RSPB response to Discussion Paper 03: Aviation and Climate Change

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Summary
Climate change is one of the gravest threats faced by humans and wildlife. The RSPB believes that the aviation sector needs to make a fair contribution to reducing the UK's climate change emissions, in line with other sectors of the economy. As the fastest growing source of emissions, new aviation infrastructure should only be approved if it can be built and operate within the UK's legally binding climate change limits.

We believe that the Davies Commission should:

- Only recommend new aviation infrastructure if this is capable of operating within the UK's legally binding climate change limits.
- Conduct in-depth analysis into measures to limit the growth in demand for aviation and deliver modal shift to low-carbon alternatives to flying. This should include regulatory and fiscal demand management measures.
- Ensure that the analysis of the potential role of biofuels reflects the latest understanding of their carbon and other environmental impacts.

Background
The Royal Society for the Protection of Birds (the RSPB) is the largest wildlife conservation organisation in Europe. We have 1.1 million members, and own or manage approximately 135,000 hectares of land for nature conservation on 200 reserves throughout the UK.

The RSPB considers that sustainability should be at the heart of decision-making. The RSPB's policy and advocacy work covers a wide range of issues including planning and regional policy, climate change, energy, transport, and agriculture. As well as commenting on national planning policy issues, the RSPB's professional conservation and planning specialists make representations on over 1,000 items of

planning casework each year throughout the UK, including development plans and individual planning applications and proposals. We thus have considerable planning experience, including on major infrastructure projects such as airports, ports and wind farms.

Our approach to the aviation sector is underpinned by two principles: that all development should avoid unacceptable harm to wildlife, and that the UK must continue on the path to meeting its carbon budgets, as legislated for in the Climate Change Act (2008).

The RSPB considers that human-induced climate change is the greatest threat to humans and wildlife. Up to one third of land-based species on earth could be committed to extinction by 2050 if we do not act to address this problem[1]. Rapid and deep emissions cuts in all sectors are essential to avoid dangerous climate change. An urgent challenge for the UK is therefore to tackle rising carbon emissions from transport in general and aviation in particular. The Committee on Climate Change (CCC) has concluded that at least a 60% cut in domestic emissions is needed by 2030 to be on the path to secure a 90% cut (equivalent to at least 80% once emissions from international aviation and shipping are factored in) by 2050[2].

To this end, it is essential that the aviation sector makes a fair contribution towards meeting the UK's overall climate change targets. We therefore support the existing sector-specific emissions target commitment made in 2009 to limit the sector's emissions to 2005 levels by 2050 and wish to see a commitment from the current Government to adopt this. Interim targets to 2050 should also be established in order to avoid an unacceptable medium-term increase in emissions, together with robust mechanisms to ensure the sector is on track to meet both interim and final targets. The inclusion of aviations emissions into the UK's carbon budgets is necessary to facilitate this. Furthermore, a review mechanism will be needed to assess whether or not the target is fit for purpose in light of developments in climate change science, in policy, and in quantification of the impacts of aviation's non-CO2 emissions.

Since the UK airport system, in terms of planning permissions granted, is already close to the maximum number of passengers compatible with achieving the 2050 target, any growth in the sector should only be permitted when the industry has demonstrated that such growth is possible within emission limits that reflect the carbon budgets.

[1] Thomas et al. *Extinction risk from climate change*, Nature, 2004

[2] Committee on Climate Change, *Meeting the UK aviation target – options for reducing emissions to 2050*, December 2009

Any new developments must be seen as a last resort and should avoid all unnecessary damage to places of high ecological value, particularly protected areas. In the recent past, the RSPB has objected to proposals for airport developments at both Cliffe and Lydd in Kent. The Cliffe proposal, on the south bank of the Thames, would have resulted in the single biggest destruction of a Site of Special Scientific Interest, a Special Protection Area and a Ramsar site ever in the UK. Following the RSPB's 2002 campaign, Government decided not to support the Cliffe option.

