

Written evidence submitted by Green Alliance (AAS0015)

About Green Alliance

Green Alliance is an independent think tank and charity focused on ambitious leadership for the environment. Our work crosses climate, the natural environment and resource use. Since 1979, we have been working with the most influential leaders in business, NGOs and politics to accelerate political action and create transformative policy for a green and prosperous UK.

Introduction

Transport is the UK's largest emitting sector, accounting for 31% of carbon emissions in 2018.¹ Of those, aviation accounted for 7.3%, with international flights accounting for 6.8% and domestic flights 0.3%.² These percentages are set to increase significantly in the coming years as other sectors decarbonise. Carbon emissions from UK aviation have more than doubled since 1990 and 2019 saw the highest ever level of UK aviation emissions.³

Aviation also produces non-CO2 emissions which contribute from climate change, such as nitrogen oxides and cirrus contrails. It is estimated that because of these additional non-CO2 effects, aviation's total contribution to climate warming is three times higher than that associated with its CO2 emissions alone.⁴

Aviation is the challenging to abate form of travel and given its contribution to UK emissions, it is vital that adequate policies are put in place decarbonise and reduce emissions from the sector. While emissions from aviation have recently fallen due to Covid-19, it is predicted that demand for flying will go back to 2019 levels later in the decade and then grow past 2019 levels.

To lower aviation emissions, policies must be put in place to encourage consumers to make more sustainable choices and to reduce flying. This is because technological, efficiency and offset options alone cannot put the sector on track to net zero by 2050. The CCC balanced pathway allows for a 25% growth in demand by 2050 compared to 2018 levels, rather than the 68% growth projected by DfT in a business as usual scenario.⁵ Crucially, the largest share of emissions savings needed to get aviation to net zero by 2050 (compared to a business as usual scenario) comes from policies that reduce demand for flying.

While aviation represents an important part of the UK's economy, jobs per passenger in aviation have been steadily [falling](#) for many years, as a result of increasing automation at airports and higher demand for flying.⁶ It would not be sustainable to seek to increase the volume of air travel in order to protect jobs, so targeted support is needed to help aviation workers to transition to green jobs. At the very least, financial support packages for airlines and airports should be conditional on implementing effective green policies and investing in low carbon technologies such as alternative fuels, and in particular e-kerosene.

The aviation sector's progress on reducing emissions to support the Government's aim to achieve net zero greenhouse gas emissions by 2050

This year, the Department for Transport published the [Transport Decarbonisation Plan](#) (TDP), alongside several consultations regarding aviation (the Jet Zero consultation, and the SAF mandate consultation). Together, these publications offer a high level overview of how the sector will meet this government's net zero targets.

Based on the government's policies and current trajectories for aviation, the UK's aviation sector is not on track to meet net zero CO2 emissions by 2050.

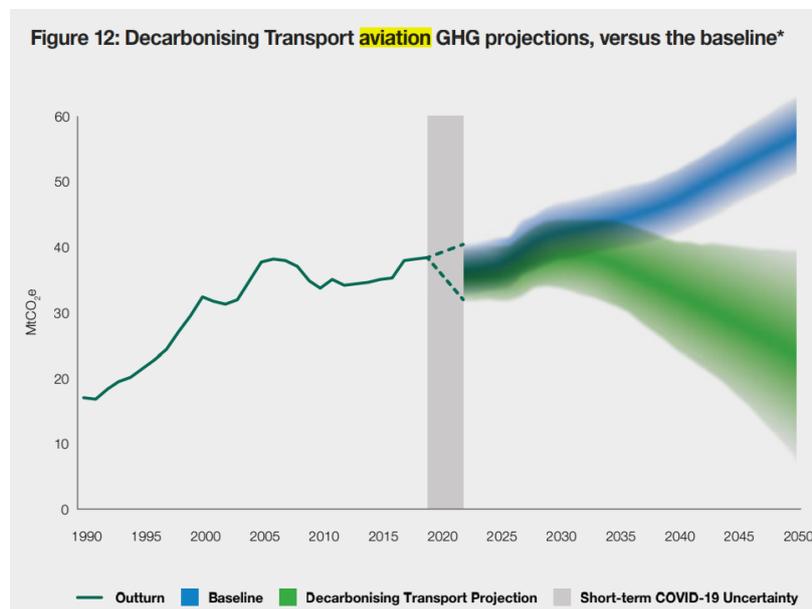
The primary reason for this is the omission of policies to manage demand, which will be critical to ensuring the sector stays on track with its emissions reduction targets. Although the suggested policies around a SAF mandate and zero-emission aircrafts are somewhat ambitious, they rely on technologies which are not yet commercially scalable, and which do not deliver emissions savings in the short term.

