



## WHO IS SUSTAINABLE AVIATION?

Sustainable Aviation (SA) is a unique and growing alliance of the UK's airlines, airports, aerospace manufacturers, air navigation service providers, sustainable fuel producers and key business partners. Together, members of Sustainable Aviation are driving a long-term strategy to deliver cleaner, quieter, and smarter flying.

A full list of members, and reports which detail the progress in reducing aviation's environmental impacts are available online.

### MEMBERS



## SA PATHWAY TO DECARBONISATION

We remain committed to cutting CO<sub>2</sub> emissions from aviation to net zero by 2050. We are making our commitment a reality by supporting many initiatives today across operations, next generation aircraft, including zero carbon propulsion solutions, Sustainable Aviation Fuels (SAFs) and carbon removal.

The UK could be a global leader in carbon removals, including making use of its geological assets to assist the UK aviation industry achieve Net Zero CO<sub>2</sub> emissions by 2050.

Over one million jobs in the UK already rely on aviation and this Road-Map shows how with the right action today we can maintain the benefits of flying for generations to come.

Whilst non-CO<sub>2</sub> factors are not addressed in this Road-Map, we are carrying out further work, to determine the best way to manage them going forwards.

We will continually review this Road-Map to ensure it remains in line with the latest scientific advice on meeting the UK and ICAO related aviation climate goals.



FOR MORE INFORMATION ON UK AVIATION'S ROAD-MAP

Sustainable Aviation is grateful to the following organisations for leading the work in producing the Road-Map:



Supported by: A&G Jefferson Limited.  
Published April 2023



SUSTAINABLE AVIATION

# NET ZERO CARBON ROAD-MAP

Enabling delivery of a UK-led zero carbon aviation revolution

[sustainableaviation.co.uk](https://sustainableaviation.co.uk)



SUSTAINABLE AVIATION  
CLEANER | QUIETER | SMARTER

FOLLOWING POSITIVE TECHNOLOGICAL DEVELOPMENTS, UK AVIATION HAS UPDATED ITS DETAILED PLAN ON HOW WE WILL REACH OUR COMMITMENT TO NET ZERO CARBON AVIATION BY 2050

Our updated Net Zero Carbon Road-Map draws on expertise from all corners of the UK aviation industry, including airlines, airports, aerospace manufacturers, air navigation service providers and key business partners.



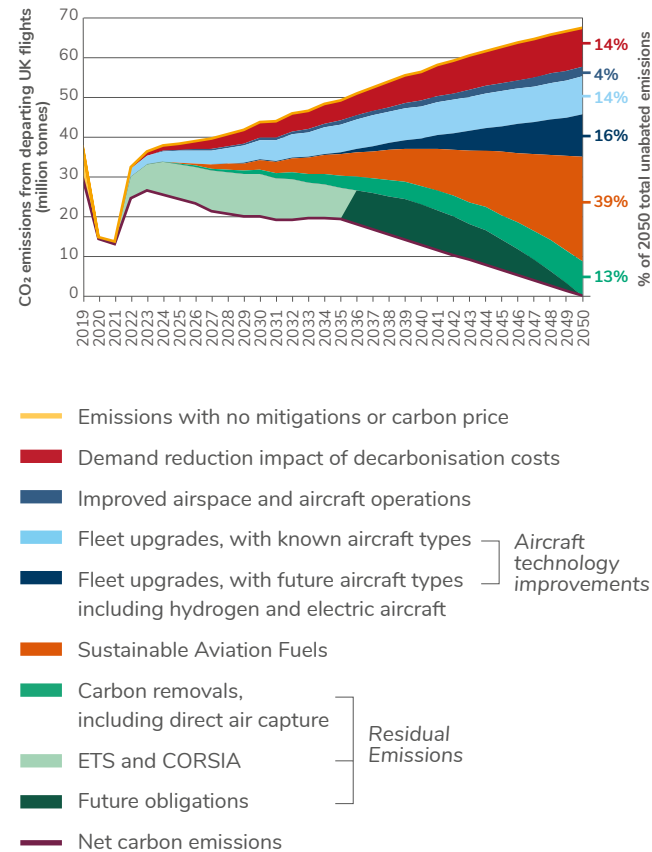


Our Road-Map shows how we will achieve our net Zero Carbon emissions commitment by 2050,

## REDUCING OUR CO<sub>2</sub> OUTPUT FROM AROUND 39 MILLION TONNES TO NET ZERO WHILST STILL GROWING UK AVIATION BY 78%, through:

- 1 Improvements in aircraft and engine efficiency: Aerospace manufacturers are investing heavily in cutting edge technology including hydrogen powered aircraft as well as improved gas-turbine engines, hybrid electric and fully electric aircraft.  
**CO<sub>2</sub> SAVING: 20.1MT IN 2050**
- 2 Sustainable aviation fuels: These have the potential to reduce UK emissions in 2050 by nearly 40%.  
**CO<sub>2</sub> SAVING: 26.4MT IN 2050**
- 3 More efficient operations and airspace: We are undertaking the completion of the most significant upgrade of route networks in UK airspace since the 1950s.  
**CO<sub>2</sub> SAVING: 2.6MT IN 2050**
- 4 Robust carbon offsets and investment in growing carbon removal solutions will address residual UK aviation emissions by 2050.  
**CO<sub>2</sub> SAVING: 8.8 MT IN 2050**
- 5 There is an estimated demand reduction in UK aviation due to decarbonisation costs from SAF, carbon removals, UK ETS and CORSIA.  
**CO<sub>2</sub> SAVING: 9.6 MT IN 2050**
- 6 Forecasts are indicating a slightly slower growth in aviation activity to 2050 post-COVID, than used in our 2020 pre-COVID Road-Map.  
**CO<sub>2</sub> SAVING: 3.6 MT IN 2050**

## CO<sub>2</sub> EMISSIONS FROM DEPARTING UK FLIGHTS



**Please note:** Sustainable Aviation Fuel (SAF) is only considered for use if produced from waste/residual feedstocks, which are independently certified to show these do not involve the conversion of agricultural land from food crops or cause increased deforestation. Stringent certification standards ensure that other natural resources e.g. fresh water are conserved and SAF production is able to divert wastes e.g. municipal wastes, from less sustainable disposal methods.

## ACHIEVEMENTS IN RECENT YEARS HAVE MADE REAL PROGRESS IN CO<sub>2</sub> REDUCTIONS



By 2019 in the UK, a 30% growth in passengers was delivered with only a 1% increase in CO<sub>2</sub> emissions when compared to 2005.



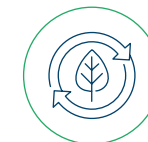
UK airspace modernisation is now well underway, with changes delivered over the past three years already enabling c60,000 tonnes of CO<sub>2</sub