

# Energy Transitions Commission consultation paper: Reaching zero carbon emissions from aviation



## Response from the Aviation Environment Federation

31<sup>st</sup> August 2018

### Summary:

- AEF strongly supports the ETC's call for ambitious, in-sector action on aviation emissions.
- The scale of the challenge should not be underestimated, however, given the fact that aviation is currently almost completely dependent on fossil fuels, that demand is growing, and that there is currently no comprehensive plan, whether global or national, on aviation's appropriate contribution to meeting the objectives of the Paris Agreement.
- The availability to the aviation sector of sustainable biofuels may be limited by demand from other sectors already covered by climate policy and by the future need for BECCS in order to achieve net zero emissions.
- The need to address non-CO2 emissions should not be forgotten, given that the associated climate impacts will remain even with biofuels.
- Governments need to clarify how aviation emissions will be included in climate change strategies and targets. In addition to international agreements, governments should, at least in the interim, set out domestic carbon policy for aviation, reinforcing the 'bottom up' approach of the Paris Agreement.

### Introduction

The Aviation Environment Federation (AEF) is the principal UK NGO campaigning exclusively on the environmental impacts of aviation. We represent individuals and community groups affected by the UK's airports and airfields or concerned about aviation and climate change. In recent years we have been called as a witness on the subjects of climate change and air pollution at inquiries into airport expansion by the Airports Commission, the Environmental Audit Committee, and the Transport Committee. At the UN we are a lead representative of the environmental umbrella organisation ICSA, which is actively engaged in the current talks aimed at agreeing global climate measures for aviation.

We very much welcome this initiative from the Energy Transitions Commission. There is, in our view, an urgent need to consider how to bring aviation into line with wider climate ambition, including the need for economy-wide decarbonisation, and there are many aspects of the ETC paper that help to move the debate forward on this issue.

In particular we support:

- The call for ambitious in-sector carbon reduction from aviation, rather than reliance on carbon offsetting
- Acceptance that the measures necessary to achieve this will come with a cost penalty, at least initially
- The call for stronger carbon pricing signals
- Recognition of the need for sustainability criteria for biofuels

There are a number of areas, however, in which we'd suggest different, or supplementary, approaches.

### **The scale of the challenge should not be underestimated**

Aviation will be hard to decarbonise, and many voices in the climate change debate therefore prefer to keep quiet about it. Governments typically leave it out of national policies and targets, few companies have measures to reduce staff air travel, and 'green bonds' providers tend to give aviation a wide berth. In this context, the case for change will surely become compelling only if the scale of the problem is acknowledged.

The opening paragraph of your paper, on page 3, states:

"Emissions from aviation currently amount to circa 1 Gt CO<sub>2</sub> accounting for almost 3% of total global emissions, but, under a business as usual scenario, they would grow to almost 1.7 Gt by 2040 representing above 4% of global emissions and 14% of the transport sector emissions."

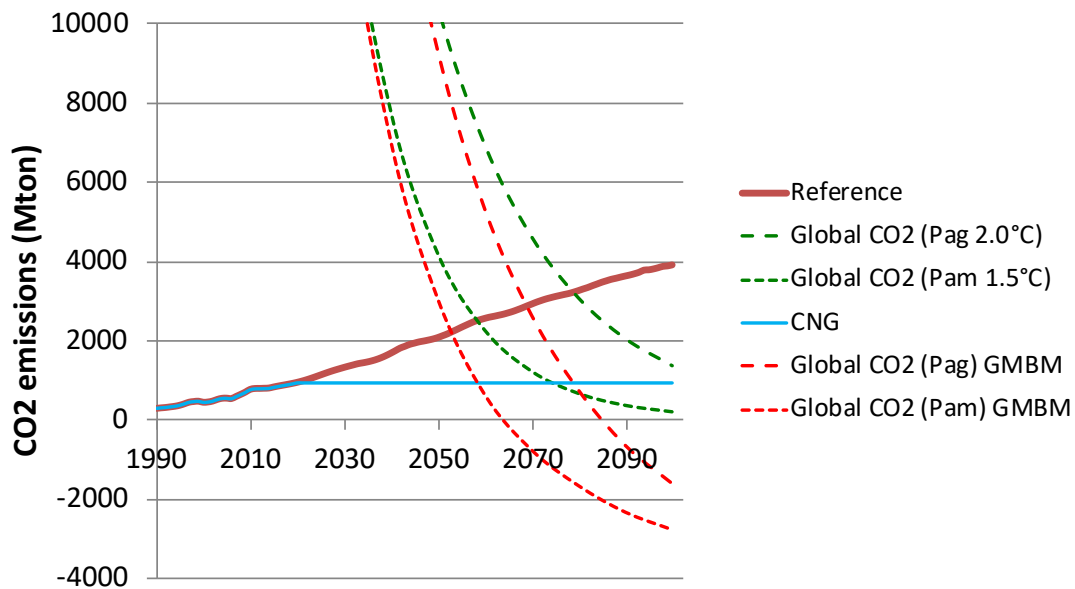
4% sounds small – worth having a go at if possible but hardly a priority. But on page 5, when this statement is repeated, the paper clarifies that the 'business as usual' reference applies not just to the aviation forecast but to the emissions forecast from all sectors, in a 4 degrees scenario.