In order to safeguard the transition to a sustainable aviation sector, measures must be taken to ensure passenger numbers do not exceed 2019 levels in the short term, while there are no ways to reduce emissions from flights at the scale necessary. Without these measures at least in the short term, we do not believe the UK will be successful in decarbonising the aviation sector.

Emissions pathways

Figure 12 in the TDP (below) shows a projection for aviation emissions up to 2050. The upper margin of error associated with this pathway assumes a growth in emissions up to 2035, then reaching 2019 levels in 2050. The TDP

states that the greenhouse gas savings are driven by fuel efficiency improvements, the uptake of sustainable aviation fuels, the introduction of zero emission aircrafts, and the impact of a carbon price on demand.



This pathway – while ambitious in its lower bound – shows that there is a risk that the strategies in place are insufficient to decarbonise the sector.

To safeguard emissions savings from aviation, demand management policies should be introduced. There is no mention of direct demand management through taxation policies or public awareness campaigns, ruling out a key method of reducing emissions from aviation, and going against the messaging in the [Williams-Shapps Plan for Rail](#) “To support a green recovery, railways need to encourage a shift away from planes, cars and lorries, become the best option for long-distance travel and improve the whole journey experience.”

In fact, the government has recently introduced a policy which directly contradict this statement in the Plan for Rail: decreasing the rate of air passenger duty on domestic flights, including for flights taken by private jets.

Following on from the TDP, the [Jet Zero consultation](#) helpfully illustrated four potential scenarios which the government perceive the aviation industry will follow. However, these scenarios are also insufficient. The Climate Change Committee (CCC) recommends a maximum of 23MtCo₂e residual emissions for aviation by 2050.⁷ Higher levels of residual emissions would require other sectors to forgo greenhouse gas removal capacity, which is not feasible.⁸

- Scenario 1 (continuation of current trends) results in 36MtCO₂e residual emissions in 2050 and is therefore incompatible with net zero by 2050.
- Scenario 2 (high ambition) results in 21 MtCO₂e residual emissions in 2050 and could in theory be compatible with net zero. However, it assumes emissions reductions of 21 MtCO₂e by 2050 from efficiency improvements, compared to the 8MtCO₂e assumed in the CCC's balanced pathway. The scenario therefore appears to largely overestimate the savings from efficiency improvements, and unless the government can prove that these can be achieved, the scenario is incompatible with net zero by 2050 because it will result in too high levels residual emissions.
- Scenario 3 (high ambition with a breakthrough on SAF) results in 8 MtCO₂e of residual emissions in 2050, which would be feasible to remove. However, it also assumes 21 MtCO₂e emissions reductions from efficiency improvements, which seems unfeasible. SAF breakthrough delivers high emissions savings, but any emissions savings from SAF would need to be genuine savings (e.g., fuel from waste should not be counted as negative emissions).
- Scenario 4 (high ambition with a breakthrough on zero emission aircraft) results in 17 MtCO₂e residual emissions in 2050, but again assumes 21 MtCO₂e emissions reductions from efficiency improvements.

The above analysis shows that the overestimation of emissions savings from efficiency improvements is skewing the likely real-world emissions savings we will see. The government must set an ambitious pathway with policies to reduce the number of flights, in which the aviation sector reaches net zero emissions by 2050, and where the reliance on offsets is minimised.

Encouraging more sustainable options than flying

Decarbonising the aviation sector requires policies to encourage more sustainable ways of travelling, and to disincentivise flying. The CCC has recommended that airport expansions are – under all scenarios of technological innovation and uptake – incompatible with a 2050 net zero target⁹. The level of demand increase ‘allowed’ by the CCC under the sixth carbon budget is 25% by 2050 compared to 2018 levels, rather than the 68% growth projected by DfT in a business-as-usual scenario.¹⁰ Crucially, the largest share of emissions savings needed to get aviation to net zero (compared to a business as usual scenario) comes from policies that reduce demand for flying.

