



WWF-UK
Registered office
Panda House, Weyside Park
Godalming, Surrey, GU7 1XR

Tel: +44 (0)1483 426444
Fax: +44 (0)1483 426409
info@wwf.org.uk
wwf.org.uk

DISCUSSION PAPER 03: AVIATION AND CLIMATE CHANGE

Response submitted by WWF-UK to the Airports Commission

June 2013

Introduction

WWF-UK welcomes continuing engagement with the Airports Commission, to provide evidence to help the Commission assess whether additional UK airport capacity is needed. We have already provided a response to discussion papers 1 and 2 regarding aviation demand forecasting and connectivity. WWF, together with RSPB and HACAN, also commissioned a CE Delft report on *The Economics of Airport Expansion*¹ which we have submitted to the Airports Commission. This report provides the economic criteria we hope will be used in airport project appraisal. It concludes that there is no proof that greater connectivity guarantees economic growth.

WWF has worked extensively on aviation policy for over five years with a focus on the climate impact of this sector and the need to keep aviation growth within the environmental limits recommended by the Committee on Climate Change. WWF's aviation policy work also extends to the EU ETS and ICAO and we understand the importance of aligning regional and international frameworks to national aviation policy.

We believe that our research on changing business travel and meeting practices² plus extensive work with leading UK companies to reduce business flying through the One in Five Challenge³ demonstrates that UK plc does not need more airport capacity to remain profitable and competitive.

We have provided all relevant evidence to this response and have sought to answer most questions posed. Over the course of this inquiry, we would be pleased to provide further written submissions and oral evidence to the Committee as we have done for the Transport Select Committee (on airport capacity) and the Energy and Climate Change Committee (on the inclusion of international aviation and shipping emissions in the Climate Change Act).

¹ The final report can be found here:

http://assets.wwf.org.uk/downloads/economics_of_airport_expansion_march_2013.pdf

² *Travelling light: why the UK's biggest companies are seeking alternatives to flying*. WWF-UK, 2008; and *Moving on: why flying less means more for business*. WWF-UK, 2011.

³ wwf.org.uk/oneinfive



**INVESTORS
IN PEOPLE**

President: His Royal Highness,
The Prince of Wales KG, KT, GCB, OM
Chair: Ed Smith
Chief Executive: David Nussbaum

WWF-UK a charity registered in England and Wales number 1081247 and in
Scotland number SC039593, a company limited by guarantee registered in
England number 4016725. VAT number 733 761821
100% recycled paper

Response

Do you consider that the DfT CO₂ forecasts present a credible picture of future UK aviation emissions? If not, why not?

The DfT CO₂ forecasts present a worrying picture of future UK aviation emissions as the central forecast of 47.0 MtCO₂ greatly exceeds the 37.5 MtCO₂ level for aviation emissions that is consistent with the Climate Change Act, as recommended by the Committee on Climate Change (CCC). The DfT central CO₂ forecast is also significantly higher than the 31 MtCO₂e per year 'cap' recommended by the CCC as the UK share of its aviation obligations under the EU Emissions Trading System (ETS), and the basis for formally including international aviation emissions within the UK Climate Change Act⁴.

Aviation emissions are directly linked to passenger demand and, as we explained in our response to the first discussion paper on aviation demand forecasting, WWF believe that the DfT forecasts for passenger demand are overoptimistic and lack credibility, as evidenced by the repeated downgrading of DfT forecasts since 2007. WWF would therefore expect lower emissions growth to 2030 than the results shown in the DfT central forecast. In particular, the effects of market maturity, slow economic growth and rising oil prices are likely to cause the growth of activity at UK airports to slow much earlier than the DfT forecasts show.

To what extent do you consider that the analysis presented in this paper supports or challenges the argument that additional airport capacity should be provided?

WWF believes that the analysis presented in this paper **challenges** the argument that additional airport capacity should be provided. This is based on the following points:

- DfT forecasts for aviation emissions, based on constrained capacity, significantly exceed the recommended CCC aviation emissions levels consistent with the Climate Change Act. Additional airport capacity would increase forecast emissions and make it even more difficult to achieve UK climate targets, placing an even heavier decarbonisation burden on other sectors of the economy in order to compensate. WWF believes that the Commission has given insufficient attention in its analysis to the impact on other industries if the aviation sector is allowed to grow unconstrained.
- As shown in Figure 2.3, historical improvements in aircraft fuel efficiency have slowed dramatically and the Commission is correct to assume no radical step change in aircraft technology will occur by 2050. Technological improvements, especially given the low rate of fleet turnover, are therefore unlikely to keep pace with the aviation growth stimulated by additional airport capacity, leading to a net increase in emissions.
- The Commission points out that there are important questions around biofuels sustainability, potential limitations and tradeoffs and WWF agrees that the pace and timing of biofuels penetration in the aviation sector remains uncertain. Our view is that biofuels can only contribute to reducing aviation emissions in the context of constrained capacity and should certainly not be relied upon to justify additional capacity, given the issues of availability at large scale, price and competition with other sectors.