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

The RSPB wishes to highlight two areas where we do not believe the DfT's forecasts accurately represent future UK emissions. The first of these is the Department's assumption in its 2013 'central' scenario that biofuels will deliver 100% greenhouse gas savings compared to kerosene. This is inaccurate as it fails to include emissions associated with the full life-cycle of biofuel production, transport and processing, including those associated with direct and indirect land use change.

We agree that any sustainable biofuels that are available should be used in those sectors of the economy with few other decarbonisation options, including aviation, shipping and heavy haulage. However, we are concerned that the availability of low-carbon sustainable biofuels is considerably lower than anticipated by the Commission.

A wealth of studies – including the UK's Gallagher Review[3] – have warned that biofuels can produce more greenhouse gas emissions than the fossil fuels they are meant to replace, in particular if the emissions from indirect land use change (ILUC) are not prevented[4,5]. One study[6] found that in the EU biofuels will provide 9.5% of transport fuel by 2020, of which more than 90% will come from food crops. When indirect land use change is taken into account, these biofuels will emit an extra 27 to 56 million tonnes of CO2 equivalent per year – the equivalent to an extra 12 to 26 million cars on Europe's roads by 2020. The report concluded that unless EU policy

[3] RFA (2008) The Gallagher Review of the indirect effects of biofuels production

[4] E.g. Plevin, R. J., O'Hare, M., Jones, A. D., Torn, M. S., and Gibbs, H. K. (2010) Greenhouse Gas Emissions from Biofuels' Indirect Land Use Change Are Uncertain but May Be Much Greater than Previously Estimated *Environ. Sci. Technol.*, , *44* (21), pp 8015–8021; *and*

[5] Hertel,T. W., Golub, A. A., Jones ,A. D., O'Hare, M., Plevin, R. P and Kammen, D. M. (2010) Effects of US Maize Ethanol on Global Land Use and Greenhouse Gas Emissions: Estimating Market-Mediated Responses, *Bioscience*, 223-231

[6] Institute for European Environmental Policy (IEEP) (2010). 'Anticipated Indirect Land Use Change Associated with Expanded Use of Biofuels in the EU: An Analysis of Member State Performance

changes, the extra biofuels that Europe will use over the next decade will be on average 81 to 167% worse for the climate than fossil fuels.

The aviation industry claims it will not use unsustainable biofuels, but already we are seeing flights planned that include palm oil in the fuel mix (e.g. Lufthansa), a feedstock which is linked to rainforest destruction. Palm oil can also be associated with substantial ILUC emissions, and, when combined with direct emissions, can have emissions of around 100kgCO_2/GJ[7]. This would provide almost no net saving compared to conventional kerosene.

Crops that can supposedly be grown on marginal land, such as jatropha and camelina, are being favoured by public policy as these have the potential to avoid displacing agricultural crops. However, yields from these crops are often only commercially viable on productive land, which means that ILUC remains a problem. Yale University has undertaken research on the use of jatropha for aviation fuel on behalf of Boeing[8]. Estimates of the lifecycle emissions of jatropha in the Yale study range from 13 to 140 kgCO_2/GJ (this compares to around 100 kgCO_2/GJ for kerosene[9]). In their scenario where they account for conversion from shrubland, jatropha can result in a 59% increase in emissions compared to fossil fuels. A separate study includes both direct and indirect land use change and estimates that lifecycle emissions from jatropha could be as high as 1956 kgCO_2/GJ[10].

Even if it proves possible to produce these crops commercially on marginal land, i.e. without ILUC taking place, there remains the question as to how much marginal land there exists globally and what other values (for people, biodiversity and carbon) this land has now and will have in the future. As an example, the Dakatcha Woodlands in Kenya, home to important wildlife species and local communities, was recently threatened with destruction as a result of European companies seeking to invest in jatropha plantations in this area[11].

