

Written evidence from Airbus

About Airbus

Airbus is a global leader in aerospace, defence, space and related services. We are the largest aeronautics and space company in Europe and a pioneer of cutting-edge technologies and products for our global customer base. Airbus operates in roughly 180 locations worldwide, employing 134,000 people and supporting 12,000 direct suppliers.

The UK remains a market of strategic importance for Airbus and we are exceptionally proud of our 100-year British aviation heritage, our 11,700 strong UK workforce and over 2,300 British suppliers. Airbus is the largest commercial aerospace company in the UK, as well as its biggest civil aerospace exporter. We are also Britain's largest space company, a world leader in cyber security, and the biggest supplier of large aircraft to the RAF, through the A400M Atlas and the A330 MRTT Voyager. Airbus Helicopters make up 100% of the UK National Police Air Service and 60% of the Air Ambulance fleet, while our share of the military helicopter market is 29%. As Britain's civil helicopter hub, Airbus also represents around 50% of the UK's civil helicopter fleet. Through these contracts and our exports, Airbus makes a significant contribution to the UK economy, with our GVA to GDP totaling £7.8 billion in 2019.

Executive Summary

- Airbus is fully committed to delivering Net Zero emissions across all the sectors that it has control of or has influence over. Airbus has already committed to Net zero emissions for its Scope 1 and Scope 2 emissions for its commercial business and has committed to net zero emissions for UK aviation as part of the Sustainable Aviation commitment on 4 February 2020.
- Airbus aircraft are the most efficient fleet of aircraft manufactured to date. The A320neo, A330neo, A350 and A380 are all 15-25% more efficient than the aircraft that they replace. And In 2020 Airbus launched the ZEROe program for game changing hydrogen flight. By 2035 Airbus will launch into service one of its concept aircraft.
- Airbus believes that hydrogen will play its part in all sectors of aviation with hydrogen fuel cells for commuter and regional flights, H2 burn for short to medium range and PtL (power to liquid) fuels for long range.
- Airbus welcomes the recently published UK hydrogen strategy. It is imperative, however, that HMG considers both the scaling up of production of low carbon hydrogen (Green in particular) in parallel to the necessary changes to the ground infrastructure for how this hydrogen will get to the airports and aircraft for aviation..
- Airbus fully supports the work of the Aerospace Technology Institute (ATI) to deliver the technology requirements and these will play a significant role in further progressing towards zero emission flight and so Airbus believes that it is imperative that the ATI's Fly Zero must be continued beyond its initial one-year plan.
- The future work of the ATI must build on the work already done and the current momentum of significant R&D investments already committed, as well as other projects funded through the ATI including supporting the development of Airbus ZEROe technology platforms. **As such the Government must signal its support for the ATI in the upcoming spending review by committing a significant investment of £3.8 billion through to 2030, that will be matched by industry.**
- Airbus fully supports the UK Sustainable Aviation roadmap which shows that by 2050 UK aviation can achieve net zero. In June 2021 the industry unveiled its Covid overlay with interim targets for 2030 net 15% reduction compared to 2019 and 2040 net 40% reduction again compared to 2019.

- Sustainable aviation fuels (SAF) are also a vital part of the journey to Zero emissions flight and will be required to be used for long haul flight for the foreseeable future .
- Airbus has stated that its whole fleet will be capable of using 100% SAF by 2030.

Answers to Consultation Questions

What contribution can operational efficiencies make to reduce emissions from aircraft / shipping vessels and over what timescale could these have an effect on emissions?

Airbus aircraft are the most efficient fleet of aircraft manufactured to date. The A320neo, A330neo, A350 and A380 are all 15-25% more efficient than the aircraft that they replaced. These aircraft have greater capabilities in flight efficiency than they are allowed to fly which is often due to the limitations of inefficient airspace.

Airspace modernisation is extremely important for UK aviation to improve the efficiency of airspace. Modernising this by 2033 would generate significant carbon savings as it would create much more efficient flying and shorter journey times. These were already highlighted in the Sustainable Aviation decarbonisation roadmap which was launched on 4 February 2020 and of which Airbus is a signatory. In the short term (at least the next five years) modernising UK airspace and enabling more efficient flight profiles offers the greatest opportunity to reduce UK aviation emissions.

