Aviation 2050: the future of UK aviation

1. Introduction

Thank you for responding to this consultation on Aviation 2050: the future of UK aviation strategy.

The easiest way to respond to this consultation is via the online form:

https://www.smartsurvey.co.uk/s/aviation2050/

The online form allows you save and continue your response and save or print a final version for your records.

The aviation strategy sets out the government's vision for aviation to 2050 and includes proposals to:

- develop a partnership for sustainable growth which meets rising passenger demand, balanced with action to reduce environmental and community impacts
- enhance the passenger experience
- build on the UK's success to establish new connections across the world and create greater choice for consumers

Your answers will help us to shape the policy proposals within this document to create a final strategy which will support industry to delivering even greater improvements for passengers, the environment and our country.

This consultation has been extended, and now closes at 11:45pm on 20 June 2019. This is with the exception of the questions posed in 'Annex A: Legislation to enforce the development of airspace change proposals', which will still close for responses at 11:45pm on 11 April 2019.

Confidentiality and data protection

The Department for Transport (DfT) is carrying out this consultation to gather views and evidence on measures for inclusion within the statutory guidance issued for the aviation strategy. This consultation and the processing of personal data that it entails is necessary for the exercise of our functions as a government department. If your answers contain any information that allows you to be identified, DfT will, under data protection law, be the controller for this information.

As part of this consultation we're asking for your name and email address. This is in case we need to ask you follow-up questions about any of your responses. You do not have to give us this personal information. If you do provide it, we will use it only for the purpose of asking follow-up questions.

We may contract a third party to analyse the responses we receive to the consultation. If you provide your contact details, we may share this information with a contractor in case they need to contact you regarding your consultation response.

DfT's privacy policy has more information about your rights in relation to your personal data, how to complain and how to contact the Data Protection Officer.

Your information will be kept securely and destroyed within 12 months after the consultation has been completed. Any information provided through the online questionnaire will be moved to our internal systems within 2 months of the consultation end date.

2. Personal details

1. Your name and email address (only used if we need to contact you).

Your name	Peter Sims
Your email	info@greenhousethinktank.org

2. Are you responding as:

	an individual? (Go to section 4. Chapter 2: Build a global and connected Britain)
✓	on behalf of an organisation? (Go to 3. Organisation details)

3. Organisation details

3. What organisation do you work for?

Green House Think Tank

4. What type of organisation is this?

	Airline
	Airport
	Regulatory body
	Interest group
	Community group
	Industry
✓	Other: Think Tank

4. Chapter 2: Build a global and connected Britain

The UK has the largest aviation network in Europe and the third largest in the world, an industry that contributes at least £22 billion to the UK economy, along with over 230,000 jobs. The government supports the growth of the aviation sector, provided that this happens in the most sustainable way, to ensure its continued success.

Build a global and connected Britain

Aviation is important for the government's goal of building a global and connected Britain. The UK already plays a prominent role on the world stage with the biggest international aviation network in Europe and currently the third largest in the world. Through the Aviation Strategy the UK will be equipped to build new connections in rapidly growing aviation markets, and to use the leverage we have internationally to pursue our objectives on environmental measures and liberalisation.

The government is working to:

• improve standards globally

• maintain and improve the UK's connectivity

• support UK aviation exports, including overcoming barriers to exporting

5. This section contains questions on chapter 2 of the consultation document - Build a global and connected Britain. Which of the following topic areas are of interest to you as an individual or to the organisation on behalf of which you are answering? (choose all relevant options)

	Air services agreements
	Liberalisation of air traffic rights
	Airline ownership and control
	Interchange (short term leasing of aircraft between airlines)
	International standards
	Aviation exports
✓	Global connectivity
	Airline competition

6. How should the UK use its global leadership and international influence to further the aims of the UK's aviation sector?

Regrettably showing leadership, doesn't always mean taking the easy option. The UK Aviation industry has to not only accept, but embrace the transition to net-zero demanded by Climate change if it is to both show Global Leadership and best serve UK citizens. This means the sector, and therefore this strategy needs to commit to a Net Zero target for aviation by 2050 at the very latest to be inline with IPCC sr15 report on 1.5°C. Arguably far earlier due to the obligation on countries with the highest historical emissions to decarbonise first (See evidence outline in Q7). Whilst this will not stop the sector from thriving if it makes the right investment decisions now, it will mean questioning growth in aviation and the viability of current passenger levels, aircraft and practices. Whilst new aviation technologies may be developed by 2050. with the average lifespan for aircraft of over 30 years, a significant number of current aircraft are likely to still be in operation in 2050. Given limited UK land available for biofuel production the industry needs to be investing heavily in both non-hydrocarbon aircraft, but also synthetic fuels technology and carbon dioxide removal from the atmosphere. It is the progress in these technologies which will determine what the scale of international aviation can be in 2050. It is therefore critical that all parts of the UK aviation industry take a leading role in funding, developing and deploying these technologies. The industry needs to recognise cost of this in its business plans and that there is a high chance that hydrocarbon aircraft purchased today may become stranded assets before the end of their service lives.

7. What should the UK's priorities be for strengthening existing connections and establishing links with emerging markets?

In the context of the Climate Emergency the UK aviation priorities have to be long haul, as domestic and short haul flights need to be replaced by rail travel as this is easy to electrify and has lower emissions per passenger km. The exceptions to this are flights between UK, Ireland and other remote islands such as Isle of Man, Channel Islands, Shetland etc, for which short haul flights will remain the only option for urgent travel.

