

Appendix A – Aviation Decarbonisation Approach

Headline Position on Aviation Decarbonisation

- 1) By priming itself as an early-mover, the North should capitalise on the significant regional economic growth opportunities presented by:
 - The development of Zero Emission Aircraft.
 - The production of Sustainable Aviation Fuel.
 - The production and use of Liquefied Green Hydrogen.
 - Seamless connection of airports to low carbon surface transport choices.

Progress is needed quickly if these technologies are to contribute meaningfully in reaching net-zero aviation by 2050. Our region can play its part by:

- a) Capitalising on the North's proximity to sources of renewable energy and potential waste industrial fuel feedstocks.
- b) Capitalising on our international airports' extensive route networks and promoting a northern airport as a prime candidate for initial investment, from Government, to be a liquid hydrogen 'feeder' location.¹
- c) Developing a mature green hydrogen supply and distribution network in the North, through early investment focussed on supplying a wider set of end uses (i.e. industrial demand and multimodal transport demand).
- d) Investing in low carbon surface transport connections to the region's airports.

TfN will:

Work with airports to integrate their potential for hydrogen demand, supply and storage, into green hydrogen generation, transport and dispense strategies for the North.

Influence Government to invest in one of the North's international airports as a liquefied hydrogen 'feeder' location.

Continue to promote high quality and low carbon public transport connections to and from the region's airports.

- 2) TfN recognises the high level of risk of not all technological options for aviation decarbonisation fully delivering the required emissions reductions.

¹ Refers to proposal from Aerospace Technology Institute, within 'Fly-Zero – The Case for UK to Accelerate Zero-Carbon Emission Air Travel', to select a number of international hubs for initial investment into support infrastructure for zero carbon aircraft.

TfN therefore supports the adoption of voluntary soft incentives to manage demand at the same time as increasing business productivity and boosting local tourism, including:

- measures that significantly increase the attractiveness of using lower carbon public transport modes, such as train and coach, both as an alternative to land based domestic flights and in improving surface access to airports;
- encouraging businesses to prioritise video conferencing in preference of air travel where it enhances productivity;
- promotion of the North's visitor attractions as an alternative to overseas holiday destinations.

TfN will:

Promote the development of cost effective public transport alternatives to popular domestic land-based aviation routes.

Commit, alongside Partners to video-conferencing instead of air travel unless exceptional case is demonstrated.

Ensure flexible, high quality, and low carbon access to the region's tourism destinations.

- 3) Given our focus on creating the right conditions for rebalancing economic growth towards the North, TfN supports the productive use of existing unused runway capacity at Northern Airports to cater for that growth, whilst acknowledging that increases in aviation demand need to be accommodated within a national cap on demand growth of 25% by 2050 (consistent with the recommendations of the CCC within their 6th Carbon Budget).

In the context of the potential for the North's airports to accommodate significant additional demand through existing unused runway capacity, TfN supports the adoption, by national government, of a moratorium on 'net'² national airport runway expansion³, as an important part of a national strategy for managing demand. This should be supported by:

- measures that significantly increase the attractiveness of using lower carbon public transport modes, such as train and coach, both as an alternative to land based domestic flights and strengthening the case for NPR, HS2 and other major public transport infrastructure schemes;

² 'Net' in this context is taken to mean no overall increase in national airport capacity, although the re-allocation of both existing demand and future growth in demand (up to 25%) between regions would be allowed. Note that many airports currently have spare runway capacity where expansion is not needed.

³ Support for a moratorium on net national airport runway expansion, does not extend to other airport works which may help make better use of currently unused existing airport runway capacity (e.g. works to terminal buildings).

- developing improved and sustainable surface access to our international gateways and encouraging the decarbonisation of air-side equipment;
- measures that increase public awareness regarding the emissions associated with flying in relation to other modes and other everyday activities (e.g. contextualised emissions information at point of booking).
- the ability of our networks of northern airports to serve all of the North's diverse communities, including the Pakistani, Indian, Bangladeshi, Chinese, African and Caribbean communities, so as to minimise the need for connections to their frequent destinations via other international hubs (e.g. Heathrow or Amsterdam).

TfN will:

Promote the development of cost-effective public transport alternatives to popular domestic land-based aviation routes.

Influence Government to apportion greater share of both existing and future flight demand growth to the North, within a national aviation demand budget.

Work to create the right economic and social conditions in the North to justify the use of unused air capacity in the North.

*Managing demand can help to reduce emissions in the short and medium term and provide resilience should not all technological options fully deliver the emissions reductions required. These measures additionally reduce the non-CO2 warming contribution from aviation and have co-benefits for noise and air quality.

