



Response to the Department for Transport

Jet Zero Consultation

8 September 2021

Stansted Airport Watch (SAW), formerly Stop Stansted Expansion (SSE), has some 7,500 members and registered online supporters including 150 parish and town councils, local residents' groups, and national and local environmental groups. Our objective is to ensure that the airport's operations are managed to reduce and minimise their adverse impacts. In this way we aim to protect the quality of life of the communities adversely affected by Stansted Airport and the natural environment locally and globally.



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1. Introduction

- 1.1 Stansted Airport Watch ('SAW') welcomes this opportunity to respond to the Department for Transport ('DfT') Jet Zero Consultation. In view of the urgent need to tackle climate change and the underlying upward trend for aviation emissions, this Consultation is long overdue. Aviation is almost completely dependent on fossil fuel kerosene and makes air travel the most carbon-intensive form of travel in most cases. Taking one return long-haul flight can generate more emissions than any other lifestyle activity in a whole year.
- 1.2 Despite the length of time the DfT has taken to plan for net zero aviation emissions by 2050, we are far from convinced by the strategy set out in the Jet Zero Consultation Document and the so-called 'Evidence and Analysis' paper which accompanies it. In reality, there is a distinct lack of credible evidence and analysis to underpin the strategy and the DfT has rejected some of the key recommendations set down by the Government's independent advisers, the Committee on Climate Change ('CCC'), in its statutory advice to Government on the Sixth Carbon Budget ('6CB')¹.
- 1.3 Following the introduction of the Climate Change Act ('CCA') in 2008 the Government has had a statutory duty to achieve very substantial reductions in CO₂ emissions. Initially, that duty, set down in section 1 of the CCA was for the UK to achieve an 80% reduction in CO₂ emissions² by 2050, compared to a 1990 baseline and, in June 2019, section 1 of the CCA was amended to a target of 'net zero' emissions by 2050.
- 1.4 Notwithstanding this statutory duty, and the CCC's advice that there should be a moratorium on airport expansion, the Government continues to support major expansion in UK air travel with policies which encourage expansion at every UK airport, primarily the Airports National Policy Statement ('ANPS') and the Making Best Use ('MBU') policy³, both of which pre-date the net zero amendment to the CCA statutory policy.
- 1.5 The DfT claims as follows in the Evidence and Analysis paper:

*"Our trajectories also indicate that aviation net zero can be met by 2050 with future capacity assumptions consistent with Making Best Use policy and the Airports National Policy Statement."*⁴

but the DfT omits to provide any credible evidence and/or analysis to support this claim. Moreover, the claim is immediately preceded by the following caveats and conditionality:

"... the four scenarios we have modelled ... show that significant in-sector abatement could be possible if we make substantial progress with new technologies. However, making the required technological progress will be very challenging and there are many barriers that will need to be overcome."

[Emphasis added]

- 1.6 Aircraft also emit nitrous oxides, soot, and water vapour in the upper atmosphere, that combine to create a net warming effect which, according to the latest research, could treble the total global warming impact of aviation compared to CO₂ alone.
- 1.7 In essence, the approach taken by the DfT appears to be to carry on as usual and see what technologies emerge. It is a case of hoping for the best. But as noted by the World Economic Forum ('WEF')⁵ and referred to in the Evidence and Analysis paper, "Hope is not a strategy".

¹ 'Policies for the Sixth Carbon Budget and Net Zero', CCC, December 2020 (Aviation summary on p.162, Table 8.1).

² The statutory duty, set down in section 1 of the CCA, applies not only to CO₂ but to all greenhouse gases ('GHGs'). However, for the aviation sector, the principal issue is CO₂ emissions.

³ 'Beyond the Horizon, Making Best Use of Existing Runways', DfT, June 2018.

⁴ 'Evidence and Analysis' paper published alongside the Jet Zero Consultation, DfT, July 2021, para 4.1.

⁵ 'Clean Skies for Tomorrow', WEF, 2020 referred to in DfT 'Evidence and Analysis' paper at para 2.7.

http://www3.weforum.org/docs/WEF_Clean_Skies_Tomorrow_SAF_Analytics_2020.pdf.