Policy proposals

The questions in the section below refer to policy proposals contained in chapter 2 of the consultation document - Build a global and connected Britain. As with the rest of this consultation, you are welcome to respond to any, all or none of the questions in this section.

8. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?

Remove inconsistencies between sector growth and sustainability.

2.1 - "The UK plays a prominent role in aviation on the world stage. We have the biggest aviation network in Europe and currently the third largest in the world. We also have the second largest aerospace industry in the world and manufacture some of the most advanced aviation technology" ------→ This gives us a responsibility to lead on decarbonisation of aviation and set

an example on behaviour change around aviation.

"2.6 As the global air transport network continues to expand with rapidly growing new markets and new destinations emerging, the UK wants to ensure air travel is safe, secure, and environmentally sustainable and can adopt new technologies and business models to continue to respond effectively to consumers' needs." ------> The strategy must explicitly recognise that "consumers" don't have aviation "needs", but "desires" and that these 'desires' are heavily influence by wider societal framing of aviation and expectation about what is normal behaviour. These are in part set by government aviation strategy. No one in our society has a need to take a flight in order to survive. The aviation industry provides a service which using can add to people's quality of life, but in a majority of cases an equivalent improvement to quality of life could be achieve without flying.

2.11 "continue to lead efforts to negotiate for robust, environmentally effective emissions reduction measures that minimise market distortions and address aviation's emissions in the most cost-effective way" - So:

- Cost effective → Act now

- Minimise market distortion → Flat carbon tax across all sectors (It would be distorting to treat some carbon emission differently to others)

"support and strengthen the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and negotiate for a long term goal for international aviation climate emissions, ideally by ICAO's 41st Assembly in 2022, that is consistent with the temperature goals of the Paris Agreement33" - Yes, but emission from UK citizens' flights should be offset in the UK where possible. 2.11 would be improved by being more specific about changes needed in the aviation sector over the coming decade and what action the government will be taking to ensure these are achieved.

2.15-7 – The strategy must recognise that although overly prescriptive regulations could constrain zero carbon aviation innovation, without sufficient targets, frameworks and regulation industry might not prioritise the right sort of innovation. The past few decades have seen industry successfully leading incremental innovation, but the next decade must deliver a step change in both level and focus of innovation to realise zero carbon aviation.

2.21-3 – The relevance & importance of aviation with the EU, particularly mainland Europe is likely to decrease with the modal shift from aviation to High Speed/long distance rail required to reduce transport emissions to net zero. The strategy should recognise this and support operators in diversifying into long distance rail. This maybe particularly relevant to tour operates serving holiday destination on the Mediterranean coast, skiing destinations and popular European cities like Prague, Vienna, Geneva. It is not currently possible to get direct trains to these destinations, which operators currently running direct flights may wish to capitalise on.

9. How should the proposals described be prioritised, based on their importance and urgency?

Environmental and Innovation measures must be priorities to ensure the UK uses its position to set an example to the rest of world on what Sustainable Aviation looks like. The priorities after this must be to measure which best facilitate the parts of aviation which are most sessional and important for quality of life. This is believed to mean prioritising passenger aviation to connect families over leisure, business and freight. Air freight should only be viable as secondary cargo on passenger aircraft.

10. What implementation issues need to be considered and how should these be approached? (e.g. resourcing challenges, high levels of complexity, process redesign, demanding timelines)

As per question 18, the UK and therefore its aviation sector must reach net zero in the early 2030s, but certainly before 2050. The focus has to be on the next decade which will mean a significant reduction in aviation from current levels as it is unlikely that zero carbon aviation technologies will be ready to be deployed at scale in this time frame.

As a result of the UK emissions (when emissions embedded in imports are included) being very similar now to the late 1990s~~continuing to rise for the last 25 years~~, a rapid transition is now urgently required across all sectors. This means a lot of the restructuring of society will have to happen very quickly and in parallel which is less ideal than a more orderly transition. It also will put huge demand on skilled labour, machinery and resources as there is a huge amount of infrastructure transition to take place in a short time frame. This may mean that activities perceived to be less critical, which may include aviation could be delayed/postponed.

11. What are the financial burdens that need to be managed and how might those be addressed?

Developing Zero Carbon commercial passenger aviation will require vast amount of upfront investment in technologies which may not come on line for decades. In the past, key technologies developed under military R&D budgets ended up transforming commercial aviation, but this is less likely to happen with zero carbon technologies due to less military R&D funding and more disparate requirements/priorities. The development of these technologies is often required to be quite speculative in the early stages when many technologies are explored, most of which will not directly lead to commercial potential, but make a more indirect contribution. This makes the investment which is required difficult for a lot of the commercial participants in the sector due to both the long time period (decades) before a technology may become commercialised and the high risk in any individual project. This may mean that development of these technologies may require government R&D funding or for industry to pool their investment funds to make the risk profiles manageable.

If the technology/land to either operate current aircraft at the current scale cannot be found or new net-zero technologies cannot be commercialised before our society must reach net-zero, then the only choice available will be to massively scale back aviation, which will have a significant impact on the profitability of much of the industry. Even if these new technologies do become available in time the transition may require retiring or retrofitting existing planes before the end of their service lives, which creates significant financial burden on those who invested in them. Either way the aviation industry will need to reconsider their business models, and the likely outcome of all scenarios is a significant increase in the cost of flying which will decrease demand. Without government intervention this risks flying becoming the reserve of the rich, which will exacerbate existing inequality issues.

All investment decisions made now, whether into airport capacity or new fossil fuel dependent aircraft must be made in this context. Current aircraft and airport capacity may become 'stranded assets'. Airports and airlines should be transparent about these risks in communications with their investors.

