AIRPORT OPERATORS ASSOCIATION RESPONSE TO THE AIRPORTS COMMISSION AVIATION AND CLIMATE CHANGE DISCUSSION PAPER – MAY 2013

1. Introduction

UK airports are committed to tackling the combined issues of reducing carbon emissions and adapting to climate change. This paper presents the views of the Airport Operators Association, (AOA) and sets out evidence of work underway in UK airports to address the issue of Climate Change.

In launching the Aviation Policy Framework in March 2013, the Transport Secretary, the Rt. Hon Patrick McLoughlin MP, stated:

"The Government believes that aviation needs to grow, delivering the benefits essential to our economic wellbeing, whilst respecting the environment and protecting quality of life."

The AOA fully supports this view and UK airports have long demonstrated a commitment to enabling the £50 billion contribution to UK GDP, £8 billion to the UK Treasury and provision of 1 million jobs which is generated each year by the aviation industry whilst at the same time managing any local environmental issues.[1]

When this is linked with the evidence from this paper and the response from the aviation sector alliance, Sustainable Aviation (SA)[2], the AOA believes future growth in UK aviation can achieved without increasing carbon emissions. SA's response to the Airport Commission's Aviation and Climate Change Discussion Paper, endorsed by the AOA, can be found in **Appendix 2**.

2. Airports tackling carbon emissions

A number of current activities occur at some of all of the UK airports to tackle carbon emissions. These fall into the following categories: Developing and reporting airport carbon footprints; managing on-site energy usage; working with airline and air traffic control business partners to reduce aircraft emissions on the ground; and, working with local authorities and public transport organisations to deliver airport surface access strategies (we acknowledge that issues related to energy usage and airport surface access strategies are not covered directly in the Discussion Paper).

i) Developing and reporting airport carbon footprints

A large number of UK airports now publicly report on their carbon footprints. Details on this can be found from each airport website.[3] These footprints look at carbon emissions from airport energy use and in

---

[1] Figures from Oxford Economics (2011), 'Economic Benefits from Air Transport in the UK'

[2] See www.sustainableaviation.org.uk

[3] A list of airport websites can be found at www.aoa.org.uk, in the 'Go to your airport' drop down box at the top of the home page

some cases the wider emission sources from staff and passenger journeys to and from the airport. They also look at emissions from aircraft operations on part or all of their flights to and from the airport.

ii) Managing on-site energy usage

UK airports have detailed and active programmes to reduce energy consumption at airports. The range of activities this includes varies depending on the complexity of airport operations but can cover the following:

- Reviewing the performance of high energy using equipment such as heating, lighting, baggage and passenger moving equipment. Engineering departments at airports then look at options to reduce energy use of these systems through ideas such as light or movement sensors or replacement of equipment with more efficient ones.
- On airport energy efficiency programmes – much of the energy used at airports occurs from business partners rather than by the airport operator themselves. In this case many airports have energy awareness or business partner incentives to reduce energy use.
- Following the work discussed above, some airports then work with the Carbon Trust to evaluate further opportunities to reduce emissions and achieve the Carbon Trust standard.

iii) Working with airline and air traffic control business partners to reduce aircraft emissions on the ground

In June 2012 a joint aviation industry initiative called '*Reducing the Environmental Impacts of Ground Operations and Departing Aircraft - An Industry Code of Practice*' was published.[4] The AOA took on the responsibility of promoting this work across UK airports. In delivering this responsibility a template was developed to enable airports to explore the opportunities to reduce carbon emissions at their airport from introducing the procedures such as reduced engine taxi or enabling aircraft to use ground based electrical systems rather than use their own on board or ground fuel based generators.[5]

In addition to this many UK airports are carrying out on-going work with airlines and air traffic control partners to progress this code of practice through airport flight operations committee forums.

iv) Working with local authorities and public transport organisations to deliver airport surface access strategies

Surface access to UK airports is a key area where airport operators are working with local authorities, public transport organisations and other key stakeholders. In many cases this work is formalised through an airport surface access strategy. The result of this work varies from airport to airport but there are many specific cases of best practice where airports have been instrumental in encouraging staff and passengers to car share or use public transport to access the airport. This has resulted in reduced traffic congestion and less journeys to and from the airport, all of which has a direct result in reducing carbon emissions.