An alternative, reasonable, basis for considering the significance of aviation emissions would be to assume that sectors directly covered by the Paris Agreement and therefore by NDCs, follow a path consistent with achievement of a 1.5 degree or 2 degree trajectory while aviation emissions follow a different path.

Approximately 40% of global aviation emissions are domestic and covered by NDCs. The remaining emissions are from international aviation and are due to be addressed on a sectoral basis by CORSIA. This is an offsetting mechanism designed to keep these emissions at or below 2020 levels, but without a long-term target linked to a 1.5 degree future.

Work undertaken by Prof Paul Peeters (at NHTV Breda University of Applied Sciences) overlays these projections for aviation with IIASA pathways. Under this approach, and looking beyond 2040, a very different picture emerges from that implied in the ETC paper. Emissions from international aviation are found to take up an increasingly large proportion

of the available carbon under 2 degree and 1.5 degree trajectories, as shown in the graph below (taken from Paul Peeters, 2017<sup>1</sup>). In this assessment, international aviation emissions use up all of the available carbon budget under a 1.5 degree trajectory by around 2060, and this reduces to shortly after 2050 when the need to provide offset credits for CORSIA is taken into account.



The UK's Climate Change Act, based on a target of limiting to no more than 50% the risk of exceeding 2 degrees of warming, rather than the more stringent target of the Paris Agreement, assumes that aviation will represent 25% of the total UK emissions by 2050.

**The argument that aviation should have priority use of biofuel needs critical evaluation.**

AEF supports the use of biofuels in aviation provided that: they can be produced sustainably; their emissions are appropriately accounted for on a full life-cycle basis; and any government incentives for their use do not decrease average overall fuel costs for airlines, which could incentivise industry growth.

In the decade that has passed, however, since a Virgin Atlantic Boeing 747 flew from London to Amsterdam with one of its engines powered by a mixture of babassu nuts and coconuts, the growth in the aviation biofuel market has been very, very small. We agree with the ETC's view that in terms of decarbonising long haul flights there are few viable alternatives to biofuel, and technical feasibility is no longer a barrier, with the first commercial flight

<sup>1</sup> <https://www.cstt.nl/publications/Tourism%E2%80%99s-impact-on-climate-change-and-its-mitigation-challenges.-How-can-tourism-become-%E2%80%98climatically->

powered 100% on biofuel having taken place earlier this year<sup>2</sup>. However, the slow rate of historic progress on this issue highlights the significant barriers – political, economic and environmental - to increasing the uptake of aviation biofuel. Below, we consider four of the challenges likely, in our view, to remain relevant in the coming decades.

1. Demand from other sectors will remain high

The UK Department for Transport recently reviewed options for incentivising aviation biofuel. The outcome was that the Government is committed to providing £2million funding support for “advanced biofuels” some of which have an aviation application, and that aviation fuel suppliers will in future be able to claim credits for sustainable aviation biofuels under the Renewable Transport Fuel Obligation.

DfT decided against the introduction of mandate for a specific percentage of aviation fuels to be from sustainable sources, however. The reason given was simply one of cost – a mandate could put UK airlines at competitive disadvantage. But the Government’s view has been influenced by other factors too. The emphasis of the transport fuels policy is now very much on using waste-based sources rather than crops, not least given evidence from the European Commission that much European biodiesel probably results in higher greenhouse gas emissions than fossil sources once ILUC impacts are accounted for.

But significant uncertainty exists about how much of this ‘advanced’ biofuel will be available in future, and sectors with existing climate change obligations under EU and UK law are likely to remain dependent on fossil fuels for their own decarbonisation. Looking just within the transport sector, even if all new car and van sales were to be zero emissions by 2020 – a highly ambitious policy – a significant quantity of low carbon liquid fuels will be required by the road transport sector in order for it to meet existing climate legislation, DfT analysis found.