The privileged position of the aviation industry relative to other modes of transport with regards to tax breaks and exemptions is rapidly become unviable. Climate Emergency declarations should lead to a carbon tax escalator covering aviation fuel. In this context the industry needs a clear plan for what its operations will look like in these circumstances, and how business models will evolve.

12. What are the regulatory burdens that need to be managed and how might these be addressed?

13. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?

Aviation is currently zero rated for VAT but unlike railway and bus travel could be describe as a luxury (nobody needs to fly in order to live). It also pays no fuel duty and Aviation Fuel is zero rated as well. Furthermore it is very unlikely that the UK will meet its emission targets without introducing a Carbon Tax. Given that Aviation is currently 7% and rising of UK GHG it seems vital that to avoid distortion in the transport market aviation fuel is covered as part of a carbon tax (which would happen naturally if tax is applied at source/point of import).

In order for the UK to decarbonise its transport sector there will need to be a shift from air freight to rail freight and from short haul flights to rail. Currently many UK internal flights are cheaper than equivalent rail fares, not because railway travel is inherently more expensive, but because fuel duty exemption for aviation distorts the transport market. There are also various externalities such as noise, air pollution and GHG emission which currently aren't factored into the cost of aviation.

Implementing a carbon tax at £100 per tonne would create additional cost of over £3bn at current demand which would be 5% of current industry turn over.

The viability of further aviation growth has to be reconsidered in the context of latest evidence on climate change. (See Q7)

14. Looking ahead to 2050, are there any other long term challenges which need to be addressed?

Beyond getting aviation to net-zero . . . .

1.33 – Global and domestic trends show that with the right economic conditions, the year-on-year growth in passenger numbers and air freight can be expected to continue.

Whether current aviation trends can continue in light of the pressing need to reach Net Zero requires serious consideration. The Quality of life consequences of reducing access to aviation have to be weighed up against Quality of life consequences of us not following a Net Zero GHG emissions pathway which gives a high chance of avoiding >1.5C climate change. Net-zero aviation being commercialised in time is currently looking unlikely, but Quality of life consequences of reduced access to aviation can be minimised by providing long distance rail alternatives for short haul flights, and ensuring fair access to the remaining aviation for all parts of society. One way of doing this would be to ban first class/business class travel, to maximise the number of people that can be carried in a flight and ensuring that we get the most passenger miles from the carbon emissions used. This would also discourage frequent flying by the very rich, as they would have to suffer the discomfort of travelling in economy. Private planes and helicopters should also be restricted.

15. Are you aware of any relevant additional evidence that should be taken into account?

✓	Yes (see following evidence page)
	No (proceed to next section)

5. Global and connected Britain evidence

16. Please give a brief summary of the additional evidence that you wish to provide.

Comments:

Evidence that continued globalisation is incompatible with a net zero world.

<ref Jonathan Essex GH report>

Evidence on UK Emission including imports

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794557/Consumption_emissions_April19.pdf

6. Chapter 3: Ensure aviation can grow sustainably

Demand for aviation has grown significantly since 2010 and the government welcomes growth in the sector, but this growth must be sustainable. Achieving this requires a partnership between the government, the regulator and industry to work within a comprehensive policy framework to better manage the environmental impacts of the sector.

The Aviation Strategy:

- outlines the government's preferred approach for developing a framework for sustainable growth and outlines the respective roles for government and industry

- makes the case for making most efficient use of infrastructure, including by reforming the system for slot allocation at airports and continuing to support industry in improving resilience

- describes the approach being taken to airspace modernisation to deliver capacity and environmental benefits

- sets out a robust policy framework and package of measures to reduce the harmful effects of aviation on the environment, such as carbon emissions, air quality and noise

- sets out government's expectations that communities should benefit directly from growth

17. This section contains questions on chapter 3 of the consultation document - Ensure aviation can grow sustainably. Which of the following topic areas are of interest to you as an individual or to the organisation on behalf of which you are answering? (choose all relevant options)

	A partnership for sustainable growth
	Airspace modernisation
✓	Resilience
	Slots allocation
✓	Safeguarding land
✓	Community engagement
✓	Carbon emissions
✓	Non-carbon emissions
✓	Air quality
✓	Noise
✓	Reducing waste
✓	Sustainable journeys to the airport

18. To what extent does the proposed partnership for sustainable growth balance realising the benefits of aviation with addressing environmental and community impacts?

As the strategy currently stands it fails of achieve this objective.

3.5 – Growth in aviation demand should not be framed as something which is beyond the control of government and industry. The increasing demand of aviation is linked to affluence, advertising of trips abroad, as well as social and cultural norms which both the industry and government play a part in shaping. If flying is pitched to the public as cheap, affordable to all, and holidays abroad as a key status symbol then are we surprised that the demand keep increasing.

1.35 - "ensure that aviation can grow sustainably – moving beyond an artificial 'choice' between growth and environmental protection by building a new partnership that actively supports sustainable growth with actions taken to mitigate environmental impacts" - Until technology proves otherwise it is wrong to describe this as an artificial choice. It would be reckless for the strategy to suggest that we do not have to consider the difficult choices around demand management because technology is guaranteed to enable zero carbon aviation before the UK must reach net zero. The IPCC sr15 report on 1.5C published last autumn made it quite clear we have a little over a decade to halve UK emission (including those embedded in imports). There is significant evidence (see Q7) that these pathway rely too heavily on negative emission and don't give enough certainly of avoiding thermal runaway from tipping points between 1.5C & 2C. It would be unrealistic in the extreme to suggest that by 2030 zero carbon aviation technologies will have been developed at scale, even with the additional R&D we propose (although their deployment may have started). Although potentially inadequate reducing aviation GHG by 50% by 2030 maybe possible without demand management, it would be likely to lock in remaining emission making the following decades reducing to Net Zero even more difficult to achieve.