A moratorium on net national airport runway expansion is a robust way of achieving a secure upper limit on possible future emissions.

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4) TfN agrees that carbon offsetting can play an important part in reaching net zero emissions for aviation. TfN recommends that Government, through CORSIA, should push aeroplane operators to utilise the highest quality of offsetting and removal schemes. Any offsetting should be considered in the context of the following key requirements:

- Offsetting schemes must negate emissions of atmospheric carbon produced through reduction or removal.
- Offsets must not cause environmental or social harm and ideally would deliver social and biodiversity co-benefits.
- Whilst nature based offsets are important in the short to medium term, offsetting strategies should transition to permanent carbon storage solutions in the longer term.
- A preference for offsetting northern emissions through northern offsetting schemes based in the North.

TfN will encourage our regional airports and airlines operating flights from Northern airports, to promote schemes based in the North, such as reforestation and peat restoration projects.

Detailed Approach

TfN position on aviation decarbonisation as part our approach to International Connectivity

TfN is, in general, supportive of the Government's measures as set out in its Jet Zero Strategy (July 2022), particularly its objectives and targets in relation to the development of sustainable aviation fuels and zero-emission aviation technology. The North has the capacity to be first -mover in responding to the challenge of sustainable aviation fuels and technology development and production, taking advantage of the North's proximity to sources of renewable energy and potential waste fuel feedstocks.

Both SAF and Liquefied Green Hydrogen offer opportunities for reaching net zero emissions by 2050 (with SAF being particularly important in achieving emissions reductions in the nearer future), and the development of each is both a challenge and opportunity for the North. With around a third of current green hydrogen supply, storage and use projects located in the North, the region should move relatively quickly to developing a mature green hydrogen supply and distribution network that our airports can play a part in.

TfN also recognises that the widespread use of SAFs is still likely to require emissions abatement measures from outside the sector (such as offsetting or GHG removal schemes).

Further to the Jet Zero Strategy, TfN recommends Government look to reduce emissions quicker in the short and medium term through developing a national strategy on managing demand. These measures would also help reduce projected emissions should breakthroughs in the development of Zero Emission Aircraft (ZEAs) utilising Liquefied Green Hydrogen and/or Sustainable Aviation Fuels (SAFs), not eventuate or not progress at the rate required.

In line with the core objectives within its Strategic Transport Plan, TfN will continue to work to create the right economic and social conditions in the North to justify the use of unused air capacity in the North and influence Government to apportion a greater share of both existing flight demand and future demand growth to the North, aligned with a national strategy for managing demand. That should be regionally balanced, social equitable, and employ a national carbon budget approach - limiting air travel growth nationally to 25% by 2050, in line with the Climate Change Committee's

Balanced Pathway within their 6th Carbon Budget, compared to 2018 levels (reduced from an expected 74% growth in the 'do-nothing' scenario, and a 70% increase in 'High Ambition' scenario – within the Jet Zero Strategy). Given the significant potential for the North's airports to accommodate additional demand through existing unused runway capacity, TfN supports the adoption, by national government, of a moratorium on 'net'⁴ national airport runway expansion⁵, as an important part of that national strategy for managing demand.

Limiting air travel growth is one of the few measures that is guaranteed to lead to a reduction in associated non-CO₂ warming effects and realise local air quality and noise benefits.

This approach includes additional demand management recommendations for national government as well as soft measures (typically incentives to encourage behaviour change and measures that don't place any limits on demand), that could be implemented at regional or local authority levels. Through these, the North has the opportunity to boost regional tourism, enhance regional business productivity and strengthen the case of longer distance public transport investments such as HS2 and NPR.

Our recommendation is for supporting a national strategy on managing demand and not unilateral regional action.

⁴ 'Net' in this context is taken to mean no overall increase in national airport capacity, although the re-allocation of both existing demand and future growth in demand (up to 25%) between regions would be allowed. Note that many airports currently have spare runway capacity where expansion is not needed.

⁵ Support for a moratorium on net national airport runway expansion, does not extend to other airport works which may help make better use of currently unused existing airport runway capacity (e.g. works to terminal buildings).