2. Biomass is more efficiently used in other sectors, preferably combined with CCS

A further relevant consideration, taking into account the assumption that the supply of sustainable biomass will be limited, is where it is most efficiently deployed. There are perhaps two significant drawbacks to using it in aircraft. First, energy is lost simply in the conversion to liquid fuel. A recent press article on a Qantas flight that used a 10% blend of a biofuel derived from mustard seed, for example, noted that “One hectare of the crop can be used to produce 400 litres of aviation fuel or 1,400 litres of renewable diesel.”<sup>3</sup>

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<sup>2</sup> <https://worldairlinenews.com/2018/04/23/the-first-commercial-aircraft-to-fly-using-100-biofuel/>

<sup>3</sup> <https://www.theguardian.com/environment/2018/jan/30/qantas-uses-mustard-seeds-in-first-ever-biofuel-flight-between-australia-and-us>

Second, using biomass in aircraft precludes the potential additional benefit of combining it with CCS. This is a point the CCC has long argued. It is perhaps now particularly relevant given the current view that achieving the negative emissions needed to meet the Paris goals will necessitate significant use of BECCS (bioenergy with carbon capture and storage). While a number of challenges exist to the successful rollout of this technology<sup>4</sup>, it is included in many pathways developed using integrated assessment models. The implications of various BECCS pathways for the availability of biofuel will need careful consideration to ensure that the aviation conversation does not take place in its own silo.

### 3. Biofuel doesn't avoid non-CO2 impacts

We welcome recognition in the ETC's paper that aviation has impacts on the climate beyond those of its CO<sub>2</sub> emissions. While there remains debate about the best way to tackle these impacts in policy, it is likely that their impact overall is to increase the Global Warming Potential to around double that of CO<sub>2</sub> alone over a 100 year time period.

Biofuel delivers a potential carbon saving over fossil fuel on the assumption that the CO<sub>2</sub> released when the fuel is burnt is (partially) balanced out through the capacity of plants to absorb it. But burning biofuel (or indeed synthetic fuels so far tested) still generates non-CO<sub>2</sub> impacts, without any evidence that these can be balanced in the process of generating the fuel.

A key recommendation of the ETC report is that increasing, potentially to 100%, the use of biofuel in aviation is the most cost efficient means of delivering carbon reductions in the timeframe required, and in particular that if the cost of biofuel were instead included as a tax on tickets it would fail to achieve the same level of carbon mitigation. This argument would have less relevance, however, if there was a policy to tackle non-CO<sub>2</sub> impacts.

### 4. Priority access for aviation could increase decarbonisation costs for other sectors

Finally, there is potentially a social justice argument against giving aviation priority access to scarce sustainable biofuel. In the UK, around 70% of all flights are taken by just 15% of the population<sup>5</sup>, predominantly those on high incomes, and Londoners are twice as likely to be frequent flyers as those in other parts of England<sup>6</sup>. The large majority of the global population, meanwhile, will never set foot on a plane. Questions of fairness would need to be addressed therefore if the use of biofuel in aviation either

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<sup>4</sup> See for example <https://www.carbonbrief.org/guest-post-six-key-policy-challenges-to-achieving-negative-emissions-with-beccs>

<sup>5</sup> <https://fullfact.org/economy/do-15-people-take-70-flights/>

<sup>6</sup> [https://s3-eu-west-](https://s3-eu-west-1.amazonaws.com/media.afreeride.org/documents/RunwayForTheFew_WEB.pdf)

[1.amazonaws.com/media.afreeride.org/documents/RunwayForTheFew\\_WEB.pdf](https://s3-eu-west-1.amazonaws.com/media.afreeride.org/documents/RunwayForTheFew_WEB.pdf)

increases the cost of buying or growing food or increases the cost of decarbonisation for sectors such as home heating, or electricity production.

**The role of policymakers needs to encompass not only specific interventions on carbon price and biofuel but also appropriate target setting and policy plans, both domestically and internationally.**

We welcome the fact that the ETC paper considers possible action from both the industry and the policy community. Our focus as an organisation is largely on what could and should be done by policymakers to tackle the environmental impacts of aviation, and our comments on the ETC recommendations reflect this focus.

We engage with the policy discussions both at a UK level (including in relation to the forthcoming Aviation Strategy) and internationally at ICAO, but we are concerned that conversations about appropriate climate mitigation from aviation are currently not well aligned. Our view is that there is a key decision to be taken about how best to account for aviation in the international framework including delivery of the Paris Agreement.

