

# The aviation emissions policy gap: the ongoing need for Government action to deliver the Climate Change Act



21<sup>st</sup> October 2016

## Executive summary

Aviation presents unique challenges in relation to climate change policy. Growth in demand is set to continue, and future emissions reductions from the use of biofuels and improved technology are likely to be marginal. Meanwhile, the nature of policymaking presents its own problems. While responsibility for CO<sub>2</sub> reductions has largely fallen to national governments, the question of who should tackle emissions between countries has for many years remained a grey area.

It is clear, however, that in order to tackle climate change – whether through national, regional or international action – aviation can't be ignored. The challenge has become particularly evident in the UK, where our biggest airport, Heathrow, is already responsible for more emissions from international, scheduled passenger flights than any other airport in the world<sup>1</sup>.

This briefing argues that:

- Aviation emissions in the UK need to be compatible with the Climate Change Act 2008. The long term target legislated under the Act of an 80% emissions cut should be treated as a minimum level of ambition in light of the 2015 Paris Agreement.
- The advice of the Committee on Climate Change that in order to achieve the requirements of the Act, the Government's plans and decisions in relation to aviation should reflect the need for the sector's emissions to be no higher than 37.5 Mt by 2050 must therefore similarly be regarded as a minimum level of ambition.
- The Government must act urgently on the CCC's repeated advice to draw up an effective policy plan for aviation emissions. The global carbon offsetting scheme for aviation that was agreed in October 2016 at the UN, while representing a worthwhile step forward, will be unable to deliver the UK's commitments without additional policy action.
- Since airport expansion will exacerbate the scale of this challenge, the Government should rule out new runways unless they can be demonstrated to be compatible with such an effective UK aviation emissions plan.

## What level of aviation emissions is sustainable for the UK?

The UK's key commitment on climate change, to cut emissions by 80% of 1990 levels by 2050, was made legally binding in the 2008 Climate Change Act. An independent body, the Committee on Climate Change, was created under the Act to give advice to Government on delivering the 4-yearly carbon budgets that would help keep the economy on track to delivering the target.

---

<sup>1</sup> Dave Southgate *Aviation Carbon Footprint Global Scheduled Domestic Passenger Flights - 2012*  
<https://southgateaviation.files.wordpress.com/2013/09/global-domestic-footprint-finalv6.pdf#page=41>

The Act recognises the fact that there has historically been no global agreement on how to allocate international aviation emissions to states and therefore does not, at present, formally include these emissions in carbon budgets. Instead it stipulates both (i) that the Government must review this situation on a regular basis with a view to their inclusion as soon as is practicable and (ii) that emissions from aviation and shipping must in the interim be taken into account in the setting of appropriate carbon budgets for other sectors.

The approach of the Committee on Climate Change has been to allow 'headroom' in the 2050 economy-wide emissions target of up to 37.5 Mt for aviation, equivalent to its level in 2005. The proportion of emissions from aviation would increase under this assumption from around 7% today to around 25% in 2050, with other sectors bearing an additional responsibility (beyond the 80% average) for emissions cuts. 37.5 Mt is the maximum level that can feasibly be accommodated, the CCC had made clear. All carbon budgets so far approved by Government are based around this assumption.

In fact there are several reasons why the target may well have to be tightened in future.

- (i) The CCC's modelling is based on an assumption that sectors other than aviation and shipping will make emissions cuts of 85% on average by 2050. The Committee's latest progress report however notes that we are not currently well placed to achieve this, with current policies described as "insufficient to meet the requirements of the fourth and fifth carbon budgets and keep us on a cost-effective path to the 2050 target".
- (ii) The target currently takes no account of non-CO<sub>2</sub> impacts from aviation. While uncertainties remain concerning how the impact of water vapour, NO<sub>x</sub> and soot emitted at altitude should be compared with that of CO<sub>2</sub>, scientists have estimated that these gases could double the warming impact of aircraft.
- (iii) The Paris Agreement of December 2015 commits the UK to significantly more ambition on climate change than the target underpinning the 2008 Climate Change Act, increasing the long-term emissions target from an 80% to a 100% cut. In March 2016 the Energy Minister confirmed that such a target would be made legally binding<sup>2</sup>. While the CCC does not recommend any revision of the target in the short term, it is clear that the Climate Change Act as it now stands should be regarded as a minimum level of ambition.

**Official forecasts show that the 37.5 Mt limit will be exceeded even without expansion and will be higher still with a new runway**

Independent reviews, including by the Department for Transport, of likely future UK aviation emissions have concluded that the level of 37.5 Mt CO<sub>2</sub> recommended by the Committee on Climate Change as a maximum for aviation in 2050 will be exceeded. This is the case, the forecasts suggests, even if (i) APD is retained (ii) no new runways are built anywhere in the UK and (iii) aviation is included in a carbon pricing mechanism.