---

[4] http://www.sustainableaviation.co.uk/wp-content/uploads/DCOPractice2012approvedhi-res.pdf

[5] A copy of this template is available from the AOA upon request, by contacting Tim Alderslade, AOA Public Affairs & PR Manager, on 020 7799 3171 or timalderslade@aoa.org.uk

3. Airports adapting to Climate Change

Ten UK airports have now completed the process of evaluating risks to them from a changing climate and developed adaptation plans to address these[6] whilst others are discussing potential risks directly with their local authorities and stakeholders. These plans cover a wide range of issues, such as on-site risks from a changing climate to potential changes in passenger travel patterns. Much of the work to deliver against these plans is on-going and we would encourage the Airports Commission to familiarise itself with this work.

4. Airports working across the aviation sector

As mentioned earlier, the AOA and a number of individual UK airports are signatories to Sustainable Aviation (SA), an industry wide coalition of airports, airlines, manufacturers and air traffic control providers working for cleaner, quieter and smarter flying.[7] The AOA is committed to realising the strategic ambitions of SA and fully endorses its response to this call for evidence.[8] In 2012, SA published a CO_2 Road-Map which envisages increasing efficiency of aircraft and the way in which they are operated over the next 40 years which, when combined with the introduction of sustainable alternative fuels, means that significant growth in UK aviation can be accommodated without a substantial rise in absolute CO_2 emissions. The key challenges the AOA sees in achieving the opportunities outlined in the SA CO_2 Road-Map are developing a global emission trading scheme, scaling up the infrastructure to deliver sustainable aviation fuels from production sites to UK airports, and ensuring that airspace capacity is developed in a timescale that is consistent with growth in demand to travel and airport capacity. The Airports Commission must consider this in future decisions on airport capacity.[9]

5. Summary

In summary, the AOA continues to support UK airports and Sustainable Aviation in a range of measures to address the issue of carbon emissions and climate change. To ensure that these efforts to reducing impacts are achieved we call on the Airports Commission to ensure any decisions on future airport capacity take full account of the barriers to reducing carbon emissions and adapting to climate change. Issues of providing airspace capacity, supply of sustainable fuels and surface access infrastructure in enabling full use of airport capacity are critical to this.

---

[6] For more information see airport websites or https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69518/pb13740gov-summary-adapt-reports.pdf

[7] See http://www.sustainableaviation.co.uk/about/signatories/

[8] http://www.sustainableaviation.co.uk/2013/response-to-call-for-evidence-aviation-and-climate-change/

[9] Further details on the AOA's recommendations on Aviation Policy can be found in our report, An Integrated Policy Framework for UK Aviation: Connecting the Economy for Jobs and Growth (http://www.aoa.org.uk/media/7284/aoa-an-integrated-framework-for-uk-aviation-report.pdf)

Appendix 1

The following web links provide further information on the work of the 10 largest UK airports in tackling Climate Change.[10]

Airport	Web link
Birmingham Airport	http://www.birminghamairport.co.uk/meta/about-us/environment/energy-and-climate-change.aspx
Bristol Airport	http://www.bristolairport.co.uk/about-us/environment.aspx
Edinburgh Airport	http://www.edinburghairport.com/about-us/facts-and-figures/our-performance/sustainability
Gatwick Airport	http://www.gatwickairport.com/business/corporate-responsibility/sustainability-reports/
Glasgow Airport	http://www.glasgowairport.com/about-us/living-near-the-airport/local-environment-impacts/climate-change
Heathrow Airport	http://www.heathrowairport.com/about-us/community-and-environment/sustainability/environment/climate-change
Luton Airport	http://www.london-lutoninthecommunity.co.uk/environment/
MAG incl. Manchester and Stansted Airports	http://www.magworld.co.uk/magweb.nsf/Content/CorporateResponsibility
Newcastle Airport	http://www.newcastleairport.com/energy-and-carbon-reduction

In addition to this on-going airport work the following airports have completed climate change adaptation plans as required by DEFRA[11].

- Birmingham Airport
- Cardiff International Airport
- East Midlands Airport (joint report with Manchester Airport)
- Edinburgh Airport
- Glasgow International Airport
- London Gatwick Airport
- London Heathrow Airport
- London Luton Airport
- London Stansted Airport
- Manchester Airport (joint report with East Midlands Airport)

For further information, please contact Tim Alderslade, AOA Public Affairs & PR Manager, on 020 7799 3171 or timalderslade@aoa.org.uk.

