase in productivity in the economy[43] (p.42)*

7.2.3. Bristol Airport are not alone in relying on this 10%/0.5% relationship (i.e. coefficient) as it has been used in a number of recent airport analyses. The frequent use of this relationship should not be taken as an endorsement of its credibility for it is in my opinion completely inappropriate for an assessment of the business impacts of airport expansion in 2021.

7.2.4. The underpinning study was published in 2013, but the data used covered the period 1980-2010.[44] The data this relationship relies on is now 11 to 41 years out of date. In addition, the data covers a distinctly different period of UK economic development, in which there was booming growth in business air travel. But the world has changed dramatically since 2010.

7.2.5. It is vital to note that other studies have produced much lower estimates of the impact of increase air connectivity and GDP. In fact, in a 2014 report, Oxford Economics themselves chose to make use of a much lower estimate.[45] In explaining why they did not use their own estimate (the 0.5% productivity coefficient) they said:

*"A much wider 2006 study, based on a cross-country statistical analysis of connectivity and productivity, derived a lower estimate of 0.07% for the elasticity*

[42] McKinsey and Company (2020) For corporate travel, a long recovery ahead. August 2020. URL: https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/for-corporate-travel-a-long-recovery-ahead#

[43] CD2.8. York Aviation (2018) Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Economic Impact Assessment

[44] Oxford Economics (2013) Impacts on the UK economy through the provision of international connectivity. CD11.48

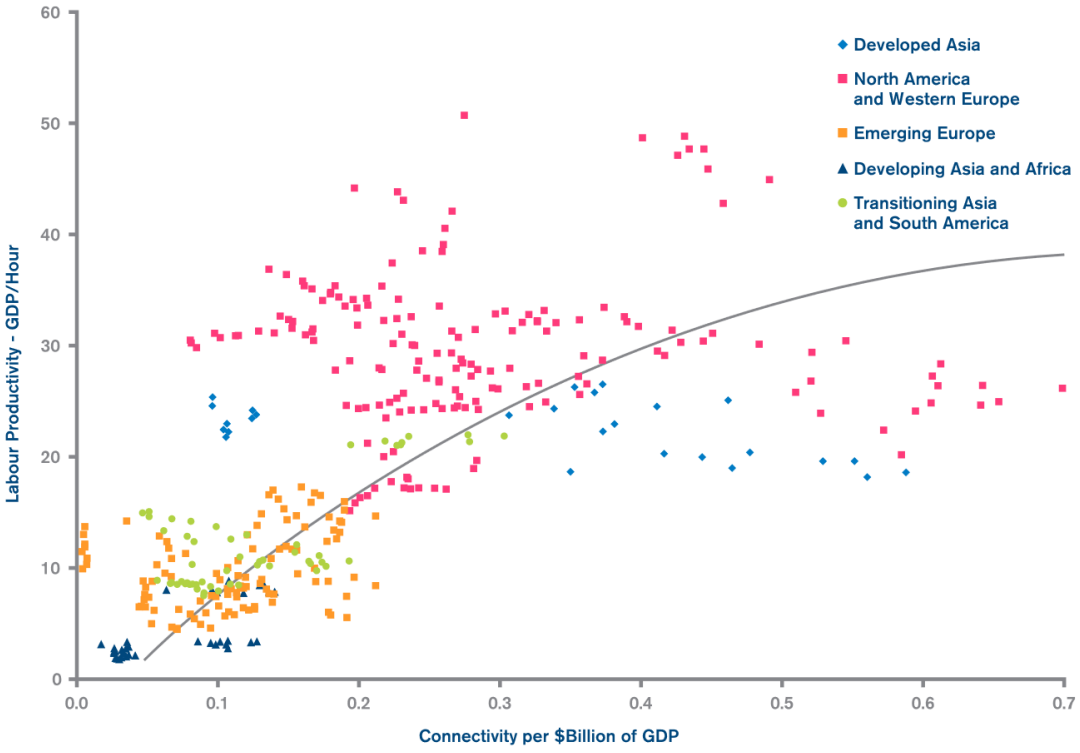
[45] Oxford Economics (2014) Economic Benefits from Air Transport in the UK. CD11.49

*between connectivity and long-run productivity. Given the uncertainty about the correct elasticity, here we adopt the elasticity of 0.07 derived from the 2006 study" (p.21)*

7.2.6. This alternative coefficient in only 14% of the coefficient applied by York Aviation. On this basis alone, the business impacts of the proposed development in 2030 at the regional level might be moderated down from £140m (post-displacement) to £20m.

7.2.7. But there are further key concerns with the approach applied. The first core problem is that of diminishing returns. Adding new connectivity to a poorly connected economy is likely to create far more business productivity than adding new connectivity to an already highly connected nation. This has been evidenced by the IATA. The table below, taken from the IATA's 2007 report,[46] shows that after a certain threshold, the positive correlation between connectivity per unit GDP and labour productivity is cut. Indeed, on the right-hand side of the figure, additional connectivity appears to correlate with lower levels of labour productivity.

**Chart 1: Labour Productivity vs Connectivity/GDP**




7.2.8. The same 2007 IATA study estimated that a 10% increase in connectivity would result in just a 0.01% rise in productivity in the UK – even less than the lower estimate used by Oxford Economics. Other countries with greater connectivity per unit GDP than the UK, such as Australia, Denmark and Switzerland actually showed a negative relationship. This suggests that adding additional connectivity to an already highly connected country could even be counterproductive to the economy.

[46] IATA (2007) Aviation Economic Benefits: Measuring the economic rate of return on investment in the aviation industry. IATA Economics Briefing No.8 CD11.50

7.2.9. Analysis by PwC shows the growth in the number of international air travel routes from the UK between 2003 and 2016, highlighting that routes from the UK to Europe grew to around 10,000 by 2016, a 107% increase over the period.[47] In absolute terms, the IATA ranked the UK as the 6th most connected country in the world as of 2019.[48] It is highly unlikely that adding additional connectivity will result in the same level of benefit seen between 1980-2010.

7.2.10. This can be evidenced using recent data. Business travel peaked in 2006, 15 years later, after a significant impact of the 2007/08 financial crisis, numbers of business travellers are only just approaching their 2006 level. This is despite very significant growth in connectivity and overall passenger numbers. The IATA suggest connectivity in the UK increased by 51% between 2009 and 2019. If business travellers are using these news routes, it is at the expense of old routes.