"1.21 This is why the government is supportive of the development of a third runway at Heathrow Airport"
If demand management, particularly around airfreight are a serious consideration going forward the aviation growth prediction which currently justifies the expansion of Heathrow Airport should be reconsidered.

However we welcome 3.9:

"The government recognises the significance of sustainable fuels. It has introduced policies for and will continue to: • support the development of sustainable aviation fuel through its inclusion in the Renewable Transport Fuel Obligation (RTFO) and £22 million funding in its Future Fuels for Flight and Freight completion".

19. How regularly should reviews of progress in implementing the partnership for sustainable growth take place?

Annually until aviation emission are on a trajectory for net zero before 2050. Then every 3 years.

20. Are there any specific 'triggers' (e.g. new information; technology development etc) that should be taken into account when planning a review?

UK remaining carbon budget for 75% chance of 1.5°C degrees climate change and the latest evidence around climate tipping points.

Policy proposals

The questions in the section below refer to policy proposals contained in chapter 3 of the consultation document - Ensure aviation can grow sustainably. As with the rest of this consultation, you are welcome to respond to any, all or none of the questions in this section.

21. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?

"3.73 The government has committed to achieving zero avoidable plastic waste by the end of

2042 and the aviation sector will need to play its part in achieving this"

This deadline should be brought forward to 2030, there is no reason why the vast majority of single use plastic could not be phased out in a decade. The government should send a clear signal about what it wants to change and not set needless distant targets which reduce the incentive for immediate action.

"3.78 The government welcomes the sector's positive progress in responding to the challenge of addressing its impact on climate change." - This is dishonest – In 3.77 you say UK aviation emissions have increased then you welcome this as good progress.

"In developing this vision and pathway, the government recognises the following challenges:

concerted global action requires consensus and takes time to achieve unilateral, national level action could put UK airlines at a competitive disadvantage compared to their global competitors and lead to carbon leakage (when emissions are moved elsewhere rather than reducing them), with no environmental gain."

Unfortunately we don't have time. The UK should take unilateral action on this to set the pace of change required. It should then work simultaneously on building consensus and getting others to follow our lead. Although we should expect to have to revise our approach in light of international agreements and climate developments, we no longer have the time available to build consensus before taking drastic action. Although there is a real risk that unilateral action could risk the UK's competitive advantage now, if the UK leads the development of zero-carbon aviation in the long

run we will be ahead of the game in the new aviation era.

"3.84 The government plans to negotiate for any long term goal to be set and reviewed in light of aviation's full climate impact, taking into account evolving evidence on non- CO2 effects." - This is the right approach, but current strategy does not live up to this plan/goal. See Evidence.

3.85 - "The UK's trajectory to meeting its Climate Change Act 2050 target is set out in five-yearly carbon budgets that currently exclude emissions from international aviation. However, the Committee on Climate Change (CCC), established by the Climate Change Act as the independent advisory body on climate change, recommends that international aviation should be included by 2050." - Aviation needs to be included from the start of the next carbon budget. If left beyond the point we need to get to net zero (potentially as soon as 2030), it will make UK targets meaningless.

22. How should the proposals described be prioritised, based on their importance and urgency?

The risk of runaway Climate Change and Mass Extinction are jointly the biggest threats we face so must be prioritised ahead of all other issues and constraints.

23. What implementation issues need to be considered and how should these be approached? (e.g. resourcing challenges, high levels of complexity, process redesign, demanding timelines)

Carbon Lock in. Mass deployment of new more efficient aircraft which still rely on hydrocarbons may reduce emission in the short term but risk locking us into CO_2 intensive aviation for the life span of those aircraft which is likely to far exceed the net zero deadline.

A shift from fossil fuel based to biofuel based aviation fuel could lead to further deforestation and land use change emissions as well as putting further pressure on biodiversity though increased use of energy crop monocultures.

24. What are the financial burdens that need to be managed and how might those be addressed?

Developing Zero Carbon commercial passenger aviation will require a vast amount of upfront investment in technologies which may not come on line for decades. In the past, key technologies developed under military R&D budgets ended up transforming commercial aviation, but this is less likely to happen with zero carbon technologies due to less military R&D funding and more disparate requirements/priorities. The development of these technologies is often required to be quite speculative in the early stages when many technologies are explored most of which will not directly lead to commercial potential but do make a more indirect contribution. This

makes the investment which is required difficult for a lot of the commercial participants in the sector due to both the long time period (decades) before a technology may become commercialised and the high risk in any individual project. This may mean that for these technologies to be developed will require government R&D funding or for industry to pool their investment funds to make the risk profiles manageable.

If the technology/land to either operate current aircraft at there current scale cannot be found or new net-zero technologies commercialised before our society must reach net-zero, then the only choice available will be to massively scale back aviation which will have significant impact on profitability of much of the industry. Even if these new technologies do become available in time the transition may require retiring or retrofitting existing planes before the end of their service lives, which creates significant financial burden on those who invested in them. Either way the aviation industry will need to reconsider their business models. The likely outcome of all scenarios in significant increase in the cost of flying and hence reduced demand. Without government intervention this risk flying becoming the reserve of the rich, which exacerbate existing inequality issues.