<p>Proposed Key Policy Areas:</p>	<p>System Efficiencies</p> <p>Support the Governments approach to achieving efficiency improvements in our current aviation system.</p> <p>This would involve moving to best-in-class aircraft, as well as both airspace and airport operations modernisation and the decarbonisation of surface transport connections to airports.</p> <p>Recommendation to National Government Support:</p> <p>We support the Government’s new policy proposals in Jet Zero Strategy consultation:</p> <ul style="list-style-type: none"> • All airport operations in England should be zero emission by 2040⁶. • Voluntary agreement from airlines to avoid tankering where there is no practical reason for doing so. • Landing fees based on emissions and noise. • Landing slots at constrained airports prioritised based on environmental performance. • Making provision for Air Navigation Service Providers (ANSPs) to implement differential charging based on environmental performance within their controlled airspace. • Changes to regulations where needed to implement new CO₂ emission saving operations (e.g. formation flight).
	<p>Zero Emission Flight</p> <p>TfN supports all existing and proposed Government policies within the Jet Zero Strategy in relation to Zero Emission Flight . In addition, TfN proposes a number of local actions to maximise the clean growth benefits for the region including securing new high wage aerospace industry jobs –producing hydrogen aircraft/parts.</p> <p>Recommendation to National Government Support:</p> <p>We support the Government’s new policy proposals in the Jet Zero Strategy:</p> <ul style="list-style-type: none"> • Supportive of Government policy for mandating Zero Emission aircraft on UK Public Service Obligation routes (although note the commitment currently is to look at the feasibility of doing this).

⁶ The commitment includes Scope 1 and Scope 2 emissions from airport operators, not Scope 3 emissions.

- **Supportive of Government policy for all domestic flights to be zero-carbon by 2040** (although we note that this is currently an 'aspiration' in the Jet Zero consultation document).

In addition, we would commend the recommendations to Government made by the FlyZero programme in relation to the further development of hydrogen aircraft, to create the enabling environment for zero-carbon emissions aviation by the mid 2030s.

Regional/Local Action

- **The North should be a leader and centre of excellence for the development of ZEA** - partners, academia, local business and regional airports to position the North as leading region for ZEA research, design, production and trialling.
 - Government and Tees Valley Hydrogen Hub to facilitate ZEA demonstration activity at Teeside International Airport.
- **Ensure our regions airports are 'ZEA Ready'** - Regional airports should be national leaders in demonstrating and delivering ZEA airport infrastructure.

Sustainable Aviation Fuel (SAF) and Liquefied Hydrogen

TfN supports all existing and proposed Government policies within the Jet Zero Strategy. In addition, TfN proposes a number of local actions to maximise the clean growth benefits for the North, principally through optimising the region's role in the supply of both SAF and Liquefied Green Hydrogen fuels.

Recommendation to National Government Support:

We support the Government's new policy proposals in the Jet Zero Strategy:

- Support implementation of a SAF mandate on fuel suppliers and would encourage this to be in place by 2025 (with at least 10% SAF in UK fuel mix by 2030)
- Use of SAF on UK Public Service Obligation routes.
- Negotiate in the ICAO for comprehensive SAF sustainability standards and a global SAF objective.
- The development of at least 5 commercial scale UK SAF plants (under construction by 2025).

In addition, we would commend the recommendations to Government made by the FlyZero programme in relation to the further development of **liquefied green hydrogen**

production and refuelling infrastructure, to create the enabling environment for zero-carbon emissions aviation by the mid 2030s.

Regional/Local Action

- **The North should be a leader, and centre of excellence, for both SAF production and green hydrogen production** - and the sharing of costs of the development of green hydrogen supply, distribution and dispense infrastructure across modes (e.g. looking at multimodal demand) and sectors will be encouraged.
- **Encourage and support the development of waste-to-SAF plants in the North**, building on the planned developments already underway at Fulcrum (Merseyside) and Philips 66 (Humber region).
- **Supporting our regional airports in development of SAF transport and storage infrastructure**, a good example is partnership between MAG and Fulcrum and the proposed use of an existing pipeline between Manchester Airport and Fulcrum Northpoint (Stanlow).
- **Encourage our regional airports to utilise SAF produced in the North** so as to reduce the emissions associated with the transport of the SAF but also to build upon the North's strengths in offshore wind and electrolyser development.
- **Encourage our regions airports to be 'ZEA Ready' in terms of supporting infrastructure** - this should include promoting, to Government, one of the North's international airports as a prime candidate for any initial investment as a liquid hydrogen 'feeder' location for regional networks – capitalising on the North's proximity to renewable energy (green hydrogen) production facilities and also its substantial and growing international connectivity through Manchester Airport.

Carbon Pricing and Removals

TfN supports national government target of 27% reduction in carbon emissions due to demand reduction effects of carbon pricing, by 2050. These effects will be realised relatively quickly and so the Government estimates that reductions will be seen in the short to medium term. Carbon pricing to be achieved primarily through use of the UK Emissions Trading Scheme and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSA).