7.2.11. From this information it is apparent that post-2006 there was a shift in the relationship between connectivity, business air travel, and productivity benefits. This shift almost certainly relates to diminishing marginal returns. The point at which adding additional air connectivity ceases to create additional economic benefits can be referred to as the 'saturation' point. While academic research has previously shown linkages between air connectivity and growth, these studies utilise old, typically pre-2010 data. More recent analysis suggests the saturation point has been reached in most developed economies. Indeed, Arvin et al. (2015) who study the G20 countries (of which the UK is a developed group member) state:

*developed group [air] transportation intensity bears no causal relationship to economic growth in the short run (presumably because transportation intensity has reached a point of near saturation)*[49]

7.2.12. An obvious driver of diminishing returns, in addition to the saturation of the market, is the rise of high speed internet and digital communication technologies. At very least, the improvements in such technologies will mean that the 'marginal' benefit of travelling by air compared to communicating via the internet will have declined significantly. The past 18 months have been transformative in this regard, driving further shifts to digital communications.

7.2.13. In addition to the issues described above, the business productivity relationship the Appellant's model relies on was originally developed using national data and designed for an assessment of the London Airport system. The business productivity-air travel relationship is likely to be very different in London to its relationship in the South West. The model would therefore require very significant adjustment for application to the South West and South Wales region. There is nothing in the Appellant's submission which indicates that such an adjustment was made.

[47] PwC (2017) Connectivity and growth, 2017 edition.
[48] IATA (2019) Air connectivity: measuring the connections that drive economic growth. International Air Travel Association CD11.51
[49] Arvin, M. B., Pradhan, R. P., & Norman, N. R. (2015). Transportation intensity, urbanization, economic growth, and CO2 emissions in the G-20 countries. Utilities Policy, 35, 50–66. https://www.sciencedirect.com/science/article/abs/pii/S0957178715300114

7.2.14. The Appellant's business productivity methodology is fundamentally flawed because it is based on this outdated and questionable approach and its outputs should be disregarded by decision makers.

7.2.15. Given evidence from the 2007/08 financial crisis, and forecasts from industry experts, it is unlikely that business travel will even have returned to its pre-pandemic level by 2030, the assessment year, never mind growing to the extent assumed by the Appellant.

7.2.16. Aside from this there is also a basic error in the Appellant's calculations. The Appellant applies displacement to their business productivity estimates in Table 3.6 of the EIAA. The rate applied is the 28% figure for within-region displacement. The correct figure is higher, and likely nearer the 62% figure for all UK displacement. This is because benefits linked to all displaced outbound business travellers accrue within the region regardless whether the airport the business traveller flies from is within the region. Additionally, some incoming business passengers will simply be displaced from out-of-region airports to Bristol Airport and their economic impact is also not additional.

7.2.17. The figure the Appellant should have arrived at for business productivity impacts in the South West and South Wales region, net of displacement, is nearer £76m, not the £140m figure presented in Table 3.6 of the EIAA. I still reject this figure for the reasons set out above, but nonetheless it is important to point out this error.

# 8. TOURISM

## 8.1. Background

8.1.1. Table 8.8 of the ESA suggests that 19% of the economic benefits of the proposed scheme at the South West England and South Wales level rest on the tourism impact of the scheme. This is described as the totality of "the number of visitors to the relevant study areas that fly in via Bristol Airport", multiplied by average spend per trip. This is then uplifted through multiplier effects specified for the region's tourism economy and, at the final stage, a displacement factor is applied. Only inbound tourism is considered.

8.1.2. There has been a concerted effort from airports across the UK to diminish and disregard the role airport expansion plays in incentivising outbound tourism.

## 8.2. Issues with the Appellant's approach to tourism

8.2.1. The Appellant applies displacement to their inbound tourism benefit estimates in Table 3.6 of the EIAA. The rate applied is the 28% figure for within-region displacement. This is a low and optimistic figure to apply. The correct displacement figure will be somewhere between 28% and the 62% figure for all UK displacement. This is because some inbound tourism benefits accrue within the region regardless whether the airport the tourist arrives at is within the region.

8.2.2. The decision only to consider inbound (i.e. international visitor) tourism represents an important failure. As of 2019, only 11.1% of passenger journeys at Bristol Airport related to inbound international tourism.[50] The primary function of Bristol Airport is

[50] Data from the Civil Aviation Authority Passenger Surveys. https://www.caa.co.uk/data-and-analysis/uk-aviation-market/consumer-research/departing-passenger-survey/survey-reports/ CD11.52

to transport outbound UK residents on foreign tourism, in 2019 this covered 64.3% of all journeys through Bristol Airport. In other words, almost six times more passengers are on their way to overseas tourist destinations than are coming into the UK for tourism.

*8.2.3.* To remove the primary function of the airport from the appraisal in this way leaves open a very significant risk that the economic cost-benefit profile of the proposed scheme is incomplete and not fit for purpose.

8.2.4. Airport appraisals have not historically paid particular attention to economic impacts of incentivising outbound tourism. However, there is nothing in TAG, the Green Book, or EIA guidance which precludes the assessment of economic impacts from outbound tourism. Indeed, given that all three of these methodologies underscore in a variety of different ways the importance of considering all material impacts of a scheme, this might be regarded as strange.

8.2.5. The Green Book states:

*When considering proposals from a UK perspective the relevant values are viewed from the perspective of UK society as a whole… The relevant costs and benefits which may arise from an intervention should be valued and included in Social CBA unless it is not proportionate to do so. The priority costs and benefits to quantify are those likely to be decisive in determining the differences between alternative options. (Green Book, 5.7)*

8.2.6. The balance between outbound and inbound tourism, and the material negative economic impacts of outbound tourism are in fact critical to appraising a scheme. This is reflected in the 2018 report provided to the DfT by Peak Economics which sets out the following question as one of three principle diagnostic tests of the economic impact of regional airport appraisal:

*"Is it likely to generate net positive tourism to the region (i.e. the increase in tourism to the region more than compensates for any increase in outbound tourism)?"*[51]

This test cannot be run with the information provided by the Appellant.

8.2.7. One reason why outbound tourism may have been of lesser concern to the UK government is that, at the national level, outbound and inbound tourist travel is more balanced. In 2019, 46.3% of flights related to outbound tourism, and 28.2% of flights related to inbound tourism, a ratio of 1.64. The equivalent ratio at Bristol Airport is 5.79. This significantly different local context is important.