All investment decisions made now, whether into airport capacity or new fossil fuel dependent aircraft must be made in this context. Current aircraft and airport capacity may become 'stranded assets'. Airports and airlines should be transparent about these risks in communications with their investors.

The privileged position of the aviation industry relative to other modes of transport with regards to tax breaks and exemptions is rapidly become unviable. Climate Emergency declarations should lead to a carbon tax escalator covering aviation fuel. In this context the industry needs a clear plan for what its operations will look like in these circumstances, and how business models will evolve.

25. What are the regulatory burdens that need to be managed and how might these be addressed?

26. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?

Even if noise pollution from aviation is limited by night time curfews, it can provide day after day after day of monotonous drone for those living in certain areas, affecting, for example, the ability of children to play outside in school playgrounds. Regular quiet days should be explored to give residents the opportunity to enjoy being outside without constant aircraft noise pollution.

Areas of Outstanding Natural Beauty and National Parks should be zero regular noise pollution zones and this should be considered in all flight path and airport capacity decisions.

Set Target date for all flights in and out of UK to include Carbon Dioxide removals in ticket price.

All booking confirmation forms and tickets must include carbon footprint of flight with suitable reference markers (e.g. Global average carbon footprint today).

27. Looking ahead to 2050, are there any other long term challenges which need to be addressed?

28. Are you aware of any relevant additional evidence that should be taken into account?

✓

7. Sustainable growth evidence

29. Please give a brief summary of the additional evidence that you wish to provide.

Comments:

According to IPCC sr15 report on 1.5^{o}C publish in Autumn 2018, the globally remaining carbon budget for a 66% chance of limiting global temperature rise to 1.5 Degrees is 420 GTCO$_2$ with an uncertainty of -1020 to +920 GTCO$_2$.

It is an incorrect application of the precautionary principle to use this remaining budget as a solid basis for a claim to be protecting UK citizens from harm. The large potential variation in the remaining budget, because of uncertainty (from zero to 3x larger), means a much higher degree of certainty is needed to reasonably claim to be guarding against >1.5^{o}C global temperature rise.

Unfortunately the 75th, 80th and 90th percentiles for the remaining carbon budget for 1.5^{o}C are not available in Table 2.2 of IPCC sr15 report, but from figure 2.3 on page 13, the 84th percentile can be read off the graph as about 300 GTCO$_2$. This would provide a much better basis for a reasonable claim to be protecting both UK and Global citizens from harm.

Green House Think Tank believes that for the UK to claim to be making a fair contribution to global emission reduction efforts, it should commit to a UK cumulative carbon budget based on proportion by population of the global budget. Assuming that UK's current population is 0.87% of global population, this would give 2600 MTCO$_2$ of remaining carbon budget for the UK. According to a report entitled "UK's Carbon Footprint 1997 – 2016~~5~~" published by DEFRA in ~~May~~April 20~~19~~8 the UK citizens are current responsible for around 800 Million tonnes CO$_2$ equivalents anually (2015).This would imply a very rapid reduction in emissions over the next decade and the UK reaching net zero long before 2040.

The 7th Feb 2017 publication by Department for Business Energy and Industrial Strategy entitled "2015 UK GREENHOUSE GAS EMISSIONS, FINAL FIGURES" state that international aviation emissions were 33 MTCO$_2$ annual. Even a decade more emission at this level would use over 12% of the UK emission budget outlined above.

8. Chapter 4: Support regional growth and connectivity

Airports are vital hubs for local economies, providing connectivity, employment, and a hub for local transport schemes. The government wants to ensure, through the Aviation Strategy, that these benefits are maximised, by ensuring that:

- markets are functioning effectively for consumers and local communities

- airports are delivering the connectivity that regions need to maximise their potential

- the industry continues to provide high quality training and employment opportunities

- barriers to freight are reduced

The government recognises the importance of rebalancing the UK through economic growth of the regions and ensuring that the UK remains competitive after we leave the EU. Airports have a crucial role to play as hubs for growth within and beyond the region in which they are situated. The government is committed to working with the industry to develop appropriate and practical policies that support the industry's ambitions. The Aviation Strategy focuses on:

- regional connectivity

- regional transport hubs

- supporting freight

- regional employment, training and skills

30. This section contains questions on chapter 4 of the consultation document - Support regional growth and connectivity. Which of the following topic areas are of interest to you as an individual or to the organisation on behalf of which you are answering? (choose all relevant options)

	Regional connectivity
	Public service obligations (PSOs)
	Start up aid
✓	Air passenger duty
	Surface access to airports
✓	Supporting freight
✓	Regional employment and skills

31. To what extent do these proposals provide the right approach to support the complex and varied role that airports play in their regions?

"4.9 The government recognises the value of domestic air connectivity and an expanded Heathrow will provide an unprecedented opportunity to strengthen and develop these links, enabling all UK regions to develop new business, tourism and cultural links across the globe." - This is very much the wrong approach. The UK should be phasing out short haul flights within mainland UK as a matter of urgency and instead investing in increased cross country / intercity railway capacity to provide net zero compatible alternatives to these journeys. There is no reason why even if short haul flights connect to long haul flights these journeys cannot be made by train.

~~Projects like a railway tunnel between mainland~~Other zero carbon transport options between Britain and Ireland should be consider so that short haul flights to both Ireland and Northern Ireland can be displaced in the future.