Airspace must be considered as critical national infrastructure that has not been fundamentally upgraded since the 1950s. Modernising and redesigning it will lead to less airborne holding, fewer miles flown per aircraft and less fuel burn¹. Creating more efficient and streamlined airspace benefits airports and airlines but also the passengers and communities surrounding them, through reduced emissions. Government sponsorship of airspace modernisation is also now helping to focus attention clearly on the benefits this can deliver. From the 2020 Sustainable Aviation roadmap the potential savings account for around 5% on the carbon reduction opportunity and this is calculated to be 3.1 MtCO₂ saving per annum from better air traffic management and operating procedures by 2050.

We are concerned that the pandemic could have an impact on the timing of the implementation of Airspace modernisation. It has already severely hit the industry financially however Airbus would encourage HMG to continue to support the modernisation program. With the Government's recent funding support, airspace modernisation can move forward and help to deliver better environmental performance ahead of those more radical innovations. Nonetheless, Airbus are still concerned about the risks for delivering the UK airspace modernisation programme if this support is not sustained and built upon.

We welcome HMG's policy support for SAF but this will take time to implement, whereas airspace efficiency changes are able to be delivered in the very near term with this investment, policy and support.

How close are zero carbon fuels to commercialisation for aviation / shipping? How effective will the Jet Zero Council be in catalysing zero emissions technologies? What role should transitional fuels such as alternative hydrocarbon fuels play?

Sustainable Aviation Fuels (SAF)

Sustainable aviation fuels will be required to be used for long haul flight for the foreseeable future however they can and will be used for short haul flights too in the shorter term. Airbus has stated that its whole fleet will be capable of using 100% SAF by 2030.

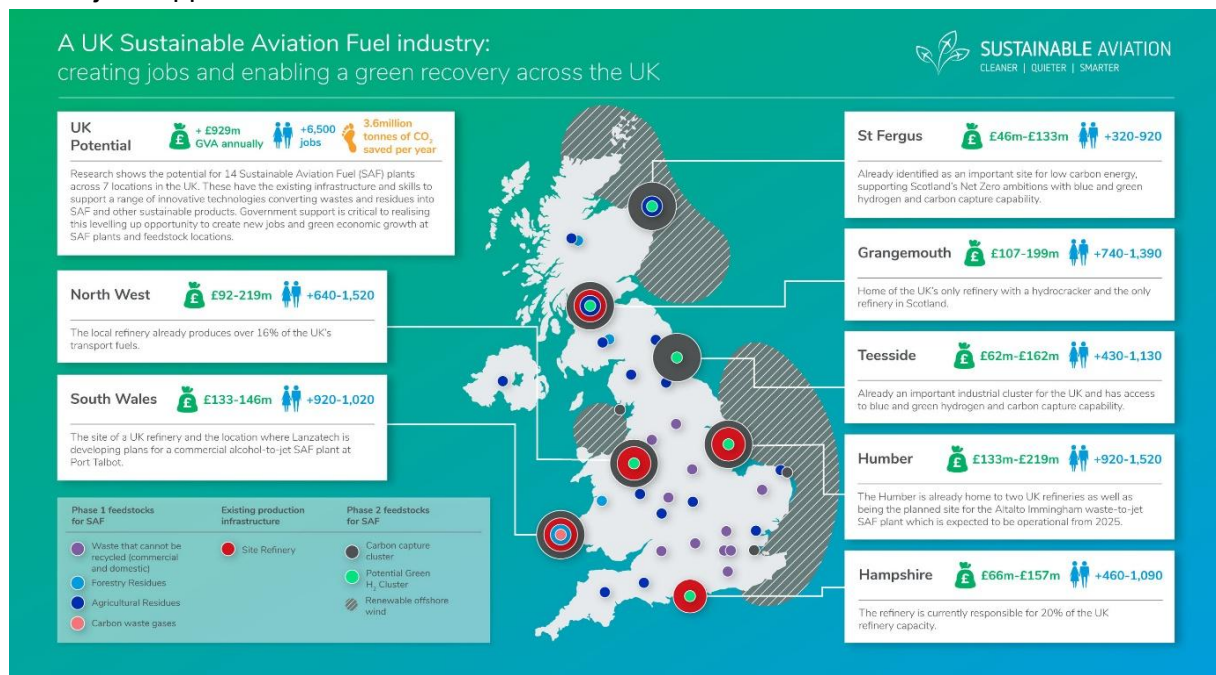
¹ <https://www.ourfutureskies.uk/why-modernise/environment/>

The first SAF facility in the UK has now secured planning permission: Altalto Immingham, the UK's first waste-SAF facility that will be built in North East Lincolnshire. With the right Government support the UK can build a world leading sustainable aviation fuel (SAF) industry, with up to 14 UK-based SAF plants by 2035 bringing tens of thousands of jobs and £billions in GVA to former industrial regions of the country in seven clusters².

