

## The Sixth Carbon Budget and Welsh emissions targets – Call for Evidence

### Response from the Aviation Environment Federation

We have answered only those questions where we have relevant evidence to share. Our answer to the question on aviation and shipping emissions is longer than for any of the other questions, since this is the topic on which we have particular expertise.

### Question and answer form

#### A. Climate science and international circumstances

**Question 1:** The climate science considered in the CCC's 2019 Net Zero report, based on the IPCC Special Report on Global Warming of 1.5°C, will form the basis of this advice. What additional evidence on climate science, aside from the most recent IPCC Special Reports on Land and the Oceans and Cryosphere, should the CCC consider in setting the level of the sixth carbon budget?

**ANSWER:** The IPCC Special Report on Global Warming of 1.5°C addressed all greenhouse gases. No policy has yet been developed relating to the non-CO2 impacts from aviation. Scientists have for many years indicated that such impacts are likely to cause significant additional warming although the degree of impact has been subject to some scientific uncertainty.

We understand that two analyses are likely to be published in the near future both addressing aviation's total warming impact. The first will provide an update to the Lee et al scientific paper *Aviation and global climate change in the 21st century* (2009) which estimated, based on the total historic climate impact from aviation, that the sector's CO2 and non-CO2 impacts represent 4.9% of total anthropogenic forcing. The second, expected in the spring, will be published as a series of reports commissioned by the European Commission on the science of non-CO2 impacts from aviation, and possible mitigation and policy approaches.

CCC should review, in light of this evidence, how to account for aviation emissions and whether there is sufficiently strong evidence to include aviation's non-CO2 impact in the UK's carbon accounts.

**Question 4:** What is the international signalling value of a revised and strengthened UK NDC (for the period around 2030) as part of a package of action which includes setting the level of the sixth carbon budget?

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ANSWER: Emerging economies have highlighted, in the context of the ICAO talks in which AEF participates (giving us personal evidence), that developed countries with a well-developed aviation sector, such as the UK, have high levels of historic aviation emissions. Inclusion of International Aviation and Shipping emissions in all future carbon budgets (and in the fourth and fifth carbon budget to the extent that these are reviewed) would send a powerful signal that the UK is willing to take responsibility for these emissions, strengthening the UK's calls for a more ambitious UN programme on aviation's climate change impact including the setting of a long term emissions target at ICAO.

## B. The path to the 2050 target

**Question 5:** How big a role can consumer, individual or household behaviour play in delivering emissions reductions? How can this be credibly assessed and incentivised?

ANSWER: There is some evidence that changing attitudes towards flying and in particular the rise of 'flygskam' or 'flight shame' in parts of Northern Europe has started to impact demand for flying in those countries, especially on domestic routes. The BBC reported in January 2020 that Sweden, from which the 'flight shame' movement originated, saw a 4% drop in air travel last year compared to the year before, and a 9% drop in domestic aviation (<https://www.bbc.co.uk/news/world-europe-51067440>). Air traffic in Denmark was also reported to have flatlined for the first time since the financial crisis (<https://finans.dk/erhverv/ECE11861792/for-foerste-gang-i-10-aar-vaeksten-i-flytrafikken-er-gaaet-i-staa/?ctxref=extm>), as was domestic and short haul air travel in Germany (<https://www.bloomberg.com/news/articles/2019-12-19/german-air-travel-slump-points-to-spread-of-flight-shame>). This analysis suggests the possibility that a similar trend may be evident in the UK for domestic air travel although the Civil Aviation Authority's full data set for 2019 is yet to be published:

<https://twitter.com/HelenJackson0/status/1217746925992271872?s=20>.

We are aware of a survey of 30,000 people by the European Investment Bank that found that "36% of Europeans said they already flew less for holidays to help prevent climate change and 75% intended to do so in 2020. In China the number of people planning less air travel for holidays this year was 94%, and 69% in the U.S." These numbers seem surprisingly high however. (<https://www.reuters.com/article/us-eu-climate-survey/europeans-chinese-americans-to-fly-less-in-2020-to-fight-climate-change-survey-idUSKBN1ZD1EE?platform=hootsuite>)