While some of the carbon issues associated with biofuels are acknowledged elsewhere in the Commission paper, they are not explicitly dealt with in considering the accuracy of DfT forecasts. The CCC's assessment that biofuels will deliver 50% greenhouse gas savings is more robust in this context, but also looks to be optimistic in the light of the above evidence.

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7 Laborde, D. (2011) Assessing the Land Use Change Consequences of European Biofuel Policies,

8 Bailis, R., Baka, J.,(2010) 'Greenhouse Gas Emissions and Land Use Change from Jatropha Curcas-based Jet Fuel in Brazil', Environment, Science and Technology, 2010

[9] Imperial College London, (2003) 'The Potential for Renewable Energy Sources in Aviation'

[10] Lapola, D. M., et. al., (2010) 'Indirect land-use changes can overcome carbon savings from biofuels in Brazil', *Proceedings of the National Academy of Sciences*, , 107 (8), pp. 3388-3393

[11] See **http://www.rspb.org.uk/ourwork/casework/details.aspx?id=tcm:9-263030** for more details

Finally, any assessment of the availability of sustainable, low carbon biofuels for the aviation sector should include consideration of demand for biofuels from other sectors, including surface transport where most biofuels are currently used. Given sustainable biofuels are a restricted resource, their use in surface transport is inevitably in competition with their use in aviation. We believe that any increase in the use of biofuels in aviation must be compensated for by a decrease in their use in surface transport, through, for example, reducing the level of the Renewable Transport Fuel Obligation.

A second area of uncertainty is the air fleet model mix. While we recognise that it is difficult to model future significant structural changes in the types of planes that may be used, a large-scale shift to larger aircraft which can perform longer flights without the need to use a hub airport could have a significant impact on future emissions which currently remains unaccounted for.

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?

The RSPB believes that new airport capacity should only be considered if it can be built and operated within the UK's legally binding climate change limits. We do not consider that the analysis presented in the Commission's paper currently supports the argument that additional capacity should be provided. The Commission's paper suggests that a lack of new capacity in the UK could lead to increases in emissions, particularly in the medium term, on the basis of carbon leakage. However, we are concerned by the way this analysis has been approached and these concerns are set out below.

Firstly, we do not believe that the case has been made that UK airports are already approaching capacity and therefore imminent displacement of flights to continental hubs can be expected. There is substantial evidence that new airport capacity may not be needed that is not considered in this analysis. The Committee on Climate Change estimates that at most by 2050 our climate change limits could accommodate a 60% increase in demand for aviation[12]. Research by WWF and AEF has shown that this 60% increase could almost entirely be met by existing airport capacity, even out to 2050[13]. Specifically, this research shows that with better rail links, 25% of internal flights are easily replaceable.

[12] Committee on Climate Change (2009) 'Meeting the UK aviation target – options for reducing emissions to 2050'
[13] WWF/AEF (2011) 'Available UK airport capacity under a 2050 CO_2 target for the aviation sector'

Other possible options around best use of existing capacity should also be investigated by the Commission. For example, shifting leisure flights from Heathrow to an alternative London airport may help in reducing capacity constraints at Heathrow. Indeed, the DfT's recent aviation forecasts[14] show that Luton and Stansted are both currently operating at less than 60% capacity indicating that these airports could soak up additional leisure flights. Additional pressure could also be reduced at Heathrow by routing more direct flights to emerging markets via Birmingham and Gatwick.

Secondly, the Commission's analysis takes no account of capacity constraints in those near-continent countries to which flights are predicted to be displaced. It is unrealistic to assume that those countries do not also have limits to their own capability to expand their hub facilities including carbon constraints that will effect their own decisions on capacity. All EU countries are required to reduce carbon emissions under the EU's 2020 energy and climate change package, and have pledged to reduce emissions in line with the overarching goal of keeping global climate change to below an average increase in temperature of 2°C. Furthremore, 2030 climate targets for the EU are currently under discussion. Economy-wide carbon restrictions are therefore expected to be tighter and the aviation sector in these countries will need to play its role. In this context, there is no guarantee that near-continent hubs will be able to accept extra UK capacity and therefore that the predicted leakage will take place.