With the right policy incentives and delivery our current aim is for at least 32% of UK Fuel supply to be provided by SAF by 2050. However, this assessment might change as the potential for SAFs made from new technologies creating Synthetic fuels from renewable electricity, hydrogen and captured recycled carbon, are assessed as part of our updated Road Map due next year.

Critically, SAF is today's technology. The global aviation industry has certified 7 pathways up to 50% blend and is pursuing the capability for 100% Synthetic fuel flight. Over the last decade, SA has been fully engaged with the global industry work, and produced the first Sustainable Aviation Fuel roadmaps that set out the considerable opportunity for these low carbon fuels to decarbonise UK aviation, whilst also providing additional jobs and economic benefit to the UK.

These jobs opportunities are set out below:



The current level of SAF usage in the UK is however less than 1% of UK demand. The speed of development of the industry is too slow now and needs significant acceleration (we go into detail in answer to the question regarding support needed, below). Whilst the Government has begun to implement positive incentives for UK SAF development and production, this is significantly less than the EU or US. Decisions by investors are being taken now and so we are urging the Government to set out a comprehensive policy framework for commercialising sustainable aviation fuels, alongside finance mechanisms that will be critical to delivering first-of-a-kind UK SAF plants.

² https://www.sustainableaviation.co.uk/wp-content/uploads/2020/02/SustainableAviation_FuelReport_20200231.pdf

Hydrogen

In 2020 Airbus launched the ZEROe program for game changing Hydrogen flight. By 2035 Airbus will launch into service one of its concept aircraft. See below:



Airbus was instrumental in the report produced [by McKinsey](#) on the opportunities of Hydrogen and is particularly focussed on green hydrogen. The report sees that in both the short and long term hydrogen is playing its part in the decarbonisation of the UK aviation sector. H2 fuel cells have huge potential for the commuter and regional segments, direct combustion of Liquid H2 for the short to medium haul segments and the chemical combination of H2 with captured carbon to create 'PtL' SAF (so-called e-fuels) for medium to long haul.

In order for aviation to achieve its Net Zero target in the UK there are four key technology axis:

- Hydrogen (green hydrogen)
- SAF

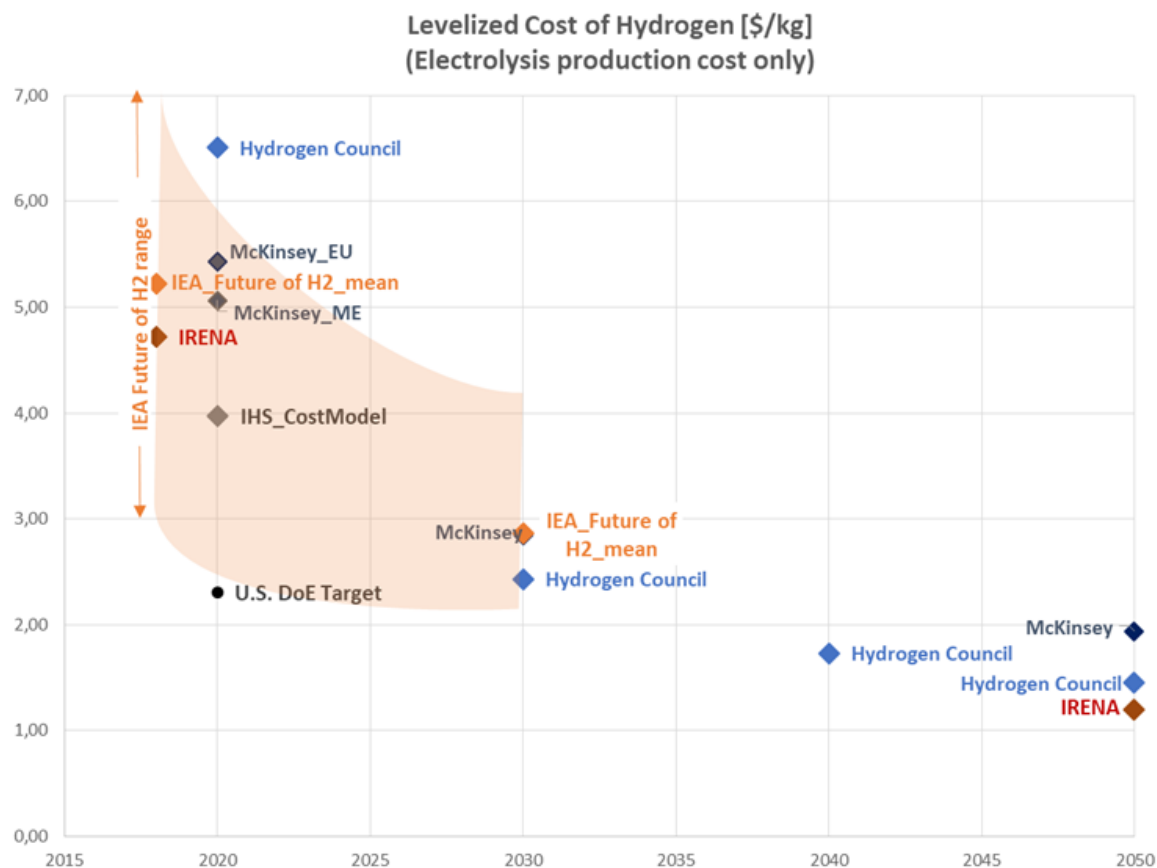
- Increased efficiency of both flight and ground operations
- Carbon removal technologies

These, together with other decarbonisation measures such as airspace change will significantly alter the landscape of aviation in the UK.

Airbus welcomes the recently published UK hydrogen strategy. It is imperative, however, that HMG considers both the scaling up of production of low carbon hydrogen (green in particular) in parallel to the necessary changes to the ground infrastructure for how this hydrogen will get to the airports and aircraft for aviation. The Hydrogen production route is really important as only green hydrogen made from renewable energy sources will truly decarbonise the sectors that utilise it.

Hydrogen has a great potential to decarbonise many industries, these include aviation, maritime, road haulage and domestic heat and power. There is also a real significant opportunity for it to have a big impact on decarbonising transportation. The current cost of hydrogen is prohibitive but with significant investment, widespread deployment in the variety of industries and a robust supply chain the **cost of Hydrogen would reduce to be comparable with aviation Kerosene.**

Airbus believes that this is possible but only with the full integration and scale up required to decarbonise all of these sectors.



The development of zero emissions flight using green hydrogen will be key in decarbonizing aviation markets. It is applicable in different forms to the whole sector. The McKinsey report clearly outlines the opportunity from fuel cells for commuter and regional aircraft to direct fuel burn for short to medium range and PtL for long haul. Hydrogen plays a part in each of these

markets. Airbus welcomes the Government strategy however the aviation specific content is lacking detail. HMG should signal clear support for the aviation industry by prioritising a robust UK green Hydrogen roadmap.

This roadmap must have a clear timeline to ensure the achievement of key milestones and a fully integrated value chain. This must include:-

- Green hydrogen production industry
- Aircraft technology development
- Airport technology and infrastructure
- A robust supply chain
 - renewable energy provider
 - distribution network
 - storage
 - user of the hydrogen
- Technology demonstration
- Integration with the wider green hydrogen economy
- New job opportunities
- Readiness for entry into service

This roadmap needs to be delivered to ensure that the UK will be ready for **commercial hydrogen flight**.

Jet Zero Council

Airbus is a member of the Jet Zero Council and believes that it can play an important role as a catalyst in commercialising these technologies. The JZC should be able to consider low carbon technologies development as well as the industry's performance in adopting these new and emerging solutions.

Airbus along with all UK aerospace companies fully support the work of the Aerospace Technology Institute (ATI) to deliver the technology requirements which are fully aligned with the JZC objectives and deliverables, however the funding and the future of the ATI need to be addressed.

Continuing to support the Aerospace Technology Institute and following through on the work of the Fly Zero project will be critical in this regard. The ATI will play a significant role in further progress towards zero emission flight and so Airbus believes that it is imperative that **the ATI's Fly Zero must be continued beyond its initial one-year plan**.