There are multiple ways to align aviation policy with environmental goals:

- Increasing air passenger duty (domestic and international)
- Introduce a frequent flyer levy that impacts the 15% of people who take 70% of flights
- Introduce a wider aviation fuel tax which is hypothecated for sustainable aviation fuels
- Mandatory reporting on the impact of flying at an interface consumers will interact with (such as ticketing websites)
- Scrap airmiles reward schemes

Greenhouse gas removals

There is no existing governance which oversees the fair allocation of greenhouse gas removal capacity in the UK. The government should establish an Office for Carbon Removal to manage the allocation of offsets across sectors that are expected to have residual emissions in 2050 and to ensure that their development is promoted in a sustainably manner and, particularly for those relying on new technologies, with investment in innovation and scale up well in advance of 2050.¹¹ Establishing this governance system for carbon removals will help ensure that the aviation industry does not rely on an unsustainable level of carbon removals and that it invests in clean fuels.

Alternative Aviation Fuels

Green Alliance welcomed the recent [consultation on a sustainable aviation fuels](#) (SAF) mandate. This would place a mandate on fuel suppliers to sell a higher proportion of fuels that are more sustainable than conventional kerosene. However, we were disappointed with the lack of mention of ekerosene (power to liquid fuel) as a viable alternative to biofuels and fuels from waste.

Such a mandate should be introduced as soon possible to reduce emissions in the short and medium term, but there should be strict criteria for what counts as a 'sustainable' fuel. Alternative fuels should not come from products associated with deforestation and land degradation, including those derived from palm and coconut. Furthermore, we should aim to drastically reduce waste, and as measures are put in place to do so, the availability of waste-based fuels will be limited. It is also important to note that these types of alternative fuels are not zero carbon: they are responsible both for emissions in the production process and at the tailpipe when they are burnt.

Ekerosene is the only fuel which can be zero carbon for aviation. It is generated by combining hydrogen and carbon dioxide. To be zero carbon, the hydrogen used must be 'green hydrogen' (hydrogen produced through electrolysis using renewable energy sources) and the carbon dioxide must come from direct air capture (extracted from the atmosphere). Ekerosene is not yet commercialised and is estimated to cost [two to three times](#) the average price of kerosene. A sub-mandate for ekerosene should be introduced alongside a mandate for alternative fuels, as is the case [in the EU](#). This would encourage industry to invest more heavily in green hydrogen and direct air capture, as well as ekerosene plants.

One of the key barriers to alternative fuel uptake today is its cost; these fuels will not be the most popular fuel choice until they become cheaper than kerosene. By imposing a tax on kerosene, the cost of alternative fuels will become more competitive and their share on the market will grow.

International aviation and shipping emissions

The government recently announced it will include international aviation and shipping (IAS) emissions into the sixth and future carbon budgets. This is a welcome inclusion, and robust policies must now be put in place to support the effective reduction in emissions from the aviation sector in line with the target to cut emissions by 78% by 2035.

Maintaining a competitive UK aviation sector while ensuring the UK can achieve net zero greenhouse gas emissions by 2050

The UK's aviation sector can remain competitive while reducing emissions.

Firstly, there is a great opportunity to be a world leader in alternative fuels, specifically in the development and export of ekerosene. Similarly, heavy investment into zero carbon aircraft will encourage industry to develop solutions more rapidly and become a leader in the manufacturing and export of sustainable flight alternatives.

Secondly, it is possible for airlines to continue operating with demand management policies in place. DfT assumes an increase in airline passenger numbers from 2020 onward, but by aiming to keep passenger levels at 2019 levels, and following any one of the Jet Zero consultation's final three scenarios, emissions reductions will be secured.

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Endnotes

¹ Climate Change Committee, December 2020, *Sixth Carbon Budget - Charts and data in the report*

² *Ibid.*

³ BEIS, March 2021, Final UK greenhouse gas emissions national statistics: 1990 to 2019

⁴ D.S. Lee *et al.*, 2021, *The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018*, <https://doi.org/10.1016/j.atmosenv.2020.117834>

⁵ Climate Change Committee, December 2020, *Sixth Carbon Budget – Aviation sector summary*, <https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Aviation.pdf>

⁶ New Economics Foundation, June 2020, Crisis support to aviation and the right to retrain, <https://neweconomics.org/uploads/files/aviation-workers.pdf#page=18>

⁷ Climate Change Committee, December 2020, *Sixth Carbon Budget - Charts and data in the report*

⁸ Green Alliance, April 2020, *The flight path to net zero*, https://green-alliance.org.uk/resources/The_flight_path_to_net_zero.pdf

⁹ [Sector-summary-Aviation.pdf \(theccc.org.uk\)](https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Aviation.pdf)

¹⁰ Climate Change Committee, December 2020, *Sixth Carbon Budget – Aviation sector summary*, <https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Aviation.pdf>

¹¹ Green Alliance, April 2020, *The flight path to net zero*, https://green-alliance.org.uk/resources/The_flight_path_to_net_zero.pdf