- 1.8 In short, we regard it as illusory to believe that net zero can be achieved alongside the Government's continued support for unfettered growth in air travel and we believe that it would be irresponsible for the Government to adopt a strategy which proceeds on that basis.
- 1.9 Finally, in this introductory section, we call upon the DfT to publish updated UK aviation forecasts to 2050 for passenger numbers, air transport movements and CO₂ emissions, in view of the fact that the most recent DfT forecasts, published in 2017, have been overtaken by the following material developments:
- (i) the airport expansion proposals triggered by the 2018 MBU policy (which are far in excess of the DfT's expectations);
 - (ii) the 2019 'Net Zero' amendment to section 1 of the Climate Change Act 2008;
 - (iii) the 2018 WHO evidence of the harms caused by aircraft noise to human health;
 - (iv) the impact of Covid-19 on the demand for air travel;
 - (v) the most recent (September 2021) BEIS carbon price valuations; and
 - (vi) the growing evidence that climate change is a 'here and now' issue and not just an issue for our children and grandchildren, reflected in Parliament's declaration of a "climate emergency" in May 2019.
- 1.10 In the light of the above the 2017 DfT forecasts can no longer be considered fit for purpose and there cannot be a credible Jet Zero strategy without a credible set of aviation forecasts.
- 1.11 The next section of our response deals with the specific questions set down in the Jet Zero Consultation Document.

2. Response to Consultation Questions

Q1: Do you agree or disagree that UK domestic aviation should be net zero by 2040? How do you propose this could be implemented?

A1: 2040 is not sufficiently ambitious. Other than a few limited exceptions (e.g. Highlands and Islands) domestic flights should be phased out by 2030 with progress reviewed in 2025.

Q2: Do you agree or disagree with the range of illustrative scenarios that we have set out as possible trajectories to net zero in 2050? Are there any alternative evidence-based scenarios we should be considering?

A2: With the exception of Scenario 1, all the proposed scenarios are highly speculative. Since the objective of net zero "*must be achieved*",⁶ it is plainly unwise to rely on these highly speculative proposals. The proposals put forward by the CCC reflect a more measured – and, in our view, far more realistic – pathway to achieving net zero and include the curtailment of future airport expansion.

Q3: Do you agree or disagree that we should set a CO₂ emissions reduction trajectory to 2050?

A3: We agree, and it needs to be monitored annually to ensure that any failings can be quickly addressed.

⁶ 'Jet Zero Consultation Document', DfT, July 2021, para 3.42.

Q3(a): Should the trajectory be set on an in-sector CO₂ emissions basis (without offsets and removals) or a net CO₂ emissions basis (including offsets and removals)?

A3(a): Both trajectories should be set so as to give clear messages as to exactly what progress is being made. However, offsetting in aviation involves either paying for a reduction in emissions in some other economic sector to compensate for the emissions from a flight, or paying for enough trees to be planted to absorb an equivalent amount of CO₂. Neither of these approaches provide a long-term solution for aviation given the need to achieve net zero emissions in the next decades.

Q3(b): Do you agree or disagree with the possible trajectories we set out, which have in-sector CO₂ emissions of 39 Mt in 2030, and 31 Mt in 2040 and 21 Mt in 2050, or net CO₂ emissions of 23-32 Mt in 2030, 12-19 Mt in 2040 and 0 Mt in 2050?

A3(b): The trajectories are based on a suggested approach best described in paragraph 3.42 of the Jet Zero Consultation Document, which states:

"We recognise that net zero 2050 must be achieved and we must ensure that any growth in aviation is compatible with our emissions reduction commitments. The approach we intend to set out in our Strategy will prioritise in-sector reductions through technological and operational improvements, then seek to address residual carbon emissions through robust, verifiable offsets and additional greenhouse gas removals. It relies on the rapid scale-up and deployment of technologies that are currently at a relatively early stage of development and requires collaboration and commitment across all parts of the sector if it is to succeed."

