

## **Comments on BIA climate change section**

Stop Bristol Airport Expansion Ltd (SBAE) makes the following comments as part of our objection to the planning application 09/P/1020/OT2 by Bristol International Airport (BIA).

### ***Summary of issues***

- 1) the proposed expansion will increase emissions from all aspects of the airport's operation considerably. Aircraft emissions will increase by 146%, and terminal and surface access emissions will increase by 49%, an overall increase of 125%. This runs counter to government policy on reduction in emissions generally, and aviation emissions in particular.
- 2) The Stansted inquiry concluded that, on climate change issues, planning inspectors should look to Government policy on how to manage aviation and climate change. BIA's application fails to take account of recent national policy developments. These changes include, the enactment of the Climate Change Act 2008 with its requirement of an 80% reduction in
- 3) total greenhouse gas emissions, based on 1990 levels by 2050, including emissions from aviation (even if the cuts were not from the aviation sector). In addition, in January 2009 Geoff Hoon announced a new government policy to reduce emissions from UK aviation in 2050 to 2005 levels (without any form of offsetting)..
- 4) The Government's own forecasts show that if demand continues unabated, these reductions will not be met. Technological progress alone is insufficient. The only evidence to the contrary is based on aviation industry projections, which are unsupported by independent experts..
- 5) The Government has requested that the Committee on Climate Change (CCC) advise by December 2009 on the delivery of the policy of reducing aviation emissions below 2005 levels by 2050. In the meantime, Lord Stern has warned against making premature decisions on carbon intensive infrastructure projects. Since BIA presents no credible evidence that its emissions will reduce over time, expansion cannot be approved.
- 6)
- 7) The IPCC experts state that the impact of aviation emissions is not confined to carbon dioxide alone. However, the Emissions Trading Scheme (ETS), by its very nature, can only address the carbon dioxide aspect of aviation. It is irresponsible and technically inaccurate for BIA to rely upon the ETS to deal with the environmental costs of flying.
- 8) The increased non-aviation emissions of BIA's expansion are not covered by the ETS or any other compensatory mechanism. It is believed that a form of inter-authority carbon trading will be introduced on a "per capita" emissions target. If so these extra emissions will have a direct cost implication for North Somerset

Council, which has not been accounted for by BIA.

It is premature for any planning permissions to be given for the expansion of BIA before the CCC reports on the feasibility of meeting national aviation emissions targets set by the Government and without any indication of how reductions in emissions at BIA will be possible. It is likely that the only way to achieve the stated targets is to constrain passenger and flight numbers. A decision to the contrary, will make these already ambitious targets even harder to achieve. The consequences of failing to meet these targets are environmental and economic in nature and have not been adequately assessed by BIA.

## **Detailed comments**

### **Emissions projections**

BIA sets out the following emissions scenarios:<sup>1</sup>

CO2 emissions tonnes	2007 (5.9m pax)	2019 (10m pax)	Ratio 2019:2007
Total from flights	329283	810322	2.46
Total apart from flights	92585	138358	1.49
Grand total	421868	948680	2.25

BIA predicts that emissions from flights will grow by 2.46 times, even though passenger numbers will only grow by 1.6 times. This implies a radical increase in long-haul flights and the use of larger planes. Further, despite all the environmental claims for the building, the ground emissions grow almost in line with the passenger numbers.

It is important to note that technological advances in terms of aircraft design and fuel change are unlikely to impact on the emissions estimates for BIA. This is due to the time it takes to develop such technology and the young nature of the fleet at BIA, meaning that roll-out of such improvements are unlikely to take place before 2019.

### **The wider impact of aviation emissions**

BIA's discussion of the wider impacts of aviation emissions (the radiative forcing factor) on climate change is incomplete and inadequate. The IPCC's most recent work on this issue suggests that the historic impact of aviation emissions is now 2.78 times as much as the impact of carbon dioxide alone.<sup>2</sup>

The lead author on aviation for the IPCC (Prof David Lee) states that:

*"the non-CO2 effects of aviation emissions cannot be ignored and that the likely*

1 See the Environmental Statement prepared by Entec, Vol.5, Tables 4.2 and 6.1

2 David Lee et al 'Aviation and global climate change in the 21st century' 2005. In this work, the IPCC were able to include the effect of cirrus clouds.

*consequence of those effects is to roughly double the impact of the CO2 effects alone".*

BIA has therefore miscalculated the global climate impact of aviation, which in fact is 4.9%. In the UK therefore, this means if aviation accounts for 6.3% of the carbon dioxide emissions, then it is responsible for 15.7% of the UK's climate impact.