8.2.8. Tourism impacts are considered by BAL under the category 'wider impacts'. TAG guidance on assessing wider impacts underlines the importance of considering local context:

*The economic impacts of transport investments are context specific; the type and magnitude of economic impacts which occur will depend upon the scheme type and more importantly the local attributes*[52]

[51] Peak Economics (2018) Wider Economic Impacts of Regional Air Connectivity. Report to the Department for Transport.
[52] CD5.30. DfT (2020) Transport Analysis Guidance. Department for Transport.

8.2.9. Given the local context of significant imbalance between outbound and inbound tourists it does not seem acceptable that the Appellant has made no quantification of this impact.

8.2.10. Quantification is eminently possible. The simplest approach would be to reverse the logic applied to calculating the benefits of inbound tourism. NEF have suggested methods for doing this.

8.2.11. Following a similar debate around the application for expansion of Leeds Bradford airport Leeds Council commissioned Volterra as independent reviewers. NEF had significant differences of opinion with Volterra's experts, and in our submissions we highlighted fundamental errors of understanding demonstrated by Volterra's experts. However, Volterra were in agreement with NEF that outbound tourism impacts could be calculated, and were likely of sufficient magnitude to at least cancel out all economic benefits of inbound tourism.[53] Table 1, on page 6 of the report, suggests the net present value of outbound tourism resulting from the scheme at the Leeds City Region was around -£533m, compared to inbound tourism benefits of £346m.

8.2.12. This finding directly contradicts the claim by the Appellant, BAL, that the negative economic impacts of outbound tourism are immaterial to this decision. The main points made by The Appellant are outlined and factchecked below.

[53] CD11.16. Volterra (2020) Leeds Bradford Airport: Economic peer review. Volterra Partners, November 2020

## 8.3. Claim and counter claim – outbound tourism impacts

**8.3.1. Claim**

Tourism demand is asymmetrical; in the event of a decrease in price to access a region (such as through airport expansion), the equilibrium number of inbound tourists will increase, as the region becomes comparatively more attractive. Outbound tourists, however, are insensitive to price, and will travel from anywhere available resulting in a similar number of outbound journeys. This is described in 3.52 of the Economic Impact Assessment Addendum.

**8.3.2. Fact check**

This is logically flawed. The Appellant's own modelling shows that some outbound tourists *are* sensitive to price. Displacement modelling shows that 38% of the new passengers would not otherwise travel if Bristol Airport were not to expand. This implies that we can look at a tourism deficit for those 38%.

**8.3.3. Claim**

Where outbound tourists are sensitive to travel cost, they compensate through changing their travel habits. In the event of an airport expansion, we might expect more frequent, shorter trips from outbound tourists, but roughly the same level of spending. This is described in 3.55 of the Economic Impact Assessment Addendum.

**8.3.4. Fact check**

While outbound tourists have changed in the length and types of trip they are taking within their 'travel budget', it should also be recognised that people's overall travel budget has changed as well, and will continue to evolve. Household spending on holidays abroad, as a proportion of total household expenditure, has risen rapidly over the past two decades. Spending on holidays abroad rose (in current prices) from £1,608 to £2,584 between 2002 and 2020. In 2009 households spent just over 6% of their income on holidays abroad. By 2019 it was just over 10%. This proportionate growth is even larger if fixed costs such as rent and bills are controlled for, and only the 'disposable' component of household expenditure is considered.

Other disposable spending has declined in order to make room for spending on holidays abroad. Some of the most significant declines in proportionate household expenditures have been seen in non-holiday related recreation and culture, which fell from around 11.5% of expenditure to 9.5% over the 2009-2019 period. Other areas which have seen declines are sections of retail, such as clothing and footwear (down from 5.5% to 4.8% over the period). Many factors have undoubtedly influenced these shifts and further research is needed to better understand cause and effect.

If passengers were not travelling overseas they would spend a proportion of this money elsewhere in the regional economy, likely on some other form of recreational or leisure-related purchase. It is correct to say that some of this spending could take place outside of the South West and South Wales region, and some of it might just be put away as savings, but almost certainly not all of it.

**8.3.5. Claim**

Outbound tourists engage in spending within the UK economy prior to making their trip. This is described in 3.57 of the Economic Impact Assessment Addendum.

**8.3.6. Fact check**

This is a red herring and one which is too often repeated in airport appraisal processes. Holiday preparation spending in the local economy would be subject to near 100% displacement if individuals were not pursuing international travel. Indeed the presumption of 100% displacement is the default position recommended in TAG Unit A2.1.

### 8.3.7. Claim

Outbound tourists would, if unable to be tourists, still spend the money on imports from outside the region. This is described in 3.59 of the Economic Impact Assessment Addendum.

### 8.3.8. Fact check

While it is true that other purchases involve flows of money overseas, scale and proportion are important. We do not know precisely what a household would spend their money on if they were not spending it overseas. But other recreational spending will typically involve a far smaller proportion going overseas. For example, a significant proportion of the money spent on a trip to the cinema or theatre, or a local restaurant, will stay within the local economy. Some imported manufactured goods will involve a much higher proportion moving overseas, for example some electrical, computing, and communications equipment, others will involve a much lower proportion, for example a UK-manufactured car or item of furniture. It is also important to note that any total quantification of the flow of money overseas does not paint a full picture of the potential negative impacts of outbound travel. Specifically, it does not include the lost economic 'multiplier' effects which also move overseas. This represents the loss of 'knock-on' spending which would follow the initial spending, for example by the employees working in the industry from which the initial product or service was bought.

### 8.3.9. Claim

There are wider non-economic and economic benefits to access to air travel. This is described in 3.61 of the Economic Impact Assessment Addendum.

### 8.3.10. Fact check

We'd agree with The Appellant that there are positive benefits that people and regions get from access to air travel. However, if this scheme is refused, the airport will still be there, and millions of people will still be using it. Furthermore, according to the Appellant's modelling, 62% of the additional trips will still happen. As for the remaining 38%, only 50% of the UK population take any flights at all each year,[54] and further, an estimated 70% of flights are taken by only 15% of the population.[55] It is likely that the majority of the remaining 38% of flights would have been repeat trips by individuals who already take multiple leisure flights every year.