Through carbon pricing, markets will facilitate the offsetting required through investments in robust schemes

that remove or avoid an equivalent volume of these emissions elsewhere.

Recommendation to National Government

Support:

We support the Government's new policy proposals in the Jet Zero Strategy:

- Support alignment of the UK ETS cap with a 'Paris compliant' net zero trajectory.
- Exploring the role of the UK ETS in stimulating a long-term market for Greenhouse Gas Removals (both engineered and nature-based), and the preferred business models for incentivising investment in engineered GGRs (as opposed to nature-based).
- Legislate for CORSIA by 2024 in UK law.
- Explore how to support other states that may need help implementing CORSIA effectively.

Go Further:

- **TfN recommends that Government, through CORSIA, should push aeroplane operators to utilise the highest quality of offsetting and removal schemes** - Any offsetting, should be considered in the context of the following key requirements:
 - Offsetting schemes must negate emissions of atmospheric carbon produced through reduction or removal. In the medium and long-term, preference should progressively be given to removal projects over reduction (i.e. actually removing carbon from the atmosphere rather than reducing the amount of emissions that *potentially* may occur in the future in other sectors/systems).
 - Offsets must not cause environmental or social harm and ideally would deliver social and biodiversity co-benefits.
 - Whilst nature-based offsets are important in the short to medium term, offsetting strategies should transition to permanent carbon storage solutions in the longer term, recognising the capacity of the biosphere to absorb additional carbon is much less than current fossil fuel emissions and will likely further reduce due to climate change itself.

Regional/Local Action

- **Offsetting in the North** - For flights originating from Northern airports, those airports and airlines

	<p>should establish high quality offsetting scheme options for consumers with a preference given to nature based solutions in the North, such as reforestation and peat restoration projects (e.g. The Great North Bog⁷, Wild Ingleborough⁸, The Northern Forest⁹)</p>
	<p>Travel Demand Drivers (Influencing Consumers) Departure from national government’s Jet Zero Strategy of applying no restrictions on travel demand or airport expansion.</p> <p>Support for the development of a regionally balanced, socially equitable national carbon budget approach to managing national aviation demand and airport expansion.</p> <p>The focus at a regional level would be on softer incentives.</p> <p>This approach would look to limit air travel growth to 25% by 2050, in line with the Climate Change Committee’s Balanced Pathway within their 6th Carbon Budget, compared to 2018 levels (reduced from an expected 74% growth in the ‘do-nothing’ scenario, and a 70% increase in ‘High Ambition’ scenario). As part of this approach to managing national aviation demand, TfN supports the adoption, by national government, of a moratorium on ‘net’¹⁰ national airport runway expansion¹¹.</p> <p>Alongside this, TfN would work to create the right economic and social conditions in the north to justify the use of unused air capacity in the North and influence Government to apportion a greater share of both existing flight demand and future demand growth to the North, recognising the significant potential for the North’s airports to accommodate additional demand through existing unused runway capacity.</p> <p>Our recommendation is for supporting a national strategy on managing demand and not unilateral regional action.</p>

⁷ <https://greatnorthbog.org.uk/>

⁸ <https://www.wildingleborough.com/>

⁹ <https://thenorthernforest.org.uk/>

¹⁰ ‘Net’ in this context is taken to mean no overall increase in national airport capacity, although the re-allocation of both existing demand and future growth in demand (up to 25%) between regions would be allowed. Note that many airports currently have spare runway capacity where expansion is not needed.

¹¹ Support for a moratorium on net national airport runway expansion, does not extend to other airport works which may help make better use of currently unused existing airport runway capacity (e.g. works to terminal buildings).

Recommendation to National Government Support:

We support the Government's new policy proposals in the Jet Zero Strategy:

- Setting of an in-sector CO₂ emissions reduction trajectory for aviation from 2025 to 2050 with interim targets.
- Annual reporting of aviation emissions data from 2025 – although we would be supportive of this starting earlier from 2023.
- Reviewing progress against the emission reduction trajectory annually, from 2025 – although we would be supportive of this starting earlier from 2023.
- Review of overall approach to aviation decarbonisation every 5 years, starting in 2027 – although we would be supportive of this starting earlier from 2025.