[Emphasis added]

In other words, the objective must be achieved, but we are relying on untried and untested technologies, which in some cases are still to be invented. Furthermore, these new technologies must be fully developed, up-scaled and deployed as commercially viable solutions in relatively short timescales which adds a further risk factor. Put shortly, it is a plan of hoping for the best whilst continuing with business as usual.

The words "uncertain", "uncertainty" and "uncertainties" together occur no fewer than 27 times in the Jet Zero Consultation (including the Evidence and Analysis paper). Such caveats sit uncomfortably with a strategy which "must be achieved" and with the imperative of tackling the existential threat of climate change. Plainly there is a need for greater certainty and it is only the DfT's blind support for the continued unfettered expansion of air travel that stands in the way of this.

Under the preferred future scenario (Scenario 2, "High Ambition") aviation CO₂ emissions continue to increase in the period to 2028 and then only reduce back to pre-pandemic levels in about 2033. In 2030 they are predicted to be 3% above pre-pandemic levels. The comparison between the CCC's recommended approach and the DfT preferred scenario for future aviation emissions, compared to pre-pandemic levels, is as follows:

Reduction in UK aviation CO₂ v pre-pandemic levels

Year	DfT ⁷	CCC ⁸
2030	+3%	-15%
2040	-19%	-26%
2050	-45%	-41%

It is clear from the above that the DfT's preferred scenario is heavily backloaded compared to the CCC's recommended approach. The DfT's strategy largely relies upon reductions being made in the period after 2040 which makes the DfT's approach higher risk compared to the approach recommended by the CCC and far more speculative, being dependent upon technologies yet to be developed and, in some cases, yet to be invented.

Assumptions for Fuel Efficiency Improvement

The speculative nature of the DfT's fuel efficiency assumptions is confirmed in the Evidence and Analysis paper, which states:

"Achieving such a high rate of fuel efficiency improvement will also be challenging, and may not be met if airlines cannot afford to invest in modernising their fleets at sufficient speed, or if the aerospace sector cannot afford to invest in creating the necessary aircraft advancements (made even more likely by the huge financial impact of Covid-19 on the aviation industry)."⁹

[Emphasis added]

A further key point concerning the DfT's preferred "High Ambition" scenario is that it assumes a fuel efficiency improvement over the period 2017-2050 of 2.0% pa. The rationale/source for this figure is said to be "Based on optimistic scenario from ATA research and in line with ICAO aspirational goal".¹⁰ But the DfT fails to mention that ICAO, in its most recent (2019) report, "Environmental Trends in Aviation to 2050" commented:

"Even under the most optimistic scenario, the projected long-term fuel efficiency of 1.37% per annum falls short of ICAO's aspirational goal of 2% per annum."¹¹

[Emphasis added]

The DfT Evidence and Analysis paper states that the figures in the ATA report translate "to a fuel efficiency improvement of between 1.5% and 2.0% per annum (for the 'Likely' and 'Optimistic' scenarios referenced in the research)"¹² but even the "Likely" figure of 1.5% appears optimistic when considered against other research evidence and the advice from the CCC.

⁷ 'Evidence and Analysis' paper, DfT, July 2021, Figure 6.

⁸ Climate Change Committee, 6th Carbon Budget, Section 4, Charts and data in the report, Chart 3.7a - <https://www.theccc.org.uk/publications/sixth-carbon-budget/>. This shows a 2019 baseline of 39MtCO₂, which reduces to 33MtCO₂ in 2030 (-15%); 29MtCO₂ in 2040 (-26%); and 23MtCO₂ in 2050 (-41%).

⁹ 'Evidence & Analysis' paper, DfT, July 2021, para 3.11.

¹⁰ Ibid, Table at para 3.10.

¹¹ [https://www.icao.int/environmental-protection/Documents/ICAO-ENV-Report2019-F1-WEB%20\(1\).pdf](https://www.icao.int/environmental-protection/Documents/ICAO-ENV-Report2019-F1-WEB%20(1).pdf) p.18.

¹² 'Evidence & Analysis' paper, DfT, July 2021, para 2.3.

The DfT Evidence and Analysis paper refers also to a report by the International Council on Clean Transportation ('ICCT') which found that aircraft fuel efficiency over the period 1960-2008 saw an improvement rate of 1.5% p.a. However, a more recent ICCT report¹³ – not referred to by the DfT – found that aircraft fuel efficiency over the later period from 1968-2014 improved at the lower rate of 1.3% p.a. which indicates a significant slowdown in the annual rate of fuel efficiency improvement between 2008 and 2014.

By way of further comparison, the CCC, for its Balanced Net Zero Pathway scenario, assumed an annual fuel efficiency improvement of 1.4%¹⁴ and we understand that the DfT in its latest forecasts assumed an annual fuel efficiency improvement of 1.14%. Meanwhile, Stansted Airport, in its recent planning application for an increase in its permitted throughput to 43 million passengers per annum, provided three scenarios for annual fuel efficiency improvement: 'Pessimistic' 0.9%; 'Central Case' 1.25%; and 'Best Practice' 1.6%.¹⁵ All of the foregoing indicates that the DfT has taken an extremely optimistic approach in projecting 2% annual fuel efficiency improvement.

Sustainable Aviation Fuels ('SAFs')

Firstly, we wish to emphasise that SAF is not a panacea. Burning SAF in an aircraft still results in CO₂ being added to the atmosphere. Furthermore, it also results in non-CO₂ emissions which have an additional warming effect.

The DfT's "High Ambition" scenario assumes an uptake of 30% SAFs by 2050 which DfT states is in line with "the CCC's Balanced Net Zero Pathway". The CCC figure is actually 25% in 2050 and this accounts for the difference in the projected percentage saving in 2050. The DfT's "High Ambition" scenario figure is therefore somewhat optimistic and, in keeping with the DfT's general approach, it is heavily backloaded, with the benefits predominantly projected to arise after 2040. This is a high-risk approach because it allows little time to adopt and implement an alternative strategy to achieve Jet Zero by 2050 if the preferred strategy fails to deliver.

This approach is contrary to the expert advice which is that the savings need to be made now otherwise we will not be on the right trajectory to achieve Jet Zero by 2050. Backloading also means that cumulative emissions will be greater in the period to 2050. Moreover, trajectories based on speculative future developments should not be relied upon to produce a critical outcome.

Even based on optimistic assumptions for fuel efficiency and SAFs, projected aviation emissions in 2035 are little different from pre-pandemic levels. It is unclear how this contributes to the Government commitment to reduce emissions by 78% by 2035. It should also be noted that the CCC has stated that GHGs need to be reduced by 45% from 2010 levels by 2030.

Q4: Do you agree or disagree that we should review progress every five years and adapt our strategy in response to progress?

A4: In view of the very serious consequences of failure, progress must be monitored annually to ensure that any failings can be acted upon immediately. Delay could be critical.

¹³ 'Fuel Burn of New Commercial Jet Aircraft: 1960 to 2019', Zheng X S and Rutherford D, ICCT, September 2020.

¹⁴ Climate Change Committee, The Sixth Carbon Budget, Aviation, Table M8.1.

¹⁵ Environmental Statement submitted by Stansted Airport Ltd, October 2020, Chapter 12, Table 12.1.

<http://www.hwa.uk.com/site/wp-content/uploads/2020/10/Chapter-12-Carbon-Emissions.pdf>.

Q5: Do you agree or disagree with the overall approach to improve the efficiency of our existing aviation system?

A5: We note that the proposals are all aspirational. We support measures to incentivise efficiency improvements such as the use of increased landing fees to charge for CO₂ emissions and for Air Navigation Service Providers to implement differential route charges based on environmental performance. This would be consistent with the "polluter pays principle" Our comments on the projected rate of improvement are given in our answer to question 3(b).

Q6: What more or differently could be done to ensure we maximise efficiency within the current aviation system?

A6: See our response to Question 5.