[54] See: https://www.theguardian.com/environment/2019/sep/25/1-of-english-residents-take-one-fifth-of-overseas-flights-survey-shows [accessed 04/01/2021]

[55] See: https://fullfact.org/economy/do-15-people-take-70-flights/ [accessed 04/01/2021]

*Figure 3: Household expenditure on recreation and culture (excluding holidays) and holidays abroad, as a proportion of all household expenditure.*


*Source: ONS Family Spending Workbook 1.*

## 8.4. Remodelling outbound tourism impacts

8.4.1. In order to emphasise the importance of consideration of overseas money flows resulting from newly incentivised international tourism we have calculated indicative estimates. These estimates are based on the top 20 destinations of passengers departing Bristol Airport in 2018, modelling the component of their trip spending which takes place overseas. This method is effectively the inverse of the Appellant's method to calculate inbound tourism impacts.

8.4.2. In Table 7 we first present the total spending of all new outbound international passengers, we then reduce this number by 62% to remove those passengers who BAL suggest would otherwise have arrived via another airport.

8.4.3. Our figures suggest this flow is a material consideration, and could be of a magnitude sufficient to comfortably cancel out any benefits from inbound tourism.

8.4.4. Our estimate of spending losses to outbound tourism in 2030 is £74m after displacement (Table 4), significantly higher than the proposed benefit resulting from new inbound tourism.

8.4.5. This figure might be diminished somewhat by considering flows of money out-of-region which could also materialise in the counterfactual 'without development' scenario, via spending on other products. Additionally it might be diminished by

those individuals who choose to save their money instead of spending it in the counterfactual. However, these figures are also conservative in that they have not had any multipliers applied to account for knock-on, or 'second-order', spending which also shifts overseas as a result of outbound tourism.

*Table 4: NEF estimates of overseas spending resulting from new international tourist trips facilitated by Bristol Airport expansion, cumulative figures represent net present values derived using the Green Book discount rates*

| **All new passengers** | **2030 (£m)** | **2050 (£m)** | **Cumulative 2020-2080 (£m)** |
|---|---|---|---|
| **South West and South Wales** | £194 | £145 | £6,834 |
| **38% of new passengers** | **2030 (£m)** | **2050 (£m)** | **Cumulative 2020-2080 (£m)** |
| **South West and South Wales** | £74 | £55 | £2,597 |

# 9. ENVIRONMENTAL IMPACTS

## 9.1. Background

9.1.1. At present, monetising environmental impacts is not mandated in Environmental Impact Assessment guidelines. However, it is typically considered best practice to do so for several topic areas and, for government decision making, the usage of such values is recommended or mandatory.

9.1.2. Alongside qualitative assessment of impact, monetisation can provide valuable evidence in determining if an application serves the public good.

9.1.3. In the aviation sector, some monetised environmental impacts are converted into a direct cost levied on certain stakeholders by legislation. For example, the UK Emissions Trading System converts carbon impacts into a direct cost to airlines.

9.1.4. The Appellant's Environmental Statement Addendum has only provided values for carbon costs. By not including air quality and noise costs, The Appellant essentially 'ignores' material impacts. As stated in the Green Book:

> *When there is no market price for costs and benefits to society they need to be estimated and are known as shadow prices. This is particularly important for environmental, social and health effects (p.40)* [56]

9.1.5. Given this guidance, the Appellant should provide the monetised value of impacts in the areas of noise, air quality, and climate impacts. None of these issues are adequately assessed in the EIAA. The remainder of this section deals with carbon costs.

9.1.6. The construction and operational atmospheric 'carbon dioxide equivalent' emissions ($CO_2e$ or 'carbon emissions') are presented in the ESA Technical Appendix 10A. The Central and High results from Table 10A.7 form the basis this review of the carbon emissions from aviation.

9.1.7. UK Aviation currently participates in both the United Kingdom Emissions Trading System (UK ETS) and the International Civil Aviation Organisation's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

9.1.8. The UK has enacted a cap-and-trade Emission Trading Scheme that is intended to be at least as ambitious as the EU ETS. The UK ETS maintains a free allocation for UK ETS aircraft operators that is equally as generous as the EU Aviation ETS[57]; therefore, additional emissions associated with Bristol Airport aviation operations will be directly subsidised by the UK government through an airline's receipt of an allowance of free credits.

9.1.9. Between 2013 and 2020, 82% of the sector's capped emissions allowance were granted 'for free' to aircraft operators under the EU ETS system. The free allocation of allowances reduces the economy-wide pressure on moving towards lower-carbon technologies, and represents, in effect, a subsidy to that industry. Research

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[56] HM Treasury (2018) Green Book: Central government Guidance on appraisal and evaluation. CD11.53

[57] BEIS (2020), UK ETS: apply for free allocation from 1 January 2021, Available at: https://www.gov.uk/guidance/uk-ets-apply-for-free-allocation [accessed 28/12/2020]

on the impact of carbon prices on carbon leakage and competitiveness from CCC and DfT shows that an allowance giveaway is a double-subsidy, since it incentivises not just the departing flight but an arriving one as well.[58] While it is intended that the giveaway under UK ETS will reduce by 2.2% a year from 2021, this means there will still be a giveaway of 60% of emissions allowances in 2030, 38% of the required allowances in 2040, and 16% in 2050.

9.1.10. It is currently unclear whether flights departing from Bristol Airport will be captured under CORSIA as the scheme only applies to emissions above a certain threshold and we currently do not know whether that threshold will be passed. The safest assumption is that CORSIA will not apply to this scheme.

9.1.11. There are other issues with the proposed design of CORSIA which other witnesses should cover. In short, concerns about the credibility of carbon offsetting as an approach mean it should not be considered adequate as a mitigation of the climate impact of the scheme, even if it does apply.

## 9.2. Issues with the Appellant's approach

9.2.1. The Appellant includes the cost of carbon in their 'Socio Economic Cost Benefit Analysis' but there is a section of the EIAA where the Appellant also appears to refute their own carbon cost estimates. The Appellant clearly contradicts themselves when it comes to their treatment of greenhouse gas emissions resulting from the scheme. The ESA states on page 159:

*there is inevitably an overall increase in GHG emissions compared to the 'Without Development' case, there will be a residual adverse effect of the project on the global climate*

In direct contradiction of this the EIAA states on page 35:

*the overall level of carbon emissions is unlikely to change because of constraints at a particular airport*

9.2.2. Paragraphs 4.7 to 4.11 of the EIAA (page 35) should be disregarded as the arguments put forward logically contradict other aspects of the ESA as well as best practice in aviation appraisal.