[10] Based on latest passenger numbers from the CAA Airport Statistics

[11] For more information see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69518/pb13740gov-summary-adapt-reports.pdf

Response to Call for Evidence: Aviation and Climate Change

May 2013

Introduction

Sustainable Aviation welcomes this opportunity to respond to the Airports Commission's call for evidence concerning aviation and climate change, and is pleased to offer the comments below which are intended to address and/or provide additional context to some of the questions posed in chapter 7 of the Commission's Document "Discussion Paper 03: Aviation and Climate Change"

About Sustainable Aviation

Sustainable Aviation (SA) is a unique alliance of the UK's airlines, airports, aerospace manufacturers and air navigation service providers. Together, we drive a long term strategy to deliver cleaner, quieter, smarter flying. SA is the first alliance of its type in the world, and reports regularly on progress in reducing aviation's environmental impact. See www.sustainableaviation.co.uk for more details.

Sustainable Aviation is governed by a Council comprising a leading panel of aviation environment experts. External advice and guidance to the work of SA is provided by a Stakeholder Panel including representatives from Government, the CAA, NGO's and academics. This structure ensures SA's work remains relevant and robust. Our signatories cover a wide range of UK and global companies.

The SA strategy has established seven goals which cover the range of sustainability issues from social and economic aspects through to climate change and noise.

In the last two years alone Sustainable Aviation and our signatory members have delivered a diverse range of work to define and address the issue of carbon emissions from aircraft.

- *Developing and publishing a CO_2 Road-Map detailing how UK aviation can accommodate significant growth to 2050 without a substantial rise in absolute CO_2 emissions.*
- *Conducting a range of perfect and optimum flight trials to highlight the potential to reduce flight trip fuel through removing inefficiencies in infrastructure capacity at airports and airspace. These include a British Airways flight from Heathrow to Edinburgh which showed the potential to reduce flight trip fuel by 11%. Trials across the Atlantic and through European airspace are currently being conducted and we are awaiting the results with interest.*
- *Developing best practice guides to the industry. In June 2012 the industry launched 'Reducing the Environmental Impacts of Ground Operations and Departing Aircraft - An Industry Code of*

Practice'. This champions a series of operational techniques to reduce noise and emissions from departing aircraft. SA is now overseeing implementation and will report on progress.

- *Engaging in policy discussions on how to address CO_2 emissions from international aviation with the Government through the Aviation Policy Framework consultation, the Committee on Climate Change, Dept. for Energy and Climate Change and the Parliamentary Energy and Climate Change Select Committee.*

- *SA members are also investing significant time and money to tackle aviation CO_2 emissions on the European and Global stage through the ICAO CAEP working groups, the EU ACARE Flightpath 2050 initiative and influencing the development of a global emissions trading scheme for aviation CO_2.*

Following the publication of the Road-Maps on CO_2 and noise, SA is now focussing on delivery. In 2013 we will be publishing our Progress Report covering full details of our work against our strategic goals in the last few years. Beyond this our working groups on climate change, operational improvements and communications will continue to focus on delivering the CO_2 Road-Map. Additionally we will explore how the aviation industry and academic research programmes can be improved.

CO_2 Emissions from UK Aviation

The Sustainable Aviation CO_2 Road-Map, published in 2012, resulted from several months of consultation and analysis involving all four corners of the UK aviation industry. It sets out SA's expectation of CO_2 emissions from UK aviation between 2010 and 2050, taking account of the latest evidence available at the time of publication, and comparing its results with aviation CO_2 forecasts from the Department for Transport and from the Committee on Climate Change.

The Road-Map combines an assessment of growth in demand - derived from UK government forecasts - with our own analysis and judgement concerning the available mitigation opportunities, and the extent to which they will deliver improvements in carbon efficiency. Our Road-Map shows that UK aviation can accommodate significant growth to 2050 without a substantial rise in absolute CO_2 emissions.

The mitigation opportunities assessed by the Road-Map include:

- reductions in fuel-burn enabled by improvements in air traffic management and in operational-practices;

- the impact of adopting the next generation of aircraft whose fuel-efficiency characteristics are already known, and whose impact on fleet fuel efficiency can therefore be estimated with some confidence;

- the potential impact on fleet-average fuel efficiency of future aircraft types whose fuel-efficiency characteristics are not yet known; and

- further reductions in CO_2 footprint made possible by the use of sustainable alternative fuels in place of fossil-based kerosene.