One important way to help encourage such trends, and incentivise behaviour change in relation to flying could be by ensuring that people are better informed about the climate impact of flying prior to ticket booking. Research by the 10:10 campaign (now Possible) found that "A large majority of people are unaware of how damaging air travel is for climate change - but those who are aware are much more supportive of reducing air travel". In particular, the study found that "When asked to select one or two actions from a list that would have the biggest impact on reducing an individual's carbon footprint, only 15% correctly identified taking one fewer transatlantic flight, whereas 37% correctly identified 'going car free' as effective. Tellingly, the most frequent flyers - those taking seven or more flights each year - ranked 'upgrade to energy efficient light bulbs' above reducing air travel." [http://files.1010global.org/documents/Aviation\\_briefing\\_Jan2019\\_FINAL.pdf](http://files.1010global.org/documents/Aviation_briefing_Jan2019_FINAL.pdf)

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Some of the recommendations in the report commissioned by the CCC from Richard Carmichael reflect the importance of better public information around this topic. To incentivise consumers to make informed choices about journeys, Government should, we believe, make it a requirement for all transport providers to clearly set out CO<sub>2</sub> and other GHG impacts associated with a trip prior to the point of booking. Some providers have started to present consumers with partial information but the quality of data can be variable. Third party booking agents should also display this information. Again, some booking agents are beginning to provide consumers with information but it is often based on 'best publicly available data', which can be limited, and assumptions.

**Question 7:** The fourth and fifth carbon budgets (covering the periods of 2023-27 and 2028-32 respectively) have been set on the basis of the previous long-term target (at least 80% reduction in GHGs by 2050, relative to 1990 levels). Should the CCC revisit the level of these budgets in light of the net-zero target?

ANSWER: Yes we would support this in the context of aviation. To the extent that, as CCC recently argued in its letter to Government there are no practical barriers to inclusion of IAS in future carbon budgets, there are similarly no barriers to inclusion in earlier budgets that have always been set so as to allow headroom for these emissions. This would help to provide certainty in the context both of airport expansion plans currently underway at many UK airports (<https://news.sky.com/story/how-much-is-your-nearest-airport-planning-to-expand-11833090>) and of the Government's aviation strategy White Paper, due out later this year.

**Question 8:** What evidence do you have of the co-benefits of acting on climate change compatible with achieving Net Zero by 2050? What do these co-benefits mean for which emissions abatement should be prioritised and why?

ANSWER: There is evidence (for example in Piers Forster's presentation to Greener by Design conference Nov 2019 <https://www.aerosociety.com/media/12752/1-piers-forster.pdf>) that if sustainable aviation fuel (whether biofuel or synthetic fuel made using captured CO<sub>2</sub>) can succeed in reducing particulates to the extent ice crystal formation is then reduced by 80% or more, it is likely that contrail formation, which can have a significant though short-lived climate warming effect, will also reduce. This potential benefit should be further explored in the context of determining the most effective measures for tackling aviation's climate impact.

In general, measures to reduce aviation demand (or demand growth) meanwhile offer co-benefits in terms of the sector's other environmental and health impacts such as noise and its contribution to air pollution levels. Low-carbon or zero-carbon technology solutions are typically, in contrast, seen with extreme scepticism in our experience by some members of community groups who are impacted by aircraft noise.

## C. Delivering carbon budgets

**Question 9:** Carbon targets are only credible if they are accompanied by policy action. We set out a range of delivery challenges/priorities for the 2050 net-zero target in our Net Zero advice. What else is important for the period out to 2030/2035?

**ANSWER:** The CCC's net zero Further Ambition modelling made assumptions in relation to technology improvement, biofuel take-up and demand growth limits that result in lower emissions than under business as usual assumptions. Specifically annual technology improvements in the Further Ambition model assumed a 1.4% annual improvement in fuel efficiency in contrast to 1.14% in the DfT's CO<sub>2</sub> forecasts; biofuel was assumed to represent 10% of fuel used (and to deliver 100% emissions reduction when used) by 2050 whereas DfT's forecasts anticipate only 5% of fuel use in 2050 delivering only 50% emissions reduction; and demand is assumed to be limited to 25% growth above its current level in contrast to DfT's central constrained forecast that anticipates growth of more than 50% over the same period.

It is currently unclear what policies would be required to deliver the Further Ambition scenario as it relates to aviation but it is clear that interventions would be required beyond relying on the market. For example, sustainable fuels accounted for just 0.002% of total global fuel use in 2018. Both DfT and CCC models assume, meanwhile, that carbon prices will be applied to aviation. The DfT's modelling assumes a carbon price of £221 by 2050, which contributes to a 10% reduction in demand (at £221, this will add approximately £20 to the average short-haul fare). Yet there is currently little likelihood of prices even approaching this level being generated through CORSIA.