4.10 "Moreover, it is important that road and rail links throughout the UK are properly accounted for in any assessment of total domestic connectivity. Air connectivity is just one facet of the overall connectivity package on offer, and should act as a supplement to, instead of a substitute for, other modes." - Domestic aviation with a country as small as the UK should be the transport mode of last resort.

"8.15 Other countries are already beginning to move towards electric and hybrid flights. For example, Norway has already announced its ambitions for all-electric short-haul flights by 2040. There is significant potential for the UK to export to countries that are not large aerospace manufacturing nations. If we can move quickly, there is an opportunity for the UK to lead the world in these areas, capturing a segment of the growing global aerospace market. This could see the delivery of greater mobility within the UK through new air mobility solutions and business models improving connectivity, greater productivity, as well as high export potential contributing to the overall economy." - Although we welcome the UK taking a leading rolel in developing technologies which enable zero carbon aviation, we question whether UK should be aiming to increase mobility, particularly air mobility. There is little evidence to suggest that further increases in mobility, as opposed to increases in accessibility, will actually improve quality of life. Although some degree of decoupling of emission from mobility is possible, due to the Jevon efficiency paradox demand management will be required to ensure this leads to a overall reduction in emission. There is no evidence to suggest complete decoupling will be possible at all, but certainly not in coming decades. It would therefore seem that domestic air mobility will need to be displaced by other less energy and GHG intensive transport modes. Even if zero-carbon, aviation will always be energy intensive and we need to ~~stop growing~~ensure we can meet our ~~use of~~ energy needs long term, ~~not just of~~ without fossil fuels.

4.11 – As Government strategy should be to phase our Domestic aviation in favour of less GHG intensive modes the need for Heathrow to have links to 14 region airports is an invalid argument for expansion.

4.19 – The government should stop all PSO where both start and end point lie on UK mainland and instead invest that money in improving railway transport, particularly east-west routes.

4.27 – Air Passenger Duty – Given that a carbon tax will soon have to apply to aviation fuel at a rate in excess of £100 per tonne, that some segments of society fly much more than others and the potential need to reduce air passenger numbers in order to get to net-zero in the next decade or two; The Department for Transport should consider replace APD with a tax graded by the number of flights (or distance flown) per year. This may help to reduce inequality by placing the additional burden of APD on those how fly most regularly, and those most able to pay, rather making that one annual trip to visit family even more unaffordable for ordinary~~er~~ families.

"4.49 The government supports continued growth of the air freight sector particularly making best use of existing capacity at airports, to continue to facilitate global trade for UK businesses and consumers. It has already taken action by supporting the Northwest Runway scheme at

Heathrow, which has been estimated to nearly double the capacity for freight at the airport to 3 million tonnes per year." - The Government should not support an increase in air freight. A certain level of air freight my be viable as secondary cargo on passenger aircraft, but airfreight on dedicated aircraft seem hard to justify in terms of quality of life delivered vs proportion of remaining carbon budget used. The vast majority of goods airfreighted thought UK airports are not perishable so could go via other transport modes, and much of the rest is food stuffs which could be substituted by lower carbon-footprint alternatives.

32. To what extent are the proposals on skills the right approach to ensuring the aviation sector is able to train and retain the next generation of aviation professionals?

Policy proposals

The questions in the section below refer to policy proposals contained in chapter 4 of the consultation document - Support regional growth and connectivity. As with the rest of this consultation, you are welcome to respond to any, all or none of the questions in this section.

33. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?

4.25/26 – Scrap Start-up aid. Government should be directing transport subsides towards less GHG intensive transport modes.

4.45: Supporting freight.

The Air Freight sector maybe one the sectors most affected by carbon taxes. The strategy should consider what interventions will be needed to ensure a just transition for those currently employed in this sector.

34. How should the proposals described be prioritised, based on their importance and urgency?

The focus should be on increasing diversity of workforce, and all levels.

35. What implementation issues need to be considered and how should these be approached? (e.g. resourcing challenges, high levels of complexity, process redesign, demanding timelines)

Ensuring a Just Transition will be important for those currently working on Domestic & Freight operations.

36. What are the financial burdens that need to be managed and how might those be addressed?

37. What are the regulatory burdens that need to be managed and how might these be addressed?

38. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?

39. Looking ahead to 2050, are there any other long term challenges which need to be addressed?

40. Are you aware of any relevant additional evidence that should be taken into account?

[ ] Yes (see following evidence page)
[ ] No (proceed to next section)

9. Regional growth evidence

41. Please give a brief summary of the additional evidence that you wish to provide.

Comments:

10. Chapter 5: Enhance the passenger experience

All passengers should have a positive experience of flying. The industry is responsive to the needs of consumers but improvements can be made for passengers with additional needs and when things go wrong. The government proposes to consult on a new Passenger Charter to promote good practice in the sector, create a shared understanding of the level of service that passengers should expect, and communicate roles and accountabilities clearly. The government proposes to take necessary action to improve the experience at the border and tackle problems cause disruptive passengers. It will also consider strengthening the Civil Aviation Authority's range of enforcement powers across the consumer agenda.

The Aviation Strategy:

- sets out the proposed standards that could be included as part of a new Passenger Charter for aviation

- sets out a range of new measures for passengers with additional needs

- outlines measures to tackle the problem of disruptive passengers associated with alcohol

- describes the government's approach to improving the operating model at the border to enhance the passenger experience

- details proposals for simplifying and improving complaints and compensation procedures

- sets out government proposals for ensuring that consumers have timely access to the information they need to make informed choices

42. This section contains questions on chapter 5 of the consultation document - Enhance the passenger experience. Which of the following topic areas are of interest to you as an individual or to the organisation on behalf of which you are answering? (choose all relevant options)

	Passenger charter
	Passengers with additional needs
	Disruptive passengers and alcohol
	Experience at the border
	Delays, complaints and compensation
	Airline failure
	Booking information

43. To what extent does the proposed Passenger Charter adequately address the issues that are most important to passengers?