The Road-Map also considers further potential reductions in UK aviation's net CO_2 emissions via market-based measures in which aviation can support CO_2 reductions in other sectors. Since CO_2 is a well-mixed gas, the geographical or sectoral distribution of its emission has little bearing on the resulting climate

impact. Market based measures can therefore play a role in ensuring that the most cost-effective CO_2-reduction opportunities can be pursued, irrespective of sector or geography.

Being based on the DfT's own demand growth forecasts, our Road-Map implicitly accounts for the impact of the price of carbon upon demand for UK aviation.

UK aviation currently accounts for 5- 6% of global aviation's CO_2 emissions. This proportion will fall over the next few decades due to a rapid growth in demand for aviation in the developing world. Looking to the future, significant UK influence over CO_2 emissions from aviation will be achieved not through restricting the scale of UK aviation activity, but through internationally focussed efforts. As a result, SA recommends that Government pursues an approach consisting of the following four elements:

1. intensifying R&D support to the UK's aerospace manufacturing sector, underpinning the development of fuel-saving technologies which will be deployed at scale on a world-wide basis;

2. encouraging the development and deployment of sustainable aviation fuels offering significant life-cycle CO_2 savings;

3. working with international partners to enable more efficient air traffic management, within the context of increased capacity requirements;

4. continuing to press for a global carbon-trading solution encompassing all of aviation, with a level playing field for all participants.

Interdependencies Between CO_2, NO_x and Noise

In 2010, Sustainable Aviation published a paper setting out some of the interdependencies between CO_2, NO_x and noise, and discussing their relevance for engine and aircraft design and operational choices. Trade-offs driven by airport capacity are also explored. Some of the key messages are:

- Inter-dependencies between noise, NO_X and CO_2 emissions are complex and require careful evaluation prior to regulatory, operational or design decisions. As regulations become more stringent, the relevant trade-offs become more difficult to address.

- Local noise regulations can in some cases result in increased fuel-burn and CO_2 emissions arising from operational choices necessary to achieve compliance. Limitations in airspace or airport capacity can increase noise and emissions through holding, or through non-optimal cruising speeds or flight altitude profiles.

- In general, it is not possible to express an inter-dependency in terms of a universally applicable metric, since its strength and character depend on the particular design point or operating point at which it is evaluated.

- Regular dialogue between regulators and industry stakeholders will be essential in ensuring that the complexities of the topic, and the delicate balances required, are adequately accounted for in the decision-making process.

Non-CO_2 Impacts

Sustainable Aviation notes the discussion of aviation's non-CO_2 climate impacts that appears within the Commission's Paper, and wishes to make the following observations:

- Whilst radiative forcing (RF) is commonly used as a metric for expressing the radiative imbalance at a particular date due to emissions that have taken place prior to that date, it does not provide an indication of the future radiative imbalance that will arise from emissions taking place today or in the future. In this respect it is not useful for informing policy decisions that will influence future emissions.

- Furthermore RF does not provide an indication of the manner in which the climate will respond to a particular level of radiative imbalance.

- In the specific case of aviation, there are (as highlighted in the Commission's paper) a number of climate-change impacts whose inherent timescales span a wide range, from minutes (non-persistent contrails) through to weeks (NOx-ozone), years (NOx-methane), and decades or more (CO_2). Radiative forcing tends to over-emphasise the importance of short-lived effects, while failing to represent the long-term future impact of emissions that have already taken place.

- More details on the shortcomings of RF as a metric can be found in Sustainable Aviation's position paper on aviation's non-CO_2 climate impacts, for which a reference may be found below.

- Irrespective of the choice of metric, there is still a great deal of uncertainty regarding the current impact of aviation's past non-CO_2 emissions. Research into this topic is on-going:

    a. The radiative imbalance arising from aviation-attributable stratospheric water vapour has recently been shown to be much smaller than previously reported[12].

    b. Estimates of the net radiative imbalance from the numerous effects triggered by aviation's NOx emissions have also been revised significantly downwards by recent papers[13],[14] which have taken into account a wider range of relevant effects.

    c. The impact of contrails and aviation-induced cirrus has yet to be quantified with certainty and is the subject of continued research in the academic community.

- Due to the very long atmospheric residence time of CO_2, from a climate change perspective it makes sense to prioritise the reduction of CO_2 over the reduction of non-CO_2 emissions, as a means of mitigating future risk. This position aligns well with the very strong commercial incentive to reduce fuel-burn.