Based on an analysis of US carriers, there is some evidence from ICCT ([https://theicct.org/sites/default/files/publications/Aircraft\\_CO2\\_Standard\\_US\\_20181002.pdf](https://theicct.org/sites/default/files/publications/Aircraft_CO2_Standard_US_20181002.pdf)) that further improvements from aircraft technology could be achieved than those modelled in the Further Ambition scenario with the right incentives, underlining the importance of UK advocacy at ICAO for tougher technology standards.

We are concerned that the Further Ambition scenario both leaves 35 Mt CO<sub>2</sub>e of the required reduction or removal necessary for net zero unaccounted for, and that it anticipates aviation to be emitting 31 MtCO<sub>2</sub> that need in some way to be removed. Our understanding from the CCC's net zero report was that the aviation industry should drive investment in carbon removal technologies such as DACCS and should not rely on tree planting as a removal option, though the most recent proposal in CCC's land use report for a possible UK carbon trading system in which airlines would participate as a mechanism for financing afforestation leaves us confused as to CCC's position on this topic. Sustainable Aviation's net zero roadmap assumes that the industry will be making significant use of CCS by the mid-2030s when CORSIA is due to end, but provides no clarity on who the aviation industry regards as responsible for ensuring these removals are available, or how it anticipates the costs of developing this being absorbed.

**Question 12:** How can a just transition to Net Zero be delivered that fairly shares the costs and benefits between different income groups, industries and parts of the UK, and protects vulnerable workers and consumers?

**ANSWER:** There is often a concern that policies aimed at limiting aviation demand through price could hit those on lower incomes more. When the Airports Commission was considering what measures would be required to mitigate the CO<sub>2</sub> implications of additional airport capacity, for example, it estimated that limiting emissions to the level it described as

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the CCC's recommended 'cap' of 37.5 Mt while permitting a third runway at Heathrow would require a carbon prices of £634 per tonne by 2050 (Airports Commission November 2014, Strategic Fit: Forecasts, Appendix 5).

Additional measures alongside carbon pricing (such as better public information about climate impacts from flying and controls on airport expansion) are likely to be preferable in our view. In terms of how aviation pricing specifically is approached, alternatives to the straightforward application of carbon prices that focus on social equity include an air miles levy (advocated by Richard Carmichael in his report to the CCC), or a frequent flyer levy (advocated by Possible).

## D. Sector-specific questions

**Question 31 (Hydrogen):** The Committee has recommended the Government support the delivery of at least one large-scale low-carbon hydrogen production facility in the 2020s. Beyond this initial facility, what mechanisms can be used to efficiently incentivise the production and use of low-carbon hydrogen? What are the most likely early applications for hydrogen?

**ANSWER:** We'd be interested to see an assessment of the likely aviation demand for hydrogen, whether in hydrogen-electric aircraft (as in the ZeroAvia pilot scheme currently receiving financial backing from ATI), or in order to produce synthetic aviation electrofuel. We are not familiar with evidence on this topic, however, in terms of the cost or wider sustainability implications.

**Question 32 (Aviation and Shipping):** In September 2019 the Committee published advice to Government on international aviation and shipping and Net Zero. The Committee recognises that the primary policy approach for reducing emissions in these sectors should be set at the international level (e.g. through the International Civil Aviation Organisation and International Maritime Organisation). However, there is still a role for supplementary domestic policies to complement the international approach, provided these do not lead to concerns about competitiveness or carbon leakage. What are the domestic measures the UK could take to reduce aviation and shipping emissions over the period to 2030/35 and longer-term to 2050, which would not create significant competitiveness or carbon leakage risks? How much could these reduce emissions?

**ANSWER:** Concerns around carbon leakage are frequently raised in relation to aviation, perhaps because people think of the sector as inherently international. It is unclear to us, however, why leakage should have particular relevance to aviation compared with other sectors, such as manufacturing, which are already included in carbon budgets.