Go Further:

- **Immediate moratorium on net national airport expansion** – in line with CCC 6th Carbon Budget – no net national expansion of airport runway capacity unless a lack of capacity is affecting efficient operations or the aviation sector creates headway in its carbon budget to accommodate additional demand (beyond 25%). This would not exclude works to release existing unused runway capacity (e.g. works to terminals).
- **Making productive use of unused airport capacity in the North** – attracting existing demand and future demand growth, within an overall carbon budget, from the southeast and elsewhere to cater for the high level of economic growth that we need.
- **Serving the North's diverse communities directly** - Our network of northern airports, connected by zero carbon surface transport links, should serve all of the North's diverse communities, including the Pakistani, Indian, Bangladeshi, Chinese, African and Caribbean communities, so as to minimise the need for connections to their frequent destinations via other international hubs (e.g. Heathrow or Amsterdam).
- **Encourage the use of train and coach as an attractive alternative to land based domestic flights** – by land based, we mean routes that do not cross seas. Policies that focus on improving the relative cost and convenience of land based public transport relative to the cost of flying. Strengthening the case for new high speed, longer

	<p>distance public transport infrastructure such as HS2 and NPR.</p> <ul style="list-style-type: none"> • National public awareness campaign – to inform consumers of the emissions associated with flying (including at point of booking), but going further than the commitments made within the Jet Zero Strategy, and contextualising this against other modes and ‘everyday’ activities (e.g. car trips, food, heating etc.). <p>Regional/Local Action</p> <ul style="list-style-type: none"> • Public Transport First policy (and public promotion of that policy) for land based, domestic journeys, where viable equivalents exist. • Development of high quality and cost effective rail and coach alternatives to the most popular domestic land-based aviation routes. • Encourage businesses to prioritise video conferencing in preference of air travel where appropriate and where it enhances productivity, and document within their travel plans. • Video and audio conferencing to be used by TfN and Partners instead of air travel unless exceptional case demonstrated. • Promotion of the North’s visitor attractions as an alternative to overseas holiday destinations, and ensure flexible, high quality and low carbon access for visitors: <ul style="list-style-type: none"> - Flexible fares including onward travel. - Working with tour operators/travel companies, as well as public transport providers to develop both mainstream and market specific joint products. - Increasing frequency of services to tourist hot spots and reducing Sunday and School Holiday closures on related rail routes. - Addressing the ‘leisure first and last miles’, particularly in rural or coastal areas to ensure non-car access provides an attractive option.
<p>Benefits and Disadvantages</p>	<p>Environmental</p> <p>Carbon Reduction benefits:</p> <ul style="list-style-type: none"> • Aviation travel demand management measures can limit growth in emissions while we wait to assess the impact of ZEA technology and SAF use. • Travel demand management measures can be introduced now thereby having an immediate impact on growth in emissions, whilst technology based policies are long-term.

- Potentially less reliance on carbon removal technologies.
- Nature based removals may see local ecological/environmental benefits.

Non-CO2 Warming Effects:

- A reduction in travel demand (compared to the Government's targets of a 70% increase by 2050) will see a corresponding instantaneous reduction in non-CO₂ warming effects as opposed to approaches where growth in air travel is not reduced as whilst many ZEA and SAF technologies could potentially reduce non-CO₂ warming effects (e.g. contrails), this will depend on which fuels and technologies predominate and for which routes.

Noise and Local Air Quality Effects:

- A reduction in travel demand (compared to the Government's target of a 70% increase) will see a corresponding reduction in local noise and air quality effects. Reductions in local air quality pollution effects cannot yet be assumed through the use of SAF.
- Increased potential for congestion related effects in and around the North's visitor hot spots if a rise in the domestic visitor trips is not managed correctly.

Economic (inc. Clean Growth Potential)

- Clean growth potential (jobs, skills and investment) in line with national government expectations in relation to the development and manufacture of both ZEA components, green liquid hydrogen and SAFs.
- In the short and medium term, potential constraint on growth of regional airports, airlines and supply chain industries associated with a cap on demand growth, and associated constraint on range of economic and jobs benefits. However, the effect may not be seen evenly between different English regions and should could be mitigated to some extent in the North if both existing demand and current future growth in demand was moved to the North's airports (using existing spare runway capacity).
- Significant potential benefits for northern visitor economy from increased domestic tourism trips.
- Potential reduction in international visitors accessing our tourism hotspots with associated economic disbenefits.
- A programme of nature based emissions offsetting schemes, if carefully managed, may create jobs in

	rural areas and deliver skills and jobs benefits to rural communities.
	Social (population, health and well being effects) <ul style="list-style-type: none">• Reduced local air quality and noise effects would see corresponding health and wellbeing effects for those living near or within landing/take-off paths of airports.• Other clean growth benefits covering skills, employment and leisure opportunities are covered within Economic.