The future work of the ATI must build on the work already done and the current momentum of significant R&D investments already committed, as well as other projects funded through the ATI including supporting the development of **Airbus ZEROe technology platforms**. As such the Government must signal its support for the ATI in the upcoming Spending Review by committing an significant **investment of £3.7 billion through to 2030**.

What new technologies are there to reduce emissions from aircraft / shipping vessels and how close to commercialisation are they?

See hydrogen answer above.

How should the Government's net zero aviation strategy support UK industry in the development and uptake of technologies, fuels and infrastructure to deliver net zero shipping and aviation?

Technology

New aerospace technologies such as hybrid, electric and hydrogen aircraft offer exciting opportunities to decarbonise aviation. Ensuring the UK makes the most of this opportunity will involve sustaining the funding on innovation projects in this area. Currently this is successfully enabled through the UK aerospace industry and Government Aerospace Technology Institute (ATI), including their exciting 'Fly Zero' project.

Increased investment in the Aerospace Technology Institute is needed, to enable the technological innovations that will make net zero flight a reality. Hydrogen power has the potential to make huge strides towards decarbonising regional and medium-range commercial flights, but the UK needs a robust hydrogen policy and strategy that enables the production of green hydrogen in the volumes required by the industry.

The current endpoint of the ATI programme is March 2026, and budgetary commitments are already being made out to then. An extension and increase of funding to £3.7 billion out to 2030 is vital if the ATI is to continue to fulfil its remit and support clean growth with the technologies to decarbonise aviation.

Regarding the UK hydrogen strategy, it is imperative that HMG consider both the scaling up of production of hydrogen alongside changes to the ground infrastructure for how this hydrogen will get to the airports and aircraft for aviation. Airbus supports the work of the current Connected Places Catapult work but sees this as the start of the work not the end of it.

SAF

With the right Government support the UK can build a world leading sustainable aviation fuel (SAF) industry, with up to 14 UK-based SAF plants by 2035 bringing tens of thousands of jobs and £billions in GVA to former industrial regions of the country in seven clusters.

However, decisions by investors are being taken now and so we are urging the Government to set out a comprehensive policy framework for commercialising sustainable aviation fuels, alongside finance mechanisms such as loan guarantees or green bonds that will be critical to attract the private investment needed for delivery of first-of-a-kind UK SAF plants. Specifically, any SAF mandate (currently being consulted on by the Department for Transport, alongside its overall Jet Zero strategy) needs to be implemented along with a **price certainty policy by the end of 2022** at the latest, to ensure the UK realises the full potential from SAF.

This is because a mandate alone will not fix the 'price gap' that currently sees SAF cost around five times as much as 'fossil' jet fuel. Proving price certainty, but also critically a competitive SAF market for the end-user – i.e. airlines – will be critical to commercialising SAF and increasing uptake.