Leakage of aviation emissions would perhaps occur if significant numbers of people start to avoid long haul flights from the UK by making a transfer in a nearby non-UK hub. There is plenty of evidence, however, that our key hub competitors in Europe will be facing very



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similar challenges to those in the UK of reconciling plans for the aviation sector with net zero commitments. With the next nearest aviation hub being in Dubai, it is unlikely to be an attractive option for most passengers unless the journey is to the Middle or Far East.

The European Green Deal – designed, like the UK’s legislation, to deliver net zero emissions by 2050, and now approved (as far as we understand) by the European Parliament and the Council of Ministers – implicitly applies to the EU’s share of aviation emissions, since it addresses ‘all sectors’ and makes reference to the need for coordination with ICAO. We understand that forthcoming climate legislation from the European Commission should clarify this. The UK has also signalled its intent to align aviation carbon pricing policies with the EU through the inclusion of UK aviation in the proposal for a UK emissions trading system that will link with the EU ETS.

Meanwhile a number of EU countries are grappling with the challenge of whether or not airport expansion is compatible with their own climate commitments. Plans for a new runway at Vienna were originally turned down on the basis of their likely climate impacts following legal action from environmental campaigners. While a higher court reversed the decision, we understand that legal action is ongoing. Similarly expansion at Marseilles airport has stalled on climate grounds  
<https://www.climatechangenews.com/2019/07/30/marseille-airport-expansion-stalled-climate-grounds/>.

Since UK climate action is broadly aligned with the approach in Europe, the impact of domestic policy measures such as constraints on airport capacity and policies to internalise the cost of carbon mitigation or removal into ticket prices should not put us at significant disadvantage. Meanwhile an increasing number of airlines operating internationally, as well as the UK-based Sustainable Aviation initiative, are making their own net zero commitments, including IAG, Qantas and Etihad.

Offsetting measures should only play a part in the short-term, as the industry transitions to in-sector reductions and carbon removals out to 2050. Both airline and environmental group representatives who are involved in discussions at ICAO agree that CORSIA will come to an end in 2035.

Domestic policy measures that would help to reduce aviation emissions in line with these international goals and ambitions include the following:

- **Introduce a moratorium on airport expansion.** The value of airport capacity controls as one policy lever is evidenced by the gap between the DfT’s aviation CO2 forecasts with and without a third runway: 39.9Mt versus 37Mt in the central 2050 forecast. In cases where it falls to local authorities to determine planning applications for expansion, climate change impacts are coming increasingly to the fore despite the DfT having issued guidance – we understand – that this should not be a matter for local authority consideration. Uttlesford, for example, recently turned down an application for expansion at Stansted, citing likely climate change impacts

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as well as other concerns. Leeds Bradford Airport's application is currently receiving similar scrutiny in terms of its emissions impacts, not least given the local authority's climate emergency declaration. The Court of Appeal has yet to rule on the Heathrow NPS requests for judicial review that were brought on the basis of climate change. A moratorium should remain in force until the Government has set out a clear plan on whether and how aviation growth can be reconciled with a net zero assumption for the sector. Airport applications can then be assessed against this policy. Without a moratorium, the UK risks sanctioning further infrastructure that could make it harder for the country to meet its net zero commitment.

- **Include IAS in carbon budgets and in the UK's NDC.** We agree with the CCC that this would support rather than undermine action at the international level, and that it would put aviation on a level playing field with other sectors, helping to guide infrastructure and other planning decisions in the period between now and the sixth budget period.
- **Develop a policy mechanism for ensuring aviation immediately starts investing appropriately in the technology needed for carbon removals, whether by way of CCS or synthetic fuel.** We are concerned that the approach endorsed by the CCC in its net zero report of allowing the aviation sector to continue burning fossil fuel on the understanding that in future these emissions will be captured and stored risks providing a false sense of security for the aviation sector. It is unclear why, over the next 15 years of CORSIA's projected lifespan, the industry would start to make the necessary, but comparatively expensive, investment in CCS, when it has access to cheap carbon offsets. This could result in a delay in the provision of the necessary supporting infrastructure. If the Government takes the lead on making this investment, the cost should, in our view, fall on the polluter (ie airlines) rather than on the general public.
- **Revise UK tourism policy to integrate effectively with climate policy,** by shifting its focus away from international air travel, whether outbound or inbound, and encouraging more sustainable transport modes and tourism options. AEF submitted detailed evidence on this subject to the Environmental Audit Committee but this has yet to be published as parliament was subsequently dissolved.