⁴ *Scope of carbon budgets – Statutory advice on inclusion of international aviation and shipping.* Committee on Climate Change, April 2012. <http://www.theccc.org.uk/publication/international-aviation-shipping-review/>

- There has so far been little progress towards a global policy framework and the ‘stop the clock’ decision to temporarily suspend aviation in ETS for non-EU carriers, as well as oversupply of allowances, has reduced its effectiveness. As a consequence, there are no convenient frameworks to ‘deal with’ the additional emissions that would result from additional capacity.
- As the Commission points out, both the CCC and the Government assume emissions pathways that include international aviation emissions, to achieve an overall emissions trajectory consistent with the 80% target contained in the UK Climate Change. That has not changed even though the Government has decided to defer a decision on inclusion until 2016. Additional airport capacity would result in a significant overshoot of aviation emissions, making it effectively impossible to achieve the aims of the Climate Change Act and would require other sectors to make much more challenging reductions (as the Commission acknowledges).

How could the analysis be strengthened, for example to allow for the effects of non-CO₂ emissions?

Although non-CO₂ emissions from aviation are important to consider, they are secondary to CO₂ emissions from aviation.

As stated in paragraph 4.3, we note that the Commission currently expects to use the DfT’s forecasting approach as the starting point for assessing future aviation demand. To enhance and supplement the DfT’s forecasting approach, WWF would like to see more sensitivity analysis conducted by the Commission, especially on the DfT’s more questionable model input assumptions regarding oil price, GDP growth and taxation (as explained in our previous submission on aviation demand forecasting).

How can we best deal with uncertainty around demand and emissions, including in relation to future carbon prices?

Given the degree of uncertainty of demand and instability in relation to future carbon prices, it will be important for the Commission to consider a range of assumptions in its sensitivity and probability analyses and to use scenario testing. It will also be important to keep recommendations from the Commission under continuous review.

What conclusions should be drawn from the analysis of effectiveness, and relative cost, of airport capacity and other abatement measures in Chapter 5? Are there alternative analytical approaches that could be used to understand these issues?

WWF has major reservations about this section of the discussion paper. It is also disappointing that a suggested NGO meeting to discuss the methodology in more detail never materialised. We consider the conclusions in this section to be very controversial and potentially dangerous, as they suggest that capacity constraint is counterproductive. Much greater transparency is therefore required if this analysis is to have credibility.

Our objections can be summarised as follows:

- There is an assumption that major UK airports will be full by 2030 and that carbon leakage will be the consequence. WWF does not believe this will occur as there is already

sufficient UK airport capacity to allow for a 60% growth in passengers and 55% growth in ATMs to 2050⁵.

- No account is taken of capacity constraint encouraging modal shift (eg greater use of High Speed Rail) and other alternatives to flying, such as videoconferencing.
- The analysis ignores price sensitivity and the extra cost of flying via a Continental hub.
- The analysis also assumes no capacity constraints at foreign hubs which WWF believes is unlikely, especially in developed countries, given existing climate change commitments.
- We strongly disagree with the statement that capacity constraint is ‘unlikely to result in a net reduction in global aviation emissions’. The assumptions behind this conclusion, such as there being an offsetting increase in other countries’ emissions as a result of UK capacity constraint, seem biased and over simplistic.

WWF also considers the whole issue of carbon leakage to be a ‘red herring’ as the Commission’s analysis shows that it accounts for a small percentage of aviation carbon, yet its importance to this discussion paper seems to be blown out of all proportion.

As regards other abatement measures, we note that according to the DfT’s Marginal Abatement Cost (MAC) curve analysis (as mentioned in paragraph 5.22 of this discussion paper), capacity constraints came out third overall in terms of abatement potential and sixth overall in terms of cost-effectiveness.

Are there examples of how other countries have considered carbon issues in relation to airport capacity planning that we should be looking at?

This is a difficult question to answer as no other country in the EU is currently considering as much additional airport capacity as we are in the UK, and therefore not in a comparable planning position. However, it is highly unlikely that the UK will be the only EU member to take action on aviation emissions given the EU-wide 2020 missions reduction target that includes aviation and Annex 1 commitments under the Kyoto Protocol to reduce CO₂ by more than 80% by 2050.

The UK is also not the only European country to experience intense public opposition to airport expansion, with France (Nantes) and Germany (Frankfurt) now seeing significant resistance to new planned or existing runways.