Airspace modernisation

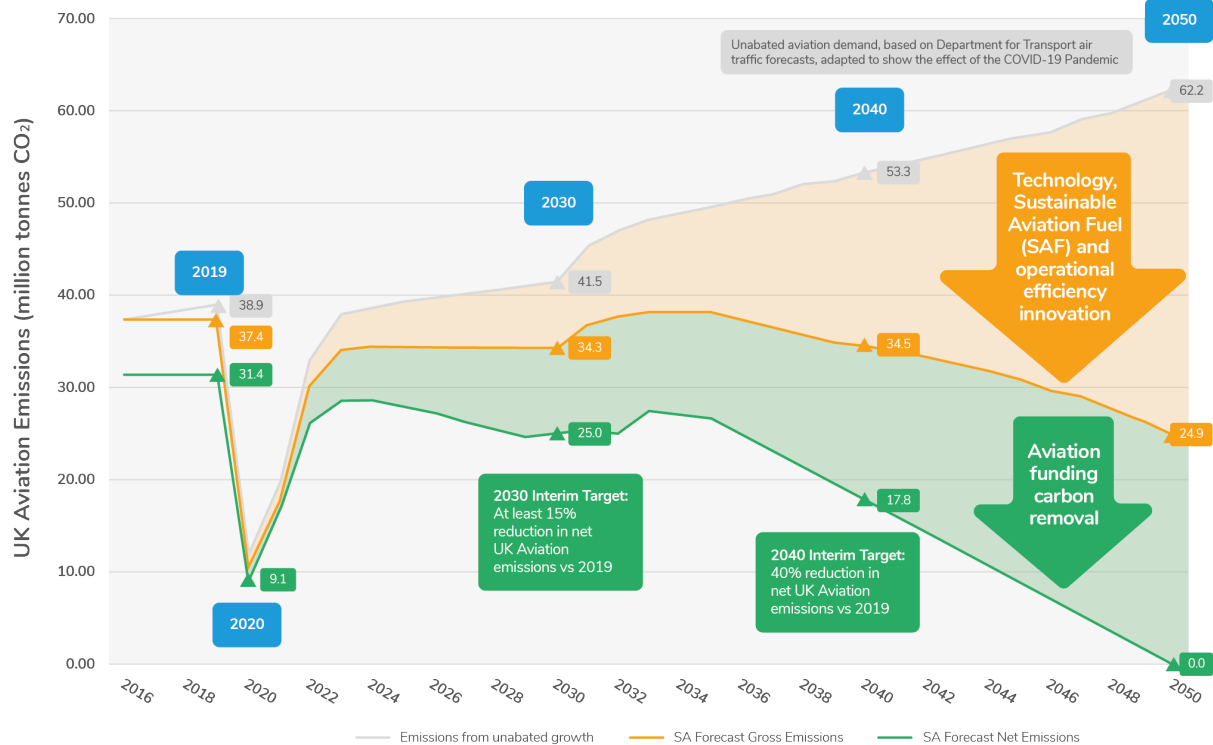
It is critical that delivery of airspace modernisation is seen as a priority and any potential barriers or delays to progress are quickly identified and resolved.

What is the most equitable way to reduce aircraft passenger numbers (e.g. reforming air passenger duty and taxes, frequent flyer levies, bans on domestic flights where trains are available, restrictions on airport capacity)? Are there any policy mechanisms that could reduce our reliance on shipping?

Airbus fully supports and was instrumental in delivering the UK Sustainable Aviation roadmap on 4th Feb 2020. The roadmap shows that by 2050 UK aviation can achieve net Zero using a number of pillars. Carbon emissions are avoided through new technologies,

use of SAF, offsetting mechanisms such as ETS and CORSIA using robust carbon reductions including permanent removals.

In June 2021 the industry unveiled its Covid overlay with interim targets for 2030 net 15% reduction compared to 2019 and 2040 net 40% reduction again compared to 2019.



Therefore Airbus believes that through these pillars aviation does not need to be artificially restrained and that with the right policies, investment and delivery UK aviation can meet its net zero target.

What further action is needed by the International Civil Aviation Organization and International Maritime Organization to drive emissions reductions? What can the UK Government do to drive international action on emissions?

[Advice from the UK Committee on Climate Change](#) and other reports recognises aviation is a hard to decarbonise sector and therefore should be eligible to address any residual emissions once all efforts have been made to minimise emissions, through access to carbon removal solutions. There will be a role to play for high-quality offsetting in aviation if we are to reach net zero, a position that Airbus supports. Specifically, they say 60-110 Mt of removals are needed for the UK's emissions per year by 2050.

Decarbonising aviation requires international cooperation and solutions, and UK leadership is vital. We need UK leadership in pursuit of a clear, long term CO₂ target for global aviation, to be agreed at the 2022 ICAO Aviation General Assembly, and compatible with existing commitments, for once CORSIA ends in 2035.

Through CORSIA UK airlines will pay billions of dollars to fund carbon reduction through high-quality, independently verified carbon offsets, whilst also being incentivised to reduce emissions 'at source' through the effective functioning of the carbon market.

The UK should be looking at COP26 as an opportunity to drive support for global action and investment in aviation decarbonisation, through supporting technological solutions, but also through CORSIA.

How effective will the global offsetting scheme for international airlines (ICAO's CORSIA) and the UK and EU ETS be at stimulating technology improvement and/ or behaviour change to reduce emissions from aviation / shipping?

As highlighted above, we need UK leadership in pursuit of a clear, long term CO2 target for global aviation, to be agreed at the 2022 ICAO Aviation General Assembly, and compatible with existing commitments, for once CORSIA ends in 2035. Such an agreement has the potential to be very effective at helping drive down emissions from aviation, in concert with other schemes such as the EU and UK ETS – so long as these schemes are coordinated and avoid undue complexity.