---

<sup>2</sup> <https://www.theguardian.com/environment/2016/mar/14/zero-carbon-emissions-target-enshrined-uk-law>

The Government periodically produces forecasts of aviation demand and associated CO<sub>2</sub> emissions. The latest figures were published in 2013<sup>3</sup>. The forecasts assumed: a reduction in the level of aviation demand growth previously anticipated, no new runways, and ongoing improvements in aircraft technology and airspace efficiencies as well as some take-up of aviation biofuel. The central forecast was of aviation emissions of 47 Mt by 2050 – 22% higher than the maximum that can be accommodated under the Climate Change Act.

The Airports Commission undertook its own forecasting of aviation emissions. It downgraded forecasts for regional airports still further while assuming significantly higher annual average efficiency improvements than the DfT (or indeed the Committee on Climate Change). Even so, the Commission's 'carbon traded' forecast exceeded 37.5 Mt in the 'no new runways' baseline, and was higher still on the assumption that a new runway was built at either Heathrow or Gatwick.

### **Can technology improvements or biofuels close the gap?**

While biofuel is sometimes touted as the way forward for tackling the aviation sector's rising emissions the commercial reality is that given the constraints represented by competition with other sectors and the cost of biofuel production, aviation will remain dependent on fossil fuels for as far ahead as anyone can see. There is also continued concern about the extent to which some biofuels contribute to sustainable development. The 2013 DfT forecast assumes 2.5% of aviation fuel coming from sustainable sources by 2050.

The industry would argue that this is a significant underestimate and the Sustainable Aviation CO<sub>2</sub> roadmap claims that 25-40% could be possible with the right Government support<sup>4</sup>. But recent evidence suggests that in the EU biofuel use probably in fact increases emissions overall, after taking account of 'indirect land use change' impacts, and the Government is therefore proceeding with great caution in relation to any incentives<sup>5</sup>. BA's flagship programme to produce fuel from waste meanwhile – showcased in the Government's Aviation Policy Framework – fell through in late 2015<sup>6</sup> and its partner, Solena, has filed for bankruptcy.

Improvements in both aircraft efficiency and airspace design meanwhile are increasingly hard to come by, and the rate of improvement has flattened out dramatically since the early days of the jet aircraft and expected to deliver improvements of less than 1% per year in future. The global fuel efficiency standard, agreed in 2016, will, meanwhile, have little if any impact on the rate of fuel efficiency improvements. The standard will apply to new in-production commercial and business aircraft delivered from 2028, and to new aircraft designs from 2020. On average, this will require a reduction of 4% in the cruise fuel consumption of new aircraft in 2028 compared to aircraft delivered in 2015, yet most average new single and twin aisle commercial aircraft already comply, over 10 years before the regulation comes into force.

---

<sup>3</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/223839/aviation-forecasts.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/223839/aviation-forecasts.pdf)

<sup>4</sup> <http://www.sustainableaviation.co.uk/wp-content/uploads/2015/09/SA-SAF-Roadmap-FINAL-24-Nov-2.pdf>

<sup>5</sup> See the second graph on page 5 of 'Consultation on proposed changes to the RTFO' from the [Low carbon fuels stakeholder workshop](https://www.gov.uk/government/publications/biofuels-events-calendar), 12 May 2016 <https://www.gov.uk/government/publications/biofuels-events-calendar>; copied at the top of p 7 here <http://www.aef.org.uk/uploads/AEF-response-to-Scottish-Government-APD-SEA-consultation-May-2016.pdf>

<sup>6</sup> <http://www.greenaironline.com/news.php?viewStory=2163>

## The limits of the GMBM in addressing the problem

The UN's aviation body ICAO has developed a scheme whereby airlines will, from 2020, be required to offset international aviation emissions covered by the scheme (about 80% of the total emissions over the period 2021-2035) above a 2020 baseline through the purchase of carbon credits, thereby in theory delivering 'carbon neutral growth' from the sector. This is a welcome step forward in that it indicates a worldwide acceptance that aviation emissions must be accounted for, and a shared willingness to take action to tackle the anticipated growth in emissions from the sector.

Aspects of the deal now agreed, however, suggest the agreement has been shaped more significantly by political considerations and sensitivities than by either scientific evidence or the level of climate ambition agreed in Paris. It bears little resemblance to the kind of global trading scheme envisaged in 2009 by the Committee on Climate Change as the background to the organisation's recommendation that CO<sub>2</sub> mitigation for aviation should ideally be at the international level<sup>7</sup>.

Crucially for the UK, it is clear the ICAO MBM will not, on its own, deliver the necessary mitigation to keep aviation emissions to a level consistent with the Climate Change Act, let alone to deliver the more stringent emissions cuts required by the Paris Agreement. Key reasons why a climate mitigation gap will remain include the following.