Thirdly, modal shift and alternatives to flying such as videoconferencing do not appear to have been included in the analysis. Much more consideration should be given to scenarios that take into account the possibility of avoiding the need for business travel altogether by businesses videoconferencing or using web-based technologies such as webinars and Skype. These technologies are highly likely to continue to improve, to reduce in price, become more ubiquitous and more familiar to users over the coming years. Claims that these kinds of technologies merely complement or even stimulate air travel miss the point: when there is an economic incentive (as in the current downturn) or an environmental imperative (as in a carbon-constrained future) to reduce flying, then telecommunication offers a low-carbon way for businesses to stay connected. In other words, given the right policy framework, videoconferencing and other related technologies can substitute for air travel, even if in a laissez-faire scenario it would not do so. The business financial benefits can be substantial, as air fares, hotel costs and trip insurance are avoided. Businesses who utilise these technologies can also continue to operate during major disruptions, such as volcanic ash clouds and terrorism alerts, without impact on their

[14] DfT (2013) UK's aviation forecasts

activities. The model should therefore be adjusted to reflect the impact of these potential shifts, rather than presuming that people will continue to fly at the same rate under a constrained scenario but shift their flight patterns.

Finally, rather than investing in new capacity to meet growing demand for aviation, there are a number of other demand management tools that do not appear to have been considered in the Commission's paper. The CCC have advised Government that limiting aviation growth is "likely to require policy measures to restrain demand which go beyond our central projected carbon price", either through economic measures or the planning system, to a maximum of a 60% increase in passengers (or a 55% increase in air transport movements (ATMs))[15]. Such additional instruments to limit demand growth include an additional tax on CO_2 and restrictions on the allocation of take-off and landing slots. The impacts of other regulatory and fiscal measures that could be introduced to reflect the true cost of carbon and other greenhouse gases should also be considered. These include:

- Reversing the tax exemption for aviation fuel and VAT exemptions.
- Strengthening air passenger duty (APD) or re-considering a switch to per-plane tax.
- Supporting taxes on non-CO_2 pollutants such as nitrogen oxides

It is important to note that in the context of non-CO_2 emissions, a 60% increase in demand, as discussed by the CCC, may be too generous and may mean that a smaller increase in the numbers of passengers and flights is compatible with our climate change limits. Our suggested approaches for dealing with these non-CO2 emissions are discussed in the next section.

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

The Committee on Climate Change reports that non-CO_2 emissions could have a substantial warming impact[16]. Incorporating these emissions into the analysis is therefore essential. While the Commission's paper acknowledges the role of these emissions, it fails to incorporate them into the modeling. The RSPB acknowledges the complexity of varying degrees of uncertainty and the different spatial scales at which the impacts of these emissions take place. However, we do not agree that these should therefore be excluded from any quantitative analysis – to do so risks

[15] Committee on Climate Change (2009) 'Meeting the UK aviation target – options for reducing emissions to 2050'
[16] Committee on Climate Change (2009) 'Meeting the UK aviation target – options for reducing emissions to 2050'

significantly distorting the outputs of the modeling and the conclusions that can therefore be drawn.

At the very least, the analysis could be improved if it included a scenario in which these emissions were accounted for. Recent advances in the science of aviation's non-CO_2 impacts supports previous Government practice of using a multiplier for non-CO_2 impacts based on the radiative forcing index (RFI) of 1.9 drawn from the IPCC's Assessment Report[17]. This would mean that the impact of aviation's contribution to the UK's emissions is closer to 12% than the 6% quoted at the start of the Commission's paper. The RSPB's view is that while use of a fixed RFI is imperfect given the different lifetimes of aviation's CO_2 and non-CO_2 impacts, a much greater distortion is created by failing to account for these gases altogether. Furthermore, we expect the science to continue to develop in this area, and it should become sufficiently robust to include these effects within the UK's carbon budgets within a decade. This will almost certainly require the aviation target to be tightened if other sectors are not able to make greater reductions. Such an outcome should be factored into the Commission's thinking.