[ ]

44. How should the operating model for border service be designed to improve the passenger experience?

[ ]

Policy proposals

The questions in the section below refer to policy proposals contained in chapter 5 of the consultation document - Enhance the passenger experience. As with the rest of this consultation, you are welcome to respond to any, all or none of the questions in this section.

45. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?

[ ]

46. How should the proposals described be prioritised, based on their importance and urgency?

[ ]

47. What implementation issues need to be considered and how should these be approached? (e.g. resourcing challenges, high levels of complexity, process redesign, demanding timelines)

[ ]

48. What are the financial burdens that need to be managed and how might those be addressed?

49. What are the regulatory burdens that need to be managed and how might these be addressed?

50. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?

51. Looking ahead to 2050, are there any other long term challenges which need to be addressed?

52. Are you aware of any relevant additional evidence that should be taken into account?

	Yes (see following evidence page)
	No (proceed to next section)

11. Enhance the passenger experience evidence

53. Please give a brief summary of the additional evidence that you wish to provide.

Comments:

12. Chapter 6: Ensure a safe and secure way to travel

The UK is a global leader in aviation security and safety, with one of the best and safest aviation systems in the world. The government and the CAA share knowledge and expertise with other nations, encouraging them to adhere to international standards and implement improvements with industry to make the skies safer for everyone.
In order to maintain the UK's safety record the Aviation Strategy focuses on:

- addressing concentrations of safety risks

- targeting emerging safety risks

- improving data and reporting

- addressing global variations in safety standards

In addition, through our Aviation Security Strategy, the government has committed to a major programme of work in partnership with industry to get ahead of the threat to aviation.

54. This section contains questions on chapter 6 of the consultation document - Ensure a safe and secure way to travel. Which of the following topic areas are of interest to you as an individual or to the organisation on behalf of which you are answering? (choose all relevant options)

	General aviation safety
	New business models
	New technologies
	Improving data and reporting
	Responding to global variations in safety standards
	UK driving global action on security
	Cyber threat to aviation
	Regulatory burden
	Electronic conspicuity

55. To what extent do these proposals sufficiently address existing and emerging safety and security risks in order to maintain the business and passenger confidence in the UK industry and as a destination?

Policy proposals

The questions in the section below refer to policy proposals contained in chapter 6 of the

consultation document - Ensure a safe and secure way to travel. As with the rest of this consultation, you are welcome to respond to any, all or none of the questions in this section.

56. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?

57. How should the proposals described be prioritised, based on their importance and urgency?

58. What implementation issues need to be considered and how should these be approached? (e.g. resourcing challenges, high levels of complexity, process redesign, demanding timelines)

59. What are the financial burdens that need to be managed and how might those be addressed?

60. What are the regulatory burdens that need to be managed and how might these be addressed?

61. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?

62. Looking ahead to 2050, are there any other long term challenges which need to be addressed?

63. Are you aware of any relevant additional evidence that should be taken into account?

	Yes (see following evidence page)
	No (proceed to next section)

13. Safety and security evidence

64. Please give a brief summary of the additional evidence that you wish to provide.

Comments:

14. Chapter 7: Support general aviation

The General Aviation (GA) sector covers non-scheduled civil aviation. It includes, amongst other things, business jets, aerial photography, pilot training, emergency service flights and air displays as well as private flying. The aircraft involved include single and multi-engine fixed wing aeroplanes, helicopters, gliders, balloons, microlights, paragliders and model aircraft. The Aviation Strategy sets out how the government proposes to enable, facilitate and encourage growth in GA, and indicates where it thinks that the GA sector itself should seize the initiative and capitalise on those opportunities. It focuses on:

- how the government proposes to reduce regulation

- the government's proposals for a strategic network

- support for new and existing commercial activities

- airspace

- safety

- safeguarding of aerodromes

65. This section contains questions on chapter 7 of the consultation document - Support general aviation. Which of the following topic areas are of interest to you as an individual or to the organisation on behalf of which you are answering? (choose all relevant options)

	Reducing regulatory burden
	General aviation (GA) strategic network
	Airspace
	Safety
	Training and skills
	Safeguarding
	Environmental impact
	Refreshing the GA strategy

66. To what extent do these proposals strike the right balance between the needs of general aviation and the rest of the aviation sector?

Policy proposals

The questions in the section below refer to policy proposals contained in chapter 7 of the consultation document - Support general aviation. As with the rest of this consultation, you are welcome to respond to any, all or none of the questions in this section.

67. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?

68. How should the proposals described be prioritised, based on their importance and urgency?

69. What implementation issues need to be considered and how should these be approached? (e.g. resourcing challenges, high levels of complexity, process redesign, demanding timelines)

70. What are the financial burdens that need to be managed and how might those be addressed?

71. What are the regulatory burdens that need to be managed and how might these be addressed?

72. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?

73. Looking ahead to 2050, are there any other long term challenges which need to be addressed?

74. Are you aware of any relevant additional evidence that should be taken into account?

	Yes (see following evidence page)
	No (proceed to next section)

15. General aviation evidence

75. Please give a brief summary of the additional evidence that you wish to provide.

Comments:

16. Chapter 8: Encourage innovation and new technology

Innovation is key to delivering the outcomes of the Aviation Strategy. The government recognises the important role that technological advances and new business models play in economic growth, especially in industries such as aviation and aerospace.