At a recent event hosted by WWF in Berlin, the German Environment Minister stressed the importance of including aviation emissions in national climate targets. He also said that he “wouldn’t be able to face other industries” if he did not. This suggests that Germany is also grappling with the issue of growing aviation emissions relative to falling emissions in other sectors and the need for aviation to do its fair share towards meeting climate targets. The Commission may therefore wish to consult Germany about its approach to airport capacity planning in line with meeting national climate targets.

It is also instructive to consider the consequences of poor airport capacity planning. For example, Ciudad Real was built as an overflow airport to Madrid but there has been insufficient

⁵ http://assets.wwf.org.uk/downloads/airport_capacity_report_july_2011.pdf

demand to make this airport economically viable. There are many other international examples of failing airports resulting from poor planning and overoptimistic demand assumptions⁶.

What do you consider to be the main climate risks and adaptation challenges that the Commission will need to consider (a) in making its assessment of the UK's overall aviation capacity and connectivity needs and (b) in considering site-specific options to meet those needs?

International aviation and shipping (IA&S) are the fastest growing sources of CO₂ contributing to climate change, which together could account for more than 30% of global emissions by 2030⁷. In the UK, aviation emissions have more than doubled since 1990 and passenger growth is forecast by the DfT to increase by 2% per year to 2050. Aviation must therefore do its fair share to help the UK meet its climate targets.

Above all, the Commission must consider the latest climate science when (a) assessing the UK's overall aviation capacity needs. (WWF's recommendations on connectivity have been submitted in the second discussion paper on aviation connectivity and the economy.)

A range of reports published at the end of 2012 from the World Bank⁸, the International Energy Agency⁹ (IEA), the United Nations Environment Programme (UNEP)¹⁰ and Pricewaterhouse Coopers (PWC)¹¹ show that the challenge of tackling GHG emissions is as urgent as ever. Key points from these reports show that:

- **If current trends continue, the world is currently on track for a warming far in excess of 2°C**, with the World Bank warning that *"even with the current mitigation commitments and pledges fully implemented, there is roughly a 20 percent likelihood of exceeding 4°C by 2100"* and *"if they are not met, a warming of 4°C could occur as early as the 2060s"*¹². UNEP notes in particular that current global emissions of GHGs are considerably higher than the maximum level of emissions that could be allowable in 2020 (44Gt CO₂e) to stay within a *"likely"* chance (greater than 66%) of preventing temperature increases of more than 2°C.

WWF-UK is aware that a recent article published in *The Economist*¹³ suggested that the recent apparent slowing down of average global temperatures may indicate that the climate is less sensitive to accumulations of GHGs in the atmosphere than previously thought and that therefore the high upper end of temperature increases contemplated by the Intergovernmental Panel on Climate Change's (IPCC) models (i.e. with warming in excess of +4.5°C) are less likely to occur than previously thought. Whilst this is a possibility and further research is required, this article under-estimates that recent warming may have been masked by other factors such as heat being redirected into deep

⁶ For other examples see http://www.huffingtonpost.com/Infrastructurist/the-6-most-underused-airp_b_1071584.html

⁷ UNEP, 2011, Bridging the Emissions Gap, http://www.unep.org/pdf/UNEP_bridging_gap.pdf

⁸ 'Turn Down the Heat: Why a Warmer 4°C World Must Be Avoided', the World Bank, November 2012: http://climatechange.worldbank.org/sites/default/files/Turn_Down_the_heat_Why_a_4_degree_centigrade_warmer_world_must_be_avoided.pdf

⁹ 'World Energy Outlook 2012', the International Energy Agency, November 2012:

<http://iea.org/publications/freepublications/publication/English.pdf>

¹⁰ 'The Emissions Gap Report 2012', United Nations Environment Programme, November 2012:

<http://www.unep.org/publications/ebooks/emissionsgap2012/>

¹¹ 'Too late for two degrees?', PricewaterhouseCoopers, November 2012:

<http://www.pwc.co.uk/sustainability-climate-change/publications/low-carbon-economy-index.jhtml>

¹² See World Bank report, page xiii.