The analysis should also be adjusted to reflect accurately the emissions associated with the production of biofuels, especially those arising from direct and indirect land use change emissions. The information presented in Table 5.2 that suggests that biofuels could result in emissions savings at an affordable rate is not accurate.

Furthermore, the cost-effectiveness analysis only includes the welfare costs associated with capacity constraints but not the health benefits associated with reduced noise and better air quality around constrained airports, which could be significant. The analysis is therefore currently unbalanced and should be adjusted to reflect both benefits and costs.

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

Political uncertainty and problems surrounding the European Emissions Trading Scheme have shown that the carbon price can be open to extreme fluctuations. The RSPB supports the inclusion of international aviation emissions in the European Emissions Trading Scheme, and applauds the EU's strong response to resistance from other countries to this arrangement. The EU ETS has the potential to be an important tool to reduce emissions in a cost-effective way in the long-term.

[17] Section 5.2.1, http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch5s5-2.html

However we the scheme is currently ineffective due to a collapse in the value of carbon that has been the result of the over-allocation of allowances. This and other implementation problems have meant that it has so far largely failed to reduce emissions significantly[18]. We therefore believe it is important for the Commission to allow for a very high degree of sensitivity to future carbon prices in its modelling, including the collapse of the ETS through to a fully functioning ETS which results in driving up carbon prices as is intended.

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?

When it comes to assessing the overall emissions savings and cost effectiveness of the various policy measures, according to Table 5.2, airport capacity ranks third in terms of emissions saved. However, if the full emissions of mandatory biofuels were reflected, it is likely that this would shift it's ranking to second place. Interestingly, if one excludes ATM efficiency and behavioural change - which are no-regrets options and actually provide cost savings - capacity constraints provide substantial emissions savings at a relatively low cost compared to options such as retrofitting. Furthermore, as we do not believe the emissions savings provided by the 'biofuels demonstration plant' and 'mandatory biofuels' options are likely to be accurate, 'airport capacity' would become relatively even more competitive and would probably prove the second best option after operational incentives under the MAC models.

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?

Main risks in making an assessment of the UK's overall aviation capacity and connectivity needs

Alongside questions about whether new capacity is actually necessary, and whether it would result in additional connectivity or economic growth, the principle risk the Commission needs to consider is that new airport capacity would seriously undermine the UK's chances of meeting our climate change targets. The DfT projects that CO_2 emissions from aviation by 2050 will be at least 34.7 Mt and could be up to 52.1 Mt. This range would represent an overshoot of either a sector-specific target

[18] Sandbag, *Rescuing the EU ETS from redundancy*, 2009

based on 2005 emissions or of aviation emissions (including international ones) under the UK's carbon budget system[19]. This would make it impossible to meet the aims of the Climate Change Act, since the levels of reductions required by other sectors of the economy to compensate would be unfeasible[20].

Main risks in considering site-specific options to meet those needs

As climate change becomes more severe, there are a number of site-based ecological factors that must be considered in any airport expansion plans. Climate change will make a range of species and habitats across the UK more vulnerable. The integrity of remaining semi-natural habitats and nature conservation areas will therefore become ever more vital in future years. In this context, it will be even more important to ensure that decisions on airport capacity do not cause unacceptable environmental destruction.

Other climate-induced changes to the natural environment that may affect siting include enhanced flood risk. Proposals for a new airport in the Thames Estuary, for example, would certainly need to assess the future flood risk that could be increased by sea level rise, alongside the potentially highly damaging ecological impacts arising from siting an airport in this location.

[19] Committee on Climate Change (2012) 'Statutory advice on inclusion of international aviation and shipping'
[20] David Kennedy, Committee on Climate Change, Corrected Transcript of Oral Evidence on Inclusion of International Aviation and Shipping Emissions in Carbon Budgets, Tuesday 16 October 2012