The government wants to capture the benefits of innovation for consumers, by unlocking mobility and offering new options on how people and goods can move around; and for the aerospace and aviation sectors, to maintain the UK's global leadership, help support jobs, increase productivity, and boost our trade and export capabilities.

The Aviation Strategy:

- sets out some of the main areas of opportunity for innovation in aviation automation, electrification and digitalisation and data sharing

- identifies some of the barriers to innovation and how these can be addressed by government in its enabling role, working in partnership with the sector

- proposes measures to better align policy and investment

76. This section contains questions on chapter 8 of the consultation document - Encourage innovation and new technology. Which of the following topic areas are of interest to you as an individual or to the organisation on behalf of which you are answering? (choose all relevant options)

	Automation
	Automation
✓	Electrification
	Digitalisation and data sharing
	Agile regulation
✓	Public acceptance of emerging technology
✓	Anticipating future developments
	Aerospace sector deal
✓	Improving cross government working

77. To what extent are the government's proposals for supporting innovation in the aviation sector the right approach for capturing the potential benefits for the industry and consumers?

To much focus on efficiency improvements of current technology, and not enough focus on non hydrocarbon powered aircraft.

78. Do the proposals in this chapter sufficiently address the barriers to innovation?

No

Policy proposals

The questions in the section below refer to policy proposals contained in chapter 8 of the consultation document - Encourage innovation and new technology. As with the rest of this consultation, you are welcome to respond to any, all or none of the questions in this section.

79. How could the policy proposals be improved to maximise their impact and effectiveness in addressing the issues that have been identified?

Change innovation focus to enabling net-zero air travel rather than making current aviation more efficient. Provide funding to develop technology needed to facilitate zero-carbon transport between Northern Ireland, Scottish islands, Isle of Man, Isles of Silly, Channel Islands etc and UK mainland (e.g. 'connecting Britain research department'). Facilitate Aviation sector collectively in funding projects to prove and commercialise this technology.

80. How should the proposals described be prioritised, based on their importance and urgency?

Focus has to be on rapid development of Net Zero compatible aviation technologies, particularly to replace fossil fuel power aircraft on critical UK routes such as between mainland and Ireland, and Scottish islands.

81. What implementation issues need to be considered and how should these be approached? (e.g. resourcing challenges, high levels of complexity, process redesign, demanding timelines)

As evidence given under environment section, there is only a decade or two for the UK to get aviation to net zero GHG emission, so a very short time frame to develop and roll out new non-hydrocarbon based aviation technologies. Given that technologies capable of meeting specification required are not yet proven as proof of concept, let alone prototyped; a concerted effort will be needed to streamline the development stage will be required.

82. What are the financial burdens that need to be managed and how might those be addressed?

83. What are the regulatory burdens that need to be managed and how might those be addressed?

84. Are there any options or policy approaches that have not been included in this chapter that should be considered for inclusion in the Aviation Strategy?

85. Looking ahead to 2050, are there any other long term challenges which need to be addressed?

86. Are you aware of any relevant additional evidence that should be taken into account?

Yes (see following evidence page)
No (proceed to next section)

17. Technology evidence

87. Please give a brief summary of the additional evidence that you wish to provide.

Comments:

18. Technical annexes

Thank you for completing the response to the consultation.

There are some additional questions on technical aspects of the strategy:

Annex A: Legislation to enforce the development of airspace change proposals

Annex D: Proposed Public Service Obligation (PSO) assessment criteria

Anyone can respond to these questions, however due to their technical nature, they are likely to only be of interest to subject matter experts.

88. Do you want to answer the questions on the technical annexes?

	Yes (Go to Annexe A)
✓	No (you have finished the questionnaire)

19. Annex A: Legislation to enforce the development of airspace change proposals

This section contains questions on Annex A of the aviation strategy - Legislation to enforce the development of airspace change proposals.

You will need to download a copy of the annexe from GOV.UK in order to respond to these questions.

You can find the annexe on this page - https://www.gov.uk//government/consultations/aviation-2050-the-future-of-uk-aviation

89. Should government legislate for powers to direct individual ACPs identified as necessary in a masterplan to be taken forward?

90. What are your views on the above two proposals?

91. Do you agree that option a) should be the lead option?

☐ Yes

☐ No

☐ Don't know

Comments:

92. What are your views on the scope for the use of the powers?

93. What are your views on the use of the triggers for using the legislative powers?

94. What are your views on the proposed sanctions and penalties regime?

95. The government proposes that the airport/ANSP would be able to appeal in relation to the following matters: the validity or terms of an enforcement order the imposition of a financial penalty the timing of the payment of a penalty the amount of the penalty What are your views on the grounds for appeals?

96. What are your views on the best approach to funding an airspace change where a small airport may need financial support to do so?

20. Annex D: Proposed Public Service Obligation (PSO) assessment criteria

This section contains a question on Annex D of the aviation strategy - Proposed Public Service Obligation (PSO) assessment criteria.

You will need to download a copy of the annexe from GOV.UK in order to respond to these questions.

You can find the annexe on this page - https://www.gov.uk//government/consultations/aviation-2050-the-future-of-uk-aviation

97. The government is proposing a new two-stage process for assessing PSO applications:* stage 1 – prerequisite criteria* stage 2 – proposed full criteriaPlease review the details of these criteria in the Annex D document, and state below if you think they are the right criteria to judge PSO proposals against.

Return this questionnaire

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Post it to:

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