One route would be to include emissions from international aviation in national or regional climate commitments and NDCs. The UK currently accounts for aviation in our Climate Change Act, but has yet to formally include it in carbon budgets. The EU ETS has been strengthened to help deliver EU-wide climate ambition, but its coverage of aviation emissions has been heavily scaled back, and its future alongside CORSIA is uncertain.

Another possible route would be to leave international aviation out of national targets and deal with it separately, for example through ICAO and a strengthened version of the CORSIA. Under this option a portion of the total available global carbon budget would be set aside for aviation, with NDCs and national carbon targets then determined by the remaining carbon budget (and with other sectors potentially working harder than currently anticipated).

The ETC paper appears to characterise CORSIA as an industry initiative, and calls on the aviation industry to “Put in place a mandatory offsetting scheme by 2027.” In fact, CORSIA was initiated and agreed by governments at the UN as the appropriate global response to the need for climate mitigation from aviation and is, indeed, due to become mandatory from 2027, although 76% of international aviation activity will be covered by voluntary pledges to participate from 2020 onwards. The scheme currently has numerous shortcomings however. For it to be an effective vehicle for delivering the Paris Agreement there would need to be greater clarity about appropriate emissions units (ensuring no double counting), a long term emissions target, and a mechanism for accounting for all international aviation emissions, not just those above the level in 2020.

In the absence of a decision on how aviation should fit in the wider climate picture, we are concerned that incentives for aviation to act are likely to be weak, and that decisions on tradeoffs, such as those listed above in relation to biofuel use, will be difficult to resolve.

In UK climate policy, the Committee on Climate Change has recommended that 25% of the economy-wide carbon target for 2050 should be set aside for aviation and that the Government should not plan on the assumption that aviation emissions will be higher than this. The CCC's preference is for this aviation "planning assumption" to be delivered by way of international measures. The Government should, in our view, be developing both a plan for delivering such international outcome, and a complementary domestic policy plan.

The specific policy interventions recommended by the ETC include a mandate for green aviation fuel, and a carbon tax on aviation fuel.

On biofuel, for the environmental reasons set out above, and in the absence of a wider climate change policy for aviation, we would be reluctant at this stage to support a volume mandate. The question of the appropriate percentage of sustainable biomass to be used by aviation should, in our view, be assessed in the wider context of the Paris Agreement, and of the need for all sectors to be part of a zero carbon future.

We would support the introduction of an aviation carbon tax and encourage the ETC to explore all possible channels for pursuing it. There are a number of barriers to be overcome, however, including inevitable industry claims of double counting given the modest costs now imposed by way of the EU ETS and CORSIA, and the existence of numerous bilateral legal agreements between pairs of states not to impose taxes on fuel used for international aviation.

**The likely need for limits to growth through capacity constraint should not be ignored.**

We very much agree with the central premise of the report that aviation emissions need to be addressed, and that action needs to come from the sector itself, not just by way of carbon offsetting. This represents a big challenge in our view.

The report argues that supply side measures will be a more efficient means of achieving carbon reductions from the aviation sector than demand side measures, based on a cost comparison that reflects today's biofuel prices. Our view is that supply side measures may in fact be no easier to implement than those focussed on demand. The politics of agreeing sustainability standards for biofuel for example, let alone how to direct biofuel resources to particular sectors, is politically very sensitive. With palm oil increasingly unwelcome in Europe, Indonesia only this week said that its companies should be allowed to build palm oil jet fuel plants in the United States and France as a condition for it buying either Boeing or Airbus planes<sup>7</sup>. There are real questions to be resolved, meanwhile, as we have set out, about the most efficient use for biomass given the energy penalty in converting it to aviation fuel, and in giving up the opportunity to combine it with CCS.

This being the case, governments need to consider the tools available to them in the immediate future for limiting the scale of the aviation emissions challenge. Aviation taxes

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<sup>7</sup> <https://www.reuters.com/article/us-indonesia-biofuels-airplane/indonesia-sets-palm-biofuel-plant-condition-for-jet-purchases-from-us-france-minister-idUSKCN1L6OAS>

are one option. Strengthening the mechanisms for imposing carbon pricing on aviation through other means, notably CORSIA or the EU ETS, should also be considered. We also believe that here is a strong case for constraints on airport capacity growth, including limits on the development of new runways and airports.

Barring successful legal challenge, the UK Government has just taken a decision in the opposite direction on Heathrow expansion. It needs to be called to account on how this can be reconciled with the need to bring aviation into line with national and global climate ambition.