Airbus fully supports effective carbon market-based measures (MBMs) as an essential element in reducing emissions in the aviation sector, rather than unilateral 'eco' taxes targeted only at air transport and introduced in individual countries. This means mandatory regulation that harnesses the power of markets to seek emission reductions where they can be made most cost effectively and applied equitably in air transport markets to avoid competitive distortion and carbon leakage.

To achieve the first requirement - environmentally and cost-effective emissions reduction – policies must allow access to a range of abatement options in multiple sectors and countries. This market-based approach means that the cost of emissions reductions is established by projects that are most able to generate them. This means that airlines and their customers pay no more than necessary for meaningfully achieving carbon targets. Over time, as global structures to support carbon pricing mature, the cost of carbon can be expected to increase.

The second requirement – equity – is achieved by carefully designing the scope and rules of the policy measure with the objective that all airlines face equal treatment. Market distortion will occur where the cost per tonne of CO2 of a policy measure is different between different airlines, leading to carbon leakage and potential increase in net emissions. In air transport markets this can affect simple point-to-point markets as well as indirect transfer markets.

The global CORSIA and EU Emissions Trading System (ETS) policy measures both achieve these requirements to a large degree, which is why they are preferred over unilateral national taxes targeted only at air transport and introduced in individual countries. In the 2020 SA decarbonisation roadmap the effect of carbon price on demand was assessed. It showed that progressively applying a carbon price through market based measures to UK aviation emissions, that rises to around £220 a tonne of CO2 by 2050, is estimated to reduce demand for flying, reducing CO2 emissions in 2050 to around 67 million tonnes. This has been built into our UK aviation demand baseline.

How should the UK define its ownership of international aviation and shipping emissions (i.e. arrivals, departures or both) in order to include them in legislative targets?

The scope of the SA Road-Map includes airborne and ground based CO2 emissions from domestic flights within the UK and gate-to-gate emissions from international departures (i.e. from UK airport to non-UK destination airport) and excluding overflights. This approach is consistent with previous Road-Maps and the convention of CO2 emissions reporting to the UNFCCC.

Annex A

Recent UK action to reduce aviation emissions

Decarbonising UK aviation will be a long process, but over the last year we have already seen:

- The first SAF facility in the UK to secure planning permission. Planning permission granted for Altair Immingham, the UK's first waste-SAF facility in North East Lincolnshire;
- The process of modernising our airspace, which will enable more efficient operations, has begun at network and airport levels;
- Manufacturers have developed concepts of hydrogen and electric aircraft;
- Responding to calls by industry and the APPG for Sustainable Aviation, the Government announced the creation of the Jet Zero Council which brings together Government and industry in a forum to accelerate aviation decarbonisation;
- "Jet Zero" was one of the ten green priorities in the Ten Point Plan for a Green Industrial Revolution, which included confirmation of a £15 million competition to support Sustainable Aviation Fuel (SAF) production, funding for SAF clearing house, a consultation on a SAF mandate, and R&D investment for infrastructure upgrades supporting electric and hydrogen aircraft
- New industry research published highlighting the economic benefits of establishing 14 SAF facilities across seven UK industrial clusters, which would create over 20,000 jobs and almost £3 billion in GVA by the mid 2030s;
- A number of UK aviation companies made new commitments on net zero, including: new zero emission concept aircraft from Airbus, a commitment from Heathrow to reach net zero by mid-2030s, a net zero pledge from Rolls-Royce, a net zero competition from MAG, and a pledge from Boeing to deliver commercial airplanes ready to fly on 100% SAF;
- On 19 March 2021 Government announced up to £5.5 million is to be made available to aid industry hit by the pandemic as it develops and evaluates new flight routes to modernise UK airspace. Creating more efficient and streamlined airspace benefits airports and airlines but also the passengers and communities surrounding them, through reduced emissions.
- In June 2020, the Government announced up to £100 million of new research and development funding to help develop direct air capture technologies in the UK. As part of this, an innovation competition seeks to support the development of Greenhouse Gas Removals (GGR) technologies to help them achieve commercialisation. In May 2021, the Projects selected for Phase 1 were revealed