Sustainable Aviation plans to update its position paper on aviation's non-CO_2 emissions referred to above during 2013, so as to take account of recent developments in the understanding of aviation's non-CO_2 climate impact, and mechanisms for expressing that impact.

---

12 LJ Wilcox et al, "Radiative forcing due to aviation water vapour emissions", Atmospheric Environment, Vol. 63, 2012

13 CD Holmes et al, "Uncertainties in climate assessment for the case of aviation NO", PNAS, vol. 108, no. 27

14 K Gottshaldt et al, "Global sensitivity of aviation NO_x effects to the HNO_3-forming channel of the HO_2+NO reaction", Atmospheric Chemistry and Physics, 12, 2012

Sustainable Alternative Fuels

Sustainable Aviation supports and encourages the development of sustainable alternative fuels that are derived from biomass and/or waste streams, and mixed with kerosene, and which have considerable long-term potential to reduce CO_2 emissions from the airline sector in the UK.

To be acceptable to the industry, such fuels must be technically suitable for use in existing engines and aircraft. They must also be environmentally sustainable, including not competing with food crops for land or fresh water supplies. Finally, they must be capable of deployment on a sufficient scale to enable a material reduction in CO_2 emissions from aviation.

SA supports robust standards for sustainability and for supply chain regulation and control in order to ensure full quality assurance for fuels delivered to aircraft. SA also welcomes the recent discussion about Indirect Land Use Change (ILUC) associated with biofuels. SA acknowledges that all effects should be considered, both direct and indirect. SA is committed to endorsing sustainable practices throughout the lifecycle of sustainable aviation fuel, and supports and endorses standards that include "The Roundtable for Sustainable Biomaterials" (RSB) – a non-profit, international, independent, multi-stakeholder certification standard, widely accepted to be the most robust standard available in this field.

SA recognises that sustainable fuels do not represent a 'silver bullet' for our sector's contribution to carbon reduction. However, in combination with a continued emphasis on greater efficiencies and market based mechanisms, sustainable fuels can offer an opportunity to reduce the carbon intensity of air travel.

Carbon Emission Targets and trading

Sustainable Aviation does support the inclusion of international aviation emissions in UK carbon budgets, based on the UK share of the EU Emissions Trading Scheme (ETS) cap subject to the following commitments:

- Delivery against the carbon budget is met through internationally agreed carbon trading.
- We support an appropriately implemented EU ETS as a good starting point towards this and call on the Government to continue pressing for an agreement on and support implementation of a global carbon-trading solution encompassing all of aviation, ensuring a level playing field for all participants.
- We do not support unilateral UK targets however as we believe this will lead to carbon leakage.

Summary

The Sustainable Aviation CO_2 Road-Map forecasts increasing efficiency of aircraft operations over the next 40 years which when combined with the introduction of market based measures such as the EU ETS means net carbon emissions from aviation will reduce. This being the case aviation growth can be accommodated within the Government's emissions trajectory.

To avoid the issue of aviation carbon leakage to countries outside the UK, Sustainable Aviation believes any policy measures to manage aviation carbon emissions should be implemented on an international level. We do not support unilateral UK aviation carbon targets.

Regarding the latest DfT forecasts of aviation carbon emissions levels Sustainable Aviation believes their model fails to take proper account of improved airspace and aircraft operational techniques and is too simplistic in its assumptions of future aircraft efficiency improvements[15].

References

Sustainable Aviation CO_2 Road-Map 2012
Sustainable Aviation, 2012
http://www.sustainableaviation.co.uk/wp-content/uploads/SA-CO2-Road-Map-full-report-280212.pdf

Inter-dependencies between emissions of CO_2, NO_x & Noise from aviation
Sustainable Aviation, 2010
http://www.sustainableaviation.co.uk/wp-content/uploads/sa-inter-dependencies-sep-2010.pdf

Non-CO_2 climate change effects of aviation emissions
Sustainable Aviation, 2008
http://www.sustainableaviation.co.uk/wp-content/uploads/nonco2papernov08.pdf

Reducing the Environmental Impacts of Ground Operations and Departing Aircraft - An Industry Code of Practice
Departures and Ground Operations Code of Practice Working Group, 2012
http://www.sustainableaviation.co.uk/wp-content/uploads/DCOPractice2012approvedhi-res.pdf

[15] See SA CO_2 Road-Map Section 9.3 Comparison of SA's Projections with DfT's CO_2 Forecasts, p.44