Q7: Do you agree or disagree with the overall approach for the development and uptake of SAF in the UK?

A7: There are numerous issues concerning SAF production. These include the feedstock and methods of production to ensure that it is "100% efficient" and the costs which are described as *"high and uncertain, ranging from two-three times the price of the fossil alternative, and potentially up to eight times more for certain technology pathways"*.¹⁶ This point is repeated in the Evidence and Analysis paper which acknowledges that *"Current SAF use in UK aviation is negligible and there is significant uncertainty around the availability and cost of SAF in the future"* and *"The costs of SAF are high and uncertain"*.¹⁷

The Evidence and Analysis paper cites a projection from the 'Clean Skies for Tomorrow' report (referred to earlier in our response) that feedstocks could supply almost 500 Mt of SAF by 2030.¹⁸ The basis for this projection is not clear and there may be a degree of optimism bias noting that 'Clean Skies for Tomorrow' is an aviation industry coalition.

The 'Clean Skies for Tomorrow' report does however acknowledge that the major problem is production capacity. SAF production in 2019 was less than 0.1% of the jet fuel used by commercial airlines and, if all the projects that have been publicly announced were to be built, annual capacity would reach just over 1% of expected global demand in 2030. The WEF makes clear that SAF is "not a silver bullet" and it goes on to say:

"Demand will need to rise sharply to change the calculus of stakeholders throughout the value chain and overcome the challenges of creating a global SAF ecosystem and reaching 2030 decarbonization targets."

...

"Scaling up each production pathway presents a range of challenges. For example, some feedstocks may be difficult to collect in sufficient quantities and some technologies need additional maturation through research and development to become practical. Demand for SAF would need to rise dramatically in the next few years even though it is likely to remain significantly more expensive than fossil fuel for decades. In short, progress will require not just scientific advances but meaningful and relatively quick changes in attitudes and behaviours around the world – including consumer preference for more sustainable travel options as well as government policy support."¹⁹

¹⁶ 'Jet Zero Consultation Document', DfT, July 2021, para 3.16.

¹⁷ 'Evidence and Analysis' paper, DfT. July 2021, para 2.5 and 2.8.

¹⁸ Ibid para 2.7.

¹⁹ 'Clean Skies for Tomorrow', WEF, 2020, p.29.

http://www3.weforum.org/docs/WEF_Clean_Skies_Tomorrow_SAF_Analytics_2020.pdf.

Aside from the question of costs, there will be competing demands for feedstock and other demands on the bioenergy resource and productive capacity. According to ICAO, in order to achieve 100% SAF use in aviation by 2050 would require *"approximately 170 new large bio-refineries to be built every year from 2020 to 2050, at an approximate cost of US\$15 billion to \$60 billion per year..."*²⁰

The Government needs to provide rapid and substantial encouragement, with clear policy support and incentives, if SAF production and use is to reach 30% by 2050. The policy proposals set down in the Jet Zero Consultation Document²¹ are vague and lack urgency. A "wait and see" policy is not realistic.

Q8: What further measures are needed to support development of a globally competitive UK SAF industry and increase SAF usage?

A8: There are two obvious problems with SAFs: (i) SAFs currently cost several times the cost of conventional fuel; and (ii) there is very little production capacity.

According to the industry body Sustainable Aviation ('SA'), there is an "urgent" and desperate need for Government support. The amount said to be needed is £500 million which, according to SA, would be matched by a similar contribution from the industry²². This is a great deal more than the £15 million of Government funding currently promised²³.

The policy proposal set down in the Jet Zero Consultation Document to review SAF by 2030²⁴ *"once the supportive policy framework is in place, and SAF production is being scaled up"* is far too casual an approach. Far more urgency is required and there needs to be a clear plan, with milestones, to reach the DfT's assumption of 30% SAFs by 2050.

Q9: Do you agree or disagree with the overall approach for the development of zero emission flight in the UK?

A9: The difficulties with battery powered flight or the use of hydrogen are well documented. With batteries weighing more than 40 times that of fossil fuel it seems likely that for some years they will only be used by small aircraft for short flights. Hydrogen has a volume requirement of four times greater than conventional fuel and its use will require airplane redesign and the need for massive investment in infrastructure and storage. Some of these difficulties are referred to in the Evidence and Analysis report where it states:

"However, the timelines for zero emission flight are still uncertain and depend on continual progression in battery, fuel cell and liquid hydrogen propulsion technologies. There is currently limited available evidence on the costs of these technologies." and goes on to comment "In the Destination 2050 study, the abatement cost for Hydrogen aircraft is estimated to be €225/tCO₂ (or around £195/tCO₂)." ²⁵

²⁰ 'Environmental Trends in Aviation to 2050', ICAO, [https://www.icao.int/environmental-protection/Documents/ICAO-ENV-Report2019-F1-WEB%20\(1\).pdf](https://www.icao.int/environmental-protection/Documents/ICAO-ENV-Report2019-F1-WEB%20(1).pdf), p.20.

²¹ 'Jet Zero Consultation Document', DfT, July 2021, p.29.

²² 'Decarbonisation Road-Map. A path to Net Zero', SA, February 2020 - https://www.sustainableaviation.co.uk/wp-content/uploads/2020/02/SustainableAviation_CarbonReport_20200203.pdf.

²³ 'Jet Zero Consultation Document', DfT, July 2021, para 3.17.

²⁴ Ibid, p.29.

²⁵ 'Evidence and Analysis' paper, DfT July 2021, para 2.11.

Production of green hydrogen involves large capital costs and a long timescale. There is considerable doubt that it could be scaled up in the next 20-30 years which introduces a high level of risk.

The proposals put forward by the DfT are purely aspirational, and a commitment of £3 million for R&D is 'a drop in the ocean' in view of the scale of the technological challenges.

Q10: What further measures are needed to support the transition towards zero emission aviation?

A10: The proposed approach is based on the hope that a number of sketchily defined incentives will result in new technologies emerging in the next decade or so that will offer solutions. Allowing business-as-usual expansion in air travel before new technologies and alternative fuels are available is tackling the issue the wrong way around. It is not the way to plan for a critical outcome. Expansion should be curtailed until solutions have been developed.

The approach recommended by the CCC is far more logical than the DfT's approach because it would enable the industry to expand in a controlled manner, directly related to its progress in achieving decarbonisation. This would incentivise new, 'greener' technologies because these would be a pre-requisite for continued expansion. Thus, the CCC recommendations offer a far greater prospect of successfully achieving the critical target of Net Zero by 2050.

Q11: Do you agree or disagree with the overall approach for using carbon markets and greenhouse gas removal methods to drive down CO₂ emissions?

A11: The DfT's proposed approach is largely aspirational. Indeed, the DfT acknowledges the considerable degree of uncertainty regarding the cost and timescales for GHG removal:

*"GGRs are not yet implemented at commercial scale, either in the UK or globally, and forecasts of costs and scale-up potential are highly uncertain"*²⁶

and

*"Cost estimates vary widely due to the early stage of these technologies, the uncertainty surrounding potential cost reductions over time and the predicted capacity of GGRs that will be required to reach net zero...However, further factors such as the sustainability of feedstocks and energy requirements for GGRs must also be considered when determining the extent to which they can be deployed to compensate residual emissions from the aviation sector."*²⁷

Even with the High Ambition scenario proposed in the Consultation Document, the DfT projects that 36.7% of UK aviation emissions in 2050 will still have to be removed from the atmosphere.

With regard to CORSIA it needs to be understood that this merely covers CO₂ emissions in excess of 2019 levels which will be covered by offsetting. Offsetting is beset with problems and difficulties and it is by no means clear as to how many countries will participate in CORSIA with China, India, Brazil and Russia already declining to join. A further shortcoming is that CORSIA does not cover aviation's non-CO₂ emissions.

²⁶ 'Jet Zero Consultation Document', DfT, July 2021, page 36.

²⁷ 'Evidence and Analysis' paper, DfT July 2021, para 2.20.

Q12: What could be done further or differently to ensure carbon markets and greenhouse gas removal methods are used most effectively?

A12: Again, we are far more persuaded by the 'Balanced Net Zero Pathway' approach advocated by the CCC than by the DfT's proposed approach. The latter places too much reliance on technologies not yet developed and also too much reliance upon international carbon trading - despite the lack of progress in this area over the past 20 years. The DfT strategy involves hoping that a number of sketchily-defined incentives will result in the emergence of new technologies in the next decade that will offer solutions. This is not the way to plan for a critical outcome.

GGR technologies and facilities require very substantial upfront investment and there is a high level of uncertainty with regard to the payback period. It is highly unlikely in the present circumstances that the private sector would be prepared to commit the necessary level of investment in order to have a significant level of GGR by the 2030s. The Consultation Document contains no strategy for resolving this major funding difficulty.

Q13: Do you agree or disagree with the overall focus on influencing consumers?

A13: The only proposals put forward by the DfT in the Jet Zero Consultation Document are:

"We will work with the CAA to explore whether mandating the provision of environmental information to customers at the time of booking flights could influence consumer decision - making when presented with standard, reliable and accurate flight comparisons."

"We will look at other ways to support consumers to make sustainable choices when booking flights and reward those parts of the aviation sector that move more quickly to decarbonise."

Commitments to "explore" and to "look at" are hardly commitments at all. In any event we are not persuaded that those soft initiatives, such as providing better information to consumers and/or appealing to their environmental conscience, will have much effect. Hard initiatives - increasing the cost of travel being the foremost of these - will be needed to change consumer behaviour.

The importance of price, as a demand management tool, is recognised in the Evidence and Analysis paper, which states:

"2.21 In order to achieve the CCC's proposed demand limit of a 25% increase in passenger numbers on today's levels by 2050, our modelling suggests a carbon price substantially higher than £600/t could be necessary. However, given the current evidence on the costs of SAF and hydrogen, we think before carbon prices reached this level, they would be sufficient to incentivise technologies to reach net zero GHG emissions by 2050.

2.22 This analysis suggests that capping demand may not be necessary to reduce emissions to levels which can be offset by GGRs to achieve net zero (such as the level suggested by the CCC's Balanced Net Zero Pathway, 23 Mt in 2050). There is much uncertainty however, and clearly there could be many combinations of technology improvements, GGR costs and demand growth which would achieve net zero. The challenge is

to provide the right incentives and support to achieve this aim in the least restrictive and most cost-effective way possible."²⁸

[Emphasis added]

Again, it appears that the DfT is determined to base its strategy upon wishful thinking rather than take meaningful action to manage demand using the demand side (pricing) and supply side (airport capacity) tools at its disposal.

Q14: What more can the Government do to support consumers to make informed, sustainable aviation travel choices?

A14: Each year only about half the population fly and 15% of the population are responsible for 70% of the flights. The Foreword to the Jet Zero Consultation Document states that the Government wants *"hardworking families to continue to enjoy their annual holiday abroad"*. A Frequent Flyer Levy could be structured so that "hardworking families" would only pay a basic rate and those flying more often could be discouraged by higher rates on additional flights. In addition, higher rates could reasonably be levied on private planes where emissions are calculated to be up to ten times as much as conventional planes.

Q15: What could be done further or differently to ensure we tackle non-CO₂ impacts from aviation?

A15: Although the science is still uncertain the latest information is that the non-CO₂ impacts of aviation are at least double, and possibly treble, the effects of the CO₂ alone.

In fact, the uncertainty is probably on a lower level than that concerning the availability and capability of future technologies to help reduce emissions. On that basis it would deserve at least equal weight in the analysis. Therefore (and having regard to the precautionary principle) projected future emissions should be updated to include non-CO₂ effects.

The use of SAFs will generally have very little effect on non-CO₂ emissions. They will usually be much the same. It would therefore be logical to assess the emissions total to include non-CO₂ emissions.

3. Other points

- 3.1 About 80% of air travel is for leisure purposes with outbound overseas visits by UK residents about double the number of inbound visits to the UK by overseas residents. This has a significant economic effect since it gives rise to a very substantial trade deficit. Pre-pandemic, in 2019, this amounted to £34 billion. This adverse impact on the UK Balance of Payments is likely to worsen with increased air travel. We note that there is no mention of this in the Jet Zero Consultation Document or the Evidence and Analysis paper.
- 3.2 Commercial aircraft have an economic life of 20-30 years and so many of the planes coming off the production line now will still be flying in 2050. It is not clear that the DfT has taken full account of this in developing its Jet Zero strategy.

²⁸ 'Jet Zero Consultation Document' DfT, July 2021, page 41.

4. Conclusions

4.1 The Introduction to the Evidence and Analysis paper states:

"The Jet Zero Consultation sets out the principles for delivering aviation net zero by 2050 and outlines the range of solutions needed to reach this goal.

...

However, many of the technologies needed to achieve net zero aviation are in the early stages of development and there is significant uncertainty regarding the expected cost, availability and uptake of these technologies over the coming decades."

and the Summary of the Evidence and Analysis paper states:

"The scenarios show that significant in-sector abatement could be possible if we make substantial progress with new technologies. However, making the required technological progress will be very challenging and there are many barriers that will need to be overcome..."²⁹

[Emphasis added]

4.2 Setting out principles and outlining solutions is commendable but what is needed is positive action. The situation is urgent and critical and the solutions need to reflect that.

4.3 The Evidence and Analysis paper also states:

"The scenarios presented here are not prescriptive. The uncertainty surrounding the future costs of the measures mean that it is not possible to assess the relative cost effectiveness of the scenarios. The optimal mix of measures will become clearer over the coming decade as the relevant technologies mature and evidence of their relative costs improves."³⁰

and

"There is significant uncertainty surrounding the abatement potential, uptake and costs of the measures described in this document and therefore these scenarios should be seen as illustrative pathways rather than forecasts."³¹

[Emphasis added]

4.4 The above examples demonstrate that the DfT's approach is so full of "ifs" and "buts" that it can barely be described as a strategy. The DfT makes clear in the Jet Zero Consultation Document that the objective of net zero "must be achieved" but the tentative and highly optimistic nature of the proposals and assumptions underlying the DfT's approach do not inspire confidence. Moreover, there is practically nothing in the DfT's strategy either to incentivise the industry to develop the necessary technologies or to penalise the industry (e.g. by demand management) if it fails to decarbonise.

4.5 The DfT's approach can best be described as continuing to support 'business-as-usual' whilst hoping that technological solutions emerge in the next two-three decades, even in the knowledge that *"Many of the technologies we need to achieve Jet Zero are at an early stage of development or commercialisation."*³² Furthermore, these new technologies must be fully developed, up-scaled and deployed as commercially viable solutions in relatively short timescales which adds a further risk factor.

²⁹ 'Evidence and Analysis' paper, DfT, July 2021, p.4 and p.19.

³⁰ Ibid, para 3.2

³¹ Ibid, para 4.3.

³² 'Jet Zero Consultation Document', DfT, July 2021, para 2.5.

- 4.6 We are also concerned that the DfT only intends to review progress every five years, and for SAFs the first progress review is not intended until 2030. It cannot be right to wait until 2030 to discover that the (highly optimistic) ambitions of the strategy are not being realised. Far more interventionist measures might then be needed in order to recover lost ground.
- 4.7 Plainly it would be preferable to adopt a measured strategy from the outset, similar to the Balanced Net Zero Pathway proposed by the CCC, which had a realistic chance of success. The industry would then have a clear incentive to decarbonise, knowing that its future growth prospects directly depended upon its trajectory towards achieving Net Zero by 2050.
- 4.8 We urge the DfT to reconsider the approach recommended by the CCC rather than a strategy of hoping for the best. As quoted in our introduction, "Hope is not a strategy".

*Stansted Airport Watch
8 September 2021*