9.2.3. The carbon costs presented by The Appellant were effectively un-auditable, and confused in presentation and interpretation. As such, the carbon costings have been remodelled using best practice methodology

9.2.4. The UK's carbon prices for appraisal are awaiting updating since the government increased its emission reduction ambition. In addition to emphasising the need for sensitivity testing of carbon prices, the DfT recently updated its guidance on the appropriate carbon prices to use in appraisal, stating:

"*…until updated carbon values are available, we require analysts to illustrate the potential impact of placing a higher value on GHG emissions by:*

[58] Air Transport Analytics Ltd and Clarity Ltd (2018) The Carbon Leakage and Competitiveness Impacts of Carbon Abatement Policy in Aviation. Report to the Department for Transport. CD11.54

- *reporting scheme GHG impacts using the current published high carbon values series as a required sensitivity test (in addition to any use of central values)*
- *reporting the results of the high values sensitivity test in value for money advice for decision makers, noting in particular if the overall value for money assessment is sensitive to the carbon values applied."*[59]

9.2.5. The appellant has not run the required sensitivity test on the published high carbon values. This relates not only to presenting the carbon cost outputs at high carbon prices, but also to the demand modelling. Higher carbon prices will increase ticket prices in the Appellant's demand modelling, with knock-on effects right across the Appellant's submission.

9.2.6. The results reported in the ESA do not include the climate impacts that aircraft have during operation through their emission of non-$CO_2$ pollutants. These are omitted by the Appellant on the following reasoning:

*"The relevant expert body, the CCC, had advised that the appropriate approach at a domestic level was "not to assess or include the impact of non-CO2 effects, given the significant scientific uncertainty surrounding their scale"." (ESA, pg. 160)*

9.2.7. We are not able to find the source document for the quote attributed to the CCC. Reviewing the CCC report referenced by the Appellant, we find that the actual comments are that:

*Action is also needed on non-$CO_2$ warming effects from aviation*[60]

9.2.8. Interestingly, from the standpoint of this Inquiry, the CCC recently made a policy recommendation that there be no net expansion of UK airports.

9.2.9. There is in fact nothing in official guidance which precludes the consideration of non-CO2 effects. Indeed, it is actively encouraged. In a 2019 report the Climate Change Committee (CCC) states:

*Overall, non-CO2 effects from aviation warm the climate and approximately double the warming effect from past and present aviation CO2 emissions*[61]

*9.2.10.* Non-$CO_2$ effects are recognised by the Department for Transport (DfT) in the aviation chapter of TAG published in 2018. The DfT advises scheme appraisers on how to treat these effects stating:

*…either a qualitative assessment should be made of the non-CO2 impacts, or a quantitative assessment can be made as a sensitivity test, drawing on the latest*

[59] DfT (2020) Forthcoming change: interim carbon values for scheme appraisal. Department for Transport. Retrieved from: https://www.gov.uk/government/publications/tag-forthcoming-changes-to-carbon-values/forthcoming-change-interim-carbon-values-for-scheme-appraisal
[60] CD9.17. Committee on Climate Change (2020) Reducing UK emissions Progress Report to Parliament
[61] CD9.9. CCC (2019) Net Zero – Technical Report. Climate Change Committee.

*guidance on GWP factors and BEIS guidance on valuing greenhouse gas emissions.*[62]

*9.2.11.* The Appellant will argue that they have made a "qualitative" assessment. But other government guidance documents suggest this is far from ideal. The Department for Business Energy and Industrial Strategy (BEIS) gave the advice below in its July 2020 guidance on company reporting of greenhouse gas emissions. Note that a more extensive discussion of the merits of different approaches to measuring non-$CO_2$ is contained within the referenced document and the below quote has been shorted for brevity.

*it is clear that aviation imposes other effects on the climate which are greater than that implied from simply considering its $CO_2$ emissions alone […] A multiplier of 1.9 is recommended as a central estimate, based on the best available scientific evidence, as summarised in Table 46. […] It is important to note that the value of this 1.9 multiplier is subject to significant uncertainty.*[63]

9.2.12. However, so rapidly is scientific research in this area progressing, that these documents may already be out-of-date. The researcher cited by both BEIS and DfT in their guidance on non-$CO_2$ effects, Professor David Lee, published new research in January 2021 which provided more robust estimation of the magnitude of non-CO2 effects of aviation. This research estimates that airplane emissions currently have a net warming impact that's three times greater than their $CO_2$ emissions alone would indicate. This research was then further cited by the European Commission in their 2020 research into the same topic. In relation to Global Warming Potential, GWP, the Commission's research paper states:

*A relatively new application of the GWP, referred to as 'GWP*', produces a better temperature-based equivalence of short-lived non-CO2 climate forcers than the traditional use of GWP by equating an increase in the emission rate of a Short Lived Climate Forcer with a one-off "pulse" emission of CO2. […] The CO2-warming-equivalent emissions based on this method indicate that aviation emissions are currently warming the climate at approximately three times the rate of that associated with aviation CO2 emissions alone.*[64]

## 9.3. Re-modelling carbon costs

9.3.1. As we have quantified the impact of non-$CO_2$ effects in our calculations of monetised carbon emissions this impact can better be termed the scheme's 'monetised climate impact'.

9.3.2. For information, we also provide the total monetised carbon emissions inclusive of inbound flights as well as outbound. While responsibility for inbound $CO_2$ emissions

[62] CD5.30. DfT (2018) TAG Unit 5.2: Aviation Appraisal. Department for Transport

[63] BEIS (2020) 2020 Government greenhouse gas conversion factors for company reporting: Methodology Paper for Conversion factors Final Report. Department for Business, Energy and Industrial Strategy

[64] European Commission (2020) Report from the Commission to the European Parliament and the Council: Updated analysis of the non-CO2 climate impacts of aviation and potential policy measures pursuant to EU Emissions Trading System Directive Article 30(4). Full length report.

is usually delegated elsewhere (e.g. at the point of departure) in national emissions accounting, airport appraisal is conceptually different. An airport expansion may still incentivise creation or relocation of new inbound flights.

9.3.3. The mechanism by which this may happen is described by a recent report commissioned by the government:

*"The global aviation system is highly interconnected. Passengers typically do not just travel one-way on a single flight segment. Most journeys are round-trips, and many journeys involve multiple flight segments in either direction. If a policy increases the cost of travelling on a single segment, this will be experienced by passengers as an increase in the ticket price of their whole itinerary. Additionally, if an aircraft flies into an airport it also has to fly out again (airlines do sometimes carry out empty 'positioning flights', but flying without passengers means no passenger revenue for that flight, so these are relatively rare). These factors mean that demand reduction on a given route is likely to be symmetric across outbound and inbound flights, even when the increased costs apply in only one direction."*[65]

9.3.4. In order to determine this potential carbon cost and subsidy the following methodology was used. The carbon emissions presented in the ES were extracted for each modelled year. Other years were linearly interpolated between these dates - it is recognised that this results in a slight variance with the full scheme totals as stated by the Appellant. However, in the absence of the full annual emissions tables, this simplifying assumption shouldn't create excessive variance.

9.3.5. When presenting uncertain outcomes, it can be valuable to look at forecast ranges. For this reason, the table below presents the UK government's Central and High Forecast Carbon assessment values. These BEIS prices were calculated based on the UK Government's previous carbon reduction target of an 80% decline by 2050.

*Table 13: Carbon costs used in the carbon model*[66]

| 2018 £/t$CO_2$e | Carbon Price, Traded, Central | Carbon Price, Traded, High |
|---|---|---|
| 2017 | 5 | 5 |
| 2024 | 41 | 65 |
| 2030 | 81 | 121 |
| 2040 | 156 | 234 |
| 2050 | 231 | 346 |

9.3.6. In addition to these pricing sensitivities, it is important to split out the potential carbon costs with reference to how they might fit in an assessment of the BAL scheme, as well as what is already included within other benefits or costs.

9.3.7. The carbon cost for appraisal recognises that when a project results in the emission of carbon dioxide it will require additional abatement action somewhere else in the economy and therefore that there is a cost to wider society.

[65] Air Transport Analytics Ltd and Clarity Ltd (2018) The Carbon Leakage and Competitiveness Impacts of Carbon Abatement Policy in Aviation. Report to the Department for Transport.

[66] BEIS (2019) Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal, Data Tables 1-19, Table 3 Available at: https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal [accessed 02/09/2020]

9.3.8. We focus only on the aviation emissions of the proposed scheme, as it is the largest component and the most material to the decision making.

9.3.9. Here we present the net additional costs, considering the central and high demand scenarios presented by Bristol Airport as well as the value if non-$CO_2$ emissions are included, and if arrivals are included (Table 14).

*Table 14: Carbon Costs of Bristol Airport expansion.*

| 2020 £, Net Present Value 2020-2080, to nearest £100k | Central prices | High prices |
|---|---|---|
| Bristol Expansion | £298,500,000 | £459,700,000 |
| Bristol Expansion (High Demand) | £319,500,000 | £492,400,000 |
| Bristol Expansion + low non-$CO_2$ Factor (x1.9) | £564,300,000 | £869,100,000 |
| Bristol Expansion + low non-$CO_2$ Factor (x1.9) (High Demand) | £604,100,000 | £931,000,000 |
| Bristol Expansion + high non-$CO_2$ Factor (x3) | £895,500,000 | £1,379,100,000 |
| Bristol Expansion + high non-$CO_2$ Factor (x3) (High Demand) | £958,500,000 | £1,477,200,000 |
| Bristol Expansion + low non-$CO_2$ Factor (x1.9)+ Arrivals | £1,111,700,000 | £1,712,200,000 |
| Bristol Expansion + low non-$CO_2$ Factor (x1.9) + Arrivals (High Demand) | £1,190,300,000 | £1,834,400,000 |
| Bristol Expansion + high non-$CO_2$ Factor (x3)+ Arrivals | £1,755,300,000 | £2,703,500,000 |
| Bristol Expansion + high non-$CO_2$ Factor (x3) + Arrivals (High Demand) | £1,879,400,000 | £2,896,400,000 |
| Bristol Airport Analysis - Carbon Costs with Offsetting | £262,000,000 | This value purports to include all residual carbon costs, after the airports offsetting programme. Therefore, it represents primarily aviation emissions. The discrepancy between this value and the one presented above under Bristol Expansion is likely a result of the usage of a flat 3.5% discount rate, rather than a stepped discount rate. |

9.3.10. The costs shown in the table above can be split into those which are internalised with the aviation sector and those which are not. Those which are internalised are those which are recharged to aviation sector businesses/customers via sector legislation, principally the UK/EU ETS schemes.

9.3.11. The UK/EU ETS for aviation does not include non-$CO_2$ effects as such, between half and two-thirds of the monetised impact of the scheme's emissions is not captured or 'recouped' by regulations and therefore will be borne externally (i.e. by wider society).

9.3.12. The free allowances given away to airlines under the UK/EU ETS are planned to continue. Over the period 2020-2080 our calculations suggest around 20% of the carbon cost of the scheme which is internalised within aviation will actually be given away for free by governments, or effectively subsidised. This represents the 'direct subsidy', the value forgone by not including non-$CO_2$ effects might be considered an additional 'effective subsidy'.

9.3.13. The value of the direct subsidy given away in the form of free UK ETS carbon credits amounts to between £63m and £98m depending on the carbon and demand scenarios selected (Table 5). This compares to the Appellant's estimate of increased tax take for the UK government resulting from the scheme via Air Passenger Duty receipts of around £91m. Even when considering the carbon subsidy provided in its most limited sense (i.e. not including non-$CO_2$ effects), the subsidy is sufficient to wipe out any UK government tax gains.

*Table 5: UK government subsidies to airlines implicit in Bristol expansion.*

| 2020 £, Net Present Value, to nearest £100k | Central | High |
|---|---|---|
| Bristol Expansion | £62,700,000 | £94,900,000 |
| Bristol Expansion (High Demand) | £64,700,000 | £97,900,000 |
| Bristol Airport - Government Revenue (Benefit) | £91,000,000 | Air Passenger Duty benefit from passengers who would not travel from any other airport. Note that this is a symmetrical benefit, as consumers pay it. |

9.3.14. The above calculations can be combined to understand the different components of the scheme, which ones have already been priced into fares, which ones have no existing mitigation, and which ones are borne by other governments or are part of other nation's carbon budgets. A summary of this distribution is shown in Table 6.

9.3.15. In a high carbon cost scenario, the net present value of the carbon cost is estimated at £1.7bn in total. Of this, £364m should be internalised via the UK ETS and £95m will be subsidised by the UK government via UK ETS giveaways. Significant additional costs are not internalised including £409m in non-$CO_2$ climate impacts of departing flights, and £843m total climate impacts of arriving flights.

9.3.16. Other factors could further increase these costs. The UK government is currently consulting on change to the discount rate, which would very significantly increase the scheme's net present value in all scenarios. These issues were explored in NEF's 2021 report *Turbulence Expected: The climate cost of airport expansion.*[67]

*Table 6: Accounting for aviation emissions.*

| 2020 £, Net Present Value, to nearest £100k | $CO_2$ Included in fares via UK ETS | Subsidised $CO_2$ via UK ETS giveaways | Non-$CO_2$ effects (x1.9 multiplier) (Not priced in) | Arrivals (inc. lower non-$CO_2$ effects; partially priced in, partially subsidised) | Total $CO_2$ equivalent cost |
|---|---|---|---|---|---|
| Central Carbon Costs | £235,700,000 | £62,700,000 | £265,800,000 | £547,400,000 | £1,111,600,000 |
| High Carbon Costs | £364,800,000 | £94,900,000 | £409,400,000 | £843,100,000 | £1,712,200,000 |

[67] CD9.32. NEF (2021) Turbulence expected: The climate cost of airport expansion. New Economics Foundation

# 10. Socio-economic Cost Benefit Analysis

## 10.1. Background

10.1.1. The Appellant has presented an assessment of the socio-economic cost-benefit or 'welfare' impact of the scheme, distinct from the GVA assessment. While this is good to do this particular assessment is unfortunately misleading in its conclusions, as it fails to be sufficiently holistic or to clearly articulate the relationships between the beneficiaries of the benefits. Further, several aspects of the methodology are either misapplied or insufficiently defined and the impacts selected for inclusion are selective and incomplete.

## 10.2. Issues with the Appellant's approach to cost benefit analysis

10.2.1. The assessment period for the analysis is "over a 60 year period". However, the actual period covered is unstated, leaving a reader to guess as to whether this begins in 2020 (the year the report was written), 2022 (when the airport reaches its constraints under the fast growth case), 2024 (when the airport reaches its constraints under the core growth case), 2030 (when the airport reaches 12 mppa under expansion and core growth).

10.2.2. The description of method states the use of a constant 3.5% discount rate; the correct approach based on the guidance of the time would be to use a stepped down discount rate declining to 3.0% after 30 years.[68] This has the effect of understating both costs and benefits, however the effect is greater where the real value increases in the second 30 years of the assessment period. No correction has been done to the data The Appellant has presented - however, an understatement of 1 to 1.5% might be expected if the flow of costs or benefits is approximately equal across the period.

10.2.3. In 2020, the Green Book provided updated guidance, indicating that it might be appropriate to value intergenerational impacts (such as those from climate change) at a flat 3% discount rate. Further, the government are considering reducing the discount rate applied to environmental valuation (including carbon costs) from the currently used 3.5% per year, to the value used for life and health effects, 1.5% per year (based on the 3.5% discount rate against an increase in perceived value of 2%). This announcement came in response to a 2020 review of the Green Book. The Government states its intention to commission an expert review into the application of the discount rate for environmental impacts.[69]

10.2.4. The Appellant describes four groups: passengers, airlines, the airport company, and the UK government. In addition, there is also the cost source of carbon emissions. This selection of stakeholders is confusing, it is not clear what is meant by airlines and the airport company. These shorthands can hide that the true

[68] HM Treasury (2008) Intergenerational wealth transfers and social discounting: Supplementary Green Book Guidance.
[69] CD16.4. HM Treasury (2020) Green Book Review 2020: Findings and Response.

beneficiaries are owners and/or shareholders who, in many cases are not actually UK residents. Arguably the most important stakeholder, the general public (non-passengers) is missing from the assessment.

10.2.5. Each of The Appellant's benefit/cost categories is considered below:

- Passengers: the greatest difficulty in interpretation and assessment is understanding who The Appellant means by passengers, as there are three sub-groups of passengers that are of interest: Existing passengers at Bristol, passengers switching from other airports, and new passengers who would not otherwise have travelled.
    - Surface access time and costs - the cost inputs for these appear to be calculated in accordance with good practice; however, there is a level of uncertainty in knowing exactly who The Appellant is considering for these. This should only be the 62% of the 2 million that are switching - the 10 million existing passengers don't change their travel, the 38% begin to incur travel costs as a result of their decision to start using the airport.
    - Flight time savings - again, this relates differently to switching and non-switching passengers.
    - Air fare savings - The savings as described - the difference in average fares at different airports for different destinations - accrue to the switching passengers; however, The Appellant also mentions the impact of relieving constraints on flights. This effect could impact the existing passengers. Further, and more importantly, this is a reciprocal benefit - it is a cost to airlines generally as well as the airports that have been switched away from. While stating potential air fare savings to passengers is useful in terms of specifying what transfers the development may enable it should not be presented as a pure benefit within the welfare analysis unless supported by demand elasticities that can demonstrate that the saving is not purely a transfer; instead the associated cost should be presented as well.
- Airport company - The Appellant suggests that as the airport grows it is able to realise economies of scale and therefore improve its profitability. Provided that this is the case, this component might represent a welfare improvement as The Appellant is able to deliver more 'supply' at a lower per unit cost. That they are able to profit from this implies that the airport expects to operate without much regulation of aero-charges for the duration of this assessment. This section contradicts the assessment of employment enabled by the scheme, which has the same job efficiency at both sizes.
- Airlines - The Appellant specifically calls out airlines as a beneficiary, noting that providing flights at Bristol Airport must be their best option, or the airlines would not do it. That view has some issues. Firstly, it assumes that the expansion has occurred. Within that scenario, providing flights is indeed the best option. However, Fare changes are partially symmetric – the saving made by a passenger is offset by a surplus lost to an airline when conducting analysis on a system scale. When comparing the expansion to the Do Nothing we see that for every £1 of 'air fare savings' that benefit passengers, there is a reciprocal £1 reduction in airline revenue. By only presenting one half of this the benefits 'to society' are overstated.

- Government - The APD gained from the new passengers is a cost to those passengers. Again, this is a reciprocal benefit / cost.
- Carbon - given the comments made by The Appellant in their preamble to this section it would have been beneficial to apply WebTAG principles. As they say, a proportion of carbon costs are implicitly 'priced in' in air fares, and should feed into the demand response functions. More detail on this subject is provided later in this assessment; however, in summary there are a fraction of flights that are, due to freely given allocations, not 'carbon adjusted' and there is also a requirement that analysts illustrate the potential impact of higher carbon prices while WebTAG 5-2 suggests to include non-CO2 emissions as quantitative sensitivity test.

10.2.6. In addition to these areas, it is notable that there are areas where no attempt was made to include other monetised environmental impacts. These impacts include noise and air quality; while the Environmental Statement concluded primarily Negligible or Minor Adverse impacts, the monetisation of those impacts, across 60 years, could influence the BCR of a sensitive assessment. Further, while this application is for the expansion of the airport, it is almost certain that airspace changes will occur as a result. Any proposal that may result in airspace changes requires noise to be monetised using the TAG Noise workbook.

# 11. KEY POINTS

## 11.1. Sensitivity testing

**11.1.1.** **None of the core economic parameters in the Appellant's submission appear to have been subjected to any quantitative sensitivity testing.** This is despite the appeal coming at a time of critical uncertainty and the DfT recommending sensitivity testing as a key support to robust decision making.

## 11.2. Appraisal geography

**11.2.1.** **The maximum appraisal extent is too small and fails to meet government guidance in this regard.** Given the importance of passengers and jobs at London airports to the appeal, they should have been in scope of the assessment.

## 11.3. Displacement

**11.3.1.** **The Appellant has made errors in their application of displacement to business productivity and inbound tourism impacts.** The appellant applies a 28% displacement rate when a higher rate of up to 62% was appropriate. This significantly overstates the magnitude of both impacts.

**11.3.2.** **The Appellant fails to apply disaggregated displacement estimates.** The Appellant has the necessary data to conduct a more refined displacement assessment but fails to do so. This leads to a very significant overstatement of the jobs impact of the scheme.

## 11.4. Jobs

**11.4.1.** **The Appellant assumes no returns to scale.** The job creation estimates put forward imply no returns to scale on employment will result from the expansion. This contradicts standard logic, as well as statements made later in the Appellant's

socioeconomic impact assessment which indicate that returns to scale are expected.

**11.4.2.** **The Appellant applies an unrealistic rate of future job creation potential.** The future job intensity of the airport is assumed to be far higher than historical data would suggest is realistic. This overstates the future jobs creation potential of the scheme.

**11.4.3.** **The Appellant fails to model the jobs impact of displacing spending away from non-aviation sectors.** Despite presenting modelling showing that 38% of passengers are expected to be taking new trips created by the airport expansion, the Appellant fails to test how this diversion of spending away from other industries will impact on jobs, GVA, and the local economy.

**11.4.4.** **The Appellant fails to adequately represent or test the Covid-19 pandemic impacts on aviation job creation potential**. Job creation has almost certainly declined due to automation and efficiency drives implemented in the past two years. These are not assessed in the application, and likely significantly reduce the scheme's job creation potential.

## 11.5. Business productivity

**11.5.1.** **The Appellant's estimates of business productivity should be disregarded.** The model utilised is out-of-date and completely inappropriate for the task it is put to in the EIAA.

**11.5.2.** **The Appellant fails to adequately test the Covid-19 pandemic impacts on the business impact of aviation.** The long-term decline in business travel expected means it is unlikely there are any business productivity benefits of the scheme at all.

## 11.6. Tourism

**11.6.1.** **Despite incentivisation of new outbound tourism representing the single largest impact of the scheme, no attempt is made to quantify its economic impact.** The magnitude of losses to outbound tourism is certainly more than sufficient to completely offset any economic benefits resulting from inbound tourism.

## 11.7. Environmental impacts

**11.7.1.** **The Appellant's qualitative statements on monetised carbon emissions should be disregarded.** These are not consistent with the Appellant's other analysis on carbon emissions and displacement, nor are they consistent with best-practice appraisal.

**11.7.2.** **The Appellant fails to test sensitivity to high carbon prices**. As such the Appellant fails to follow DfT guidance issued in July 2020. As carbon prices affect the demand model, this failure carries right through almost all aspects of the application.

**11.7.3.** **The Appellant fails to quantitatively monetise and test the non-$CO_2$ impacts of air travel.** If, as the latest science would suggest, the non-$CO_2$ impacts of air travel double or triple its climate impact this will result in very serious negative economic impacts. As the costs of non-$CO_2$ impacts are not recouped by the UK ETS this cost will impact on wider society either through increased costs of faster and deeper emissions reductions, or through the social costs of additional climate breakdown.

## 11.8. Socio-economic cost benefit analysis

**11.8.1.** **The Appellant's socioeconomic cost benefit analysis should be disregarded.** This section of the EIAA is so riddled with flaws, omissions, and contradictions, that it should be disregarded.

# 12. CONCLUSION

## 12.1.1. Opinion

**12.1.2.** **This scheme fails the three diagnostic tests set out in Prime Economics' 2018 report to the DfT on the appraisal of region aviation sector interventions.**

*i.* *Is the traffic likely to be diverted from land modes, other air routes or generated? If generated, is it displaced from elsewhere in the UK?*
Displacement is not appropriately modelled by the Appellant. No distributional impact assessment is conducted, nor is the assessment geography large enough to fully understand the scheme's impacts. More holistic modelling of disaggregated displacement conducted by NEF highlights that displacement caused by this scheme will likely lead to negative outcomes, including the moving of passenger departures from airports with high job production potential to an airport with low job production potential.

*ii.* *Is the air service under consideration likely to generate additional business travel from the region?*
The Appellant's modelling of scheme business impacts are not fit for purpose, including mistakes, inappropriate model design, and a lack of consideration of the pandemic's impacts. There is no credible case that there will be any benefits to business in the region which could not simply be secured through optimisation of the pre-existing routes and schedules.

*iii.* *Is it likely to generate net positive tourism to the region (i.e. the increase in tourism to the region more than compensates for any increase in outbound tourism)?*
It is very clear from the make-up of Bristol Airport's passenger base that the negative impacts of the proposed scheme's incentivisation of outbound tourism will significantly outweigh any beneficial impacts derived from increased levels of inbound tourism.

**12.1.3.** **My assessment would suggest that this appeal should be refused.** The economic assessment is not robust enough to base such an important decision on. Material economic risks and sensitivities have not been tested. My understanding is that this alone should be sufficient grounds to reject the appeal. However, our supplementary analysis demonstrates that if a more comprehensive and guidance-compliant assessment were conducted, and the Appellant's errors corrected, the proposed scheme would also represent a very poor investment from a public interest perspective. The scheme's negative impacts, including significant climate impact, are not reliably offset by a sufficiently attractive wider economic case.