¹³ 'A sensitive matter', The Economist, 30th March 2013: <http://www.economist.com/news/science-and-technology/21574461-climate-may-be-heating-up-less-response-greenhouse-gas-emissions>

oceans instead of the atmosphere, the temporary cooling impact that aerosols might be having by reflecting sunlight back into space and the fact that only looking back at temperature variations in the last 15 years could mask longer trends in warming which tend to evolve in a step-like rather than linear fashion. In addition, the latest evidence still confirms the validity of the IPCC's central estimation that a doubling of carbon dioxide in the atmosphere compared to pre-industrial levels will result in average global temperatures increasing by a range of 2°C to 4.5°C.¹⁴

- **The current concentration of carbon dioxide in the atmosphere is already unprecedented** with the World Bank noting that *“the present CO₂ concentration is higher than paleoclimatic and geologic evidence indicates has occurred at any time in the last 15 million years”*¹⁵ and UNEP observing that GHG emissions in 2010 were some 20% higher than in 2000.
- **The impact of projected levels of global warming would disproportionately impact “many of the world’s poorest regions, which have the least economic, institutional, scientific and technical capacity to cope and adapt”**¹⁶. These impacts would also severely undermine the provision of ecosystem services on which human society and the world economy are highly dependent. The World Bank notes in particular that *“in a 4°C world climate change seems likely to become the dominant driver of ecosystem shifts, surpassing habitat destruction as the greatest threat to biodiversity. (...) Ecosystem damage would be expected to dramatically reduce the provision of ecosystem services on which society depends (for example, fisheries and protection coast-line afforded by coral reefs and mangroves)”*¹⁷.
- **The reports all confirm that it is still possible to prevent temperature increases in excess of 2°C but the window of opportunity for doing so is rapidly closing**, with the International Energy Agency warning in its latest World Energy Outlook report that *“if action to reduce CO₂ emissions is not taken before 2017, all the allowable CO₂ emissions would be locked-in by energy infrastructure existing at that time.”*¹⁸ UNEP notes that even if fulfilled, current pledges made by countries to reduce their emissions of greenhouse gases by 2020 are some 8 GtCO₂e¹⁹ to 13 GtCO₂e above the level of annual emissions allowable in 2020 to stay on track for having a likely chance to meet the 2°C objective. To put this “emissions gap” into context, the emissions of China in 2010 were in the region of 10 GtCO₂e²⁰.
- **As made clear by the Stern Review in 2006²¹, taking early action to prevent temperature increase in excess of 2°C makes economic sense**, with UNEP noting in particular that *“the increased lock-in of carbon-intensive technologies will lead to significantly higher mitigation costs over the medium- and long-term”*²². This point was echoed by the IEA in its World Energy Outlook 2011 report, which warned that *“delaying action is a false economy: for every \$1 of investment avoided in the power*

¹⁴ A good summary of the latest evidence is provided in this review by Carbon Brief: <http://www.carbonbrief.org/blog/2013/04/climate-sensitivity-in-the-media-a-case-of-mistranslation-%281%29>

¹⁵ See World Bank report, page xiv.

¹⁶ See World Bank Report, page xiii.

¹⁷ See World Bank report, page xvi.

¹⁸ See World Energy Outlook 2012 Report, page 3.

¹⁹ Gigatonnes of carbon dioxide equivalent.

²⁰ See the Climate Action Tracker for country by country tracker: <http://climateactiontracker.org/countries/china.html>

²¹ The Stern Review: The Economics of Climate Change, 2006.

²² See UNEP report, page 4.

sector before 2020 an additional \$4.3 would need to be spent after 2020 to compensate for the increased emissions.”²³

It is therefore clear from a climate change science perspective that unconstrained aviation growth should be out of the question as additional airport capacity would endanger the UK’s commitments to reduce its GHG emissions.

In considering (b) site-specific options, it would be very helpful if the Commission were to calculate the additional CO₂ emissions arising from each option. Not enough independent assessment has been done to quantify emissions from each option and finding a capacity solution with the lowest emissions should be an important aim of the Commission.

In our view, at least as much attention should be given to calculating emissions from expansion as to calculating the amount of public and private investment required or to quantifying the benefits of expansion.

Future adaptation challenges for aviation as a result of climate change are likely to include more frequent disruptions due to extreme weather, greater flight turbulence and longer distances travelled as a result of changes in the jet stream.

Are there any opportunities arising from anticipated changes in the global climate that should be taken into account when planning future airport capacity?

A fair, ambitious and binding international agreement remains essential to adequately address the global nature of aviation emissions. However, given the slow progress towards a global market based mechanism to address aviation emissions through ICAO and the current weak state of ETS, strong national action to reduce aviation emissions is needed more than ever. It should not be assumed that regional or international frameworks will provide the means to offset or price the additional aviation emissions arising from an increase in UK airport capacity.

Contact	Jean Leston, Senior Transport Policy Advisor, WWF-UK
Email/Tel	jleston@wwf.org.uk
Date	June 2013

1961-2011: 50 years of conservation. WWF works in over a hundred countries to protect the natural world, tackle climate change and promote sustainable consumption.

²³ ‘World Energy Outlook 2011’, International Energy Agency, November 2011: http://www.iea.org/weo/docs/weo2011/executive_summary.pdf, page 2.