BIA has stated that they can safely ignore the impact of any radiative forcing factor. They therefore, have not included it in their emissions figures. As a result, BIA's figures are misleading. For example, the 21% of UK emissions in 2050 is far too low a figure and misrepresents the true position.<sup>3</sup>

Neither Air Passenger Duty (APD) nor the ETS are able to impact on this aspect of aviation emissions, because APD has no direct correlation to fuel usage or emissions, and neither ETS nor APD takes any account of non-carbon dioxide effects.

## **Government Policy on Aviation Emissions**

In January of this year, the Government announced a new target for aviation emissions.

“I can announce that we will establish a new target to get aviation emissions in 2050 below 2005 levels and I have asked the Committee on Climate Change to advise on the best basis for this development.”<sup>4</sup>

This was further clarified by the Secretary of State for Energy and Climate Change:

“We say that by 2050 aviation emissions must be back to current levels. That is a target consistent with the 80 per cent. target. Why is that significant? Because for the first time we are saying that aviation expansion is conditional on improvements and reductions in carbon emissions. That is a significant commitment.” (28 January 2009, Secretary of State for Energy and Climate Change, Ed Miliband)

The DfT has explained that this target must be by real emissions cuts, not offsetting or buying in of permits. Despite this, no mention is made by BIA of how such reductions can be achieved if it is allowed to expand. Instead, as shown above, emissions at BIA are set to increase per passenger and total emissions as opposed to reduce them.

## **Meeting targets**

BIA's Environmental Statement relies on the UK Air Passenger Demand and CO<sub>2</sub> Forecasts 2009 (the 2009 Report), which was published on the same day as the decision to introduce the 2005/2050 limit. First, it is important to note that, despite assuming major gains in aircraft efficiency and air traffic control improvements and operational

<sup>3</sup> See Table 2.1 of the Environmental Statement, Vol. 5

<sup>4</sup> See the speech to Parliament of the then Secretary of State for Transport, Geoff Hoon, <http://www.dft.gov.uk/press/speechesstatements/statements/infrastructure>

efficiencies, the 2009 Report does not demonstrate compliance with the 2005/2050 limit. (This is presumably why the CCC has been asked to advise the Government on how the target can be met.) Second, the CO<sub>2</sub> forecasts in the 2009 Report are said to be “central” (para 1.12). However two independent forecasts, put the figure a great deal higher. One study carried out for Defra estimated emissions in 2050 would be between 100 and 150 MtCO<sub>2</sub>,<sup>5</sup> whilst work for the Tyndall Centre for Climate Change Research puts the figure at around 110 MtCO<sub>2</sub>. These figures are around twice the DfT’s estimate.<sup>6</sup>

BIA therefore points to the Sustainable Aviation Roadmap (SAR) produced by the airline industry.<sup>7</sup> The conclusions of the SAR are highly questionable and rely on speculative radical advances in technology. The only examples referred to by SAR 2008 are the “blended wing aircraft” and biofuels technology, but development work on such radically new technologies is – even according to SAR 2008 – not predicted to start until after 2020. Thereafter, the use of such technology has been opened to serious criticism by the CCC.

*“More radical changes ... to aviation technologies, e.g. Blended Wing Bodied aircraft, are likely to be more expensive, require changes to infrastructure and may not lead to significant additional emissions reduction.”<sup>8</sup>*

In light of the above and the Government’s decision to expand Heathrow, further expansion cannot be approved until there is credible evidence demonstrating that the 2005/2050 limit can be met.

As a separate matter, the Climate Change Act 2008 sets a target of an 80% cut in carbon dioxide emissions by 2050 based on 1990 levels. BIA has neglected to mention that the 80% includes emissions from international aviation, even if the emissions from that sector do not themselves fall. This means that, if aviation emissions do not fall other sectors will be required to make even greater cuts at huge cost. It is worth noting that with the new 2005/2050 limit on aviation, other sectors are already being asked to make the equivalent of 90% cuts.

Expansion cannot therefore be approved now without clear evidence from BIA that it will be able to contribute to carbon reduction requirements.

As mentioned above, on 14 January 2009 the Government wrote to the CCC for advice.

“In the light of the Government’s decision to set a UK target to reduce aviation carbon dioxide emissions in 2050 below the level of 2005, and of the Committee on Climate Change’s own proposals for their work on carbon dioxide emissions from aviation, the Government invites the Committee:

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5 Study on the Allocation of Emissions from International Aviation to the UK Inventory – CPEG7 Final Report to DEFRA Global Atmosphere Division. Allocation of International Aviation Emissions from Scheduled Air Traffic – Future Cases, 2005 to 2050 (Report 3 of 3), March 2006. Owen B. and Lee D.S.

6 Decarbonising the UK Energy for a Climate Conscious Future

7 See BIA’s Environmental Statement, Vol.5, para 2.2.10

8 CCC’s December Report

To assess UK trends in international aviation emissions (using a range of appropriate methodologies);

To advise the Government on the basis for measurement for UK target for aviation emissions in 2005;

To assess the scope for reductions, including from improvements in technology and the effect of appropriate policy levers; and the implications of further aviation expansion beyond 2020.”<sup>9</sup>

The CCC is set to report on these strands in December 2009. The CCC has cautioned against making carbon-intense decisions until after they have had an opportunity to consider these fundamental questions and advise fully. It would be inappropriate for a local council to pre-emptively approve aviation expansion in Bristol with inevitable impacts elsewhere.

No mention is made by BIA of this review of climate change and aviation being made by the CCC..

### ***BIA's emissions in context***

BIA expect their emissions to be almost 1m tonnes by 2019, the same as B&NES in 2006. Taking into account the latest science, the climate impact will be the equivalent of 2.4m tonnes, the same as the whole of Bristol in 2006.

The SW region had emissions of 42.369m tonnes in 2006, so BIA plans to have carbon dioxide emissions of 2.2% of the regional 2006 total, or 6% taking into account the non-CO2 effects.

If the rest of the region makes cuts in line with government policy, then BIA's carbon dioxide emissions will be 3.7% of the regional total or 10% of the climate impact. These are much bigger figures than BIA publicises.

In BIA's Environmental Statement, figure 4.2 shows aviation emissions falling after 2001, but this is deceptive. The growth in passengers was rapid up to 2000, then the dotcom bubble burst and growth slowed to below 1% in 2001. When passenger growth returned, the balance between the no-frills carriers and the full-service airlines had changed bringing in the newer aircraft of those fleets. In addition, the phasing out of Chapter 2 aircraft completed in March 2002, many of these only being removed from service late in the day. As these were again older planes, not only were they noisier but also less fuel efficient. The growth in flights and emissions has continued after this point, although the continuing switch between full-service and no-frills produces a one-off reduction in emissions. As there is no plan to phase out Chapter 3 aircraft in favour of Chapter 4 ones, and no plan to phase out planes on the basis of emissions, it is inevitable that airlines will use the aircraft for their full service life of 25 years.<sup>10</sup>

Professor David MacKay of Cambridge in his book (at <http://www.withouthotair.com/>)

<sup>9</sup> [www.theccc.org.uk/pdfs/AviationEmissionsPR15.01.09.pdf](http://www.theccc.org.uk/pdfs/AviationEmissionsPR15.01.09.pdf)

<sup>10</sup> see <http://www.icao.int/env/noise.htm>

states that improvements in airframes are overrated:

No redesign of a plane is going to radically improve its efficiency. Actually, the Advisory Council for Aerospace Research in Europe (ACARE) target is for an overall 50% reduction in fuel burned per passenger-km by 2020 (relative to a 2000 baseline), with 15–20% improvement expected in engine efficiency. As of 2006, Rolls Royce are half way to this engine target [36w5gz]. Dennis Bushnell, chief scientist at NASA's Langley Research Centre, seems to agree with my overall assessment of prospects for efficiency improvements in aviation. The aviation industry is mature. "There is not much left to gain except by the glacial accretion of a per cent here and there over long time periods." (New Scientist, 24 February 2007, page 33.) The radically reshaped 'silent aircraft' SAX-40, if it were built, is predicted to be 16% more efficient than a conventional-shaped plane Nickol [2008]<sup>11</sup>

### ***Ineffective mitigation***

BIA's management techniques (incorporated into the emissions estimates) are all land based – reduced use of Auxiliary Power Units (APUs), more public transport, use of walkways rather than buses. Although some of these have merit, it is unlikely that they will impact much on the total emissions, especially as the walkways greatly increase the lighting/heating/cooling load of the terminal, and the APUs will be replaced with electricity from the terminal but without identifying how that is generated.

BIA plan to mitigate emissions by using efficient terminal design (although this will, in any event, be a standard applicable to all by 2019) but they still expect emissions due to electricity and gas use to increase by 80%. BIA plan to install wind turbines but these would generate only 1% of the electricity used by the terminal, and to have some biomass boilers. They promise 20% of the *extra* energy demand will come from on-site renewables, meaning at most 10% of the total due to the terminal. None of this makes any significant reduction to the total emissions of the terminal, let alone the flights.

In the draft planning conditions, the only commitment is to produce a report that shows how the building can have 20% lower emissions than "business as usual" and to check these measures are implemented. However, this requirement is already enforced on BIA by law as part of the "carbon reduction commitment" and conceals the fact that they aim for total emissions from the terminal to increase considerably.

BIA says all it can do to reduce aircraft emissions is to move towards 100% continuous descent approach and to possibly replace APU use with terminal supplied electricity – but this in itself does not even supply carbon free electricity and would result in at most a 4% reduction in ground emissions. BIA of course has much more influence – it can limit flights, charge less efficient planes more, and even penalise emptier planes.

BIA resigns all responsibility over aviation emissions despite acting directly to increase

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11 David J.C. MacKay FRS, <http://silentaircraft.org/sax40/>

them by adding more capacity and touting for extra flights.

### ***Emissions trading***

BIA assume that inclusion of aviation in the EU ETS will be sufficient to guarantee that the net emissions do not increase, yet recent statements from the EU make it clear that the ETS is failing to achieve this even for the currently included industries and that additional taxation measures need to be created to ensure the cost of carbon does not go below a minimum level sufficient to cause emissions reduction to occur. In addition, various wings of the aviation industry are fighting against the inclusion either because they feel it is unfair on non-EU carriers or because they want a global scheme which allows biofuels to substitute for emissions reductions. The ETS does not cover the non-CO2 impacts of aviation which mean at least a doubling of the overall impact.

It is therefore not reasonable to assume that any external agency will reduce emissions from BIA at a later date if it is granted permission to expand.

### ***Biofuels***

Even the most optimistic projections show 30% of aviation fuel coming from biofuel sources by 2030. Currently, no aviation biofuels are proven to be carbon neutral or even carbon reducing and supplies are likely to be no more than 1% of total aviation fuel use by 2015 when the first commercial flights using it might begin. It is highly unclear if sufficient volumes of emissions-reducing biofuel will ever be available.

Global aviation fuel use is 240 million tonnes per year<sup>12</sup>. The yield for jatropha (one of the leading candidates for 2<sup>nd</sup> generation biofuel for aviation) is around 2500kg per hectare<sup>13</sup>, so to replace the entire aviation fuel demand would require 96 million hectares of land or 0.96 million square kilometres. This is the size of two thirds of the arable land in India, or twice the size of Spain<sup>14</sup>. The likelihood of producing any fraction of this without conflicting with other land uses including food production is very low, especially with projections for a 50% increase in world population by 2050.

### ***Local planning policy***

Recent developments in national aviation and climate change policy are set out above. It is clear from this that there have been radical changes since the Air Transport White Paper (ATWP) and its reliance on ETS to deal with climate change issues.

At a local level, no current local planning policy supports the proposed expansion. The South West's draft Regional Spatial Strategy appears to be internally inconsistent. The RSS's own Strategic Sustainability Assessment states:

“The RSS should explicitly resist airport expansion, because it would undermine all the efforts within other sections of the draft RSS to reduce greenhouse gas emissions.” (SSA, s.11.20); and

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12 <http://www.after-oil.co.uk/runways.htm>

13 <http://www.biodieseltechnocrats.com/jcfactsheets.html>

14 <https://www.cia.gov/library/publications/the-world-factbook>

The RSS should “reverse the support given to airport and related development” (SSA, s.19.18).

## ***Conclusion***

The Government has committed to bringing aviation emissions in 2050 below those in 2005. BIA's emissions for 2020 are considerably more than twice those in 2005. Given that there is no credible evidence demonstrating how such drastic cuts can be achieved across the industry as a whole and at BIA, in particular, it is clear that expansion cannot be approved in line with Government policy.

A premature decision on BIA will risk making the 2050 target an impossible one and/or will have a severe economic impact on those sectors that are required to redress the balance. At the very least, the CCC must report on the new 2050 target before a decision is made.

7<sup>th</sup> August 2009

Jeremy Birch

Stop Bristol Airport Expansion Ltd