- The ICAO scheme sets out to deliver ICAO's goal of no net increase in emissions from 2020. However, ICAO has no long-term target, and, unless strengthened in the periodic reviews, will continue with this cap until the MBM ends in 2035. Unlike the Climate Change Act it is not designed in line with a specific climate objective and there is no evidence that it is consistent in any way with achievement of the Paris Objective.
- Critical decisions on what units will be available for compliance is critical to the environmental effectiveness of the scheme are yet to be taken. There remains a risk that units will be available from voluntary markets that are not covered by any climate obligation thereby not contributing to any wider climate ambition.
- The scheme as adopted allows for a large number of route and new entrant exemptions and includes a voluntary phase for the first 6 years, such that the 2020 target will not in fact be met. Our estimates suggest that only 76% of the emissions above 2020 levels will be covered in the period 2020-2035.
- The costs generated by the ICAO scheme are very unlikely to be high enough to stimulate either the right incentives for cleaner technology or to give the right market signals in relation to infrastructure investment and planning choices in a UK context. The Airports Commission calculated that in the absence of additional policy measures, if a new runway was built at Heathrow, the carbon cost required to be added to tickets in order to keep aviation emissions to 37.5 Mt (largely by using price

---

<sup>7</sup> <https://www.theccc.org.uk/publication/letter-ccc-advice-on-a-framework-for-reducing-global-aviation-emissions/>

to constrain demand) would be £634<sup>8</sup>. Modelling of the financial impact of the ICAO scheme, meanwhile, assumes a maximum carbon price of just \$50 per tonne (around £32).

### **What needs to be done to close the emissions gap?**

Government planning and policy will be essential alongside the MBM, both in the UK and in other states, in order to ensure that long-term climate objectives can be met and that carbon lock-in by way of inappropriate infrastructure investment is avoided. The uncomfortable truth is that there is no feasible and cost effective alternative to imposing some controls on aviation demand in order to meet minimum levels of climate change ambition.

On the basis of the Committee on Climate Change advice, this will not require either going backwards from where we are today, or even a halt to growth in passenger traffic, but it will mean that future growth must be limited. The Committee on Climate Change has consistently and repeatedly advised that, after taking account of likely carbon efficiency improvements in aviation, in order to keep aviation emissions to 37.5 Mt by 2050, passenger demand growth by 2050 must be no higher than 60% above its level in 2005. The latest Government forecasts predicted an increase of 93% even in the absence of new runways, simply as a result of more intensive use of existing airport capacity. The plans for expansion at Heathrow only increase the scale of the challenge.

### **Conclusion: the buck stops with the UK Government, which must urgently draw up an aviation emissions plan**

While the CCC has advised Government that it should use 37.5 Mt as its ‘planning assumption’ for aviation emissions in 2050, it has always argued that it is the responsibility of the Government to develop appropriate policy to deliver this. CCC’s 2015 progress report argued that Government should “Publish an effective policy framework for aviation emissions: plan for UK 2050 emissions at 2005 levels (implying around a 60% increase in demand) and push for strong international and EU policies”<sup>9</sup>. The 2016 report noted that Government had made no progress on this recommendation since its last report and therefore restated the original recommendation.

The Airports Commission noted the lack of policy for constraining emissions and by way of response published a paper titled ‘Carbon policy sensitivity test’. But the measures described were speculative and in several cases likely to be unenforceable (reduced aircraft cruise speeds for example, and an inexplicable strengthening of carbon price signals) and ultimately the Commission made no recommendations on how the aviation emissions problem should be tackled, again passing the challenge back to Government.

In addition to helping to ensure that the GMBM is as effective as possible, for example helping to secure robust standards for permissible carbon units, measures focused on UK demand control could include limits imposed through the planning system (though it is unclear how these would

---

<sup>8</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/374660/AC05-forecasts.pdf#page=219](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/374660/AC05-forecasts.pdf#page=219) Figure A5.2

<sup>9</sup> Recommendation 19 [https://www.theccc.org.uk/wp-content/uploads/2015/06/6.738\\_CCC\\_ExecSummary\\_2015\\_FINAL\\_WEB\\_250615.pdf#page=26](https://www.theccc.org.uk/wp-content/uploads/2015/06/6.738_CCC_ExecSummary_2015_FINAL_WEB_250615.pdf#page=26)

be delivered at airports that already have planning consent to grow so has most relevance in the context of applications or proposals for expansion), or increases in aviation taxation.

It is very hard to see how policies that will make the problem worse, such as runway expansion, could be compatible with such a strategy, particularly where they are likely to have long-term emissions consequences, locking in a high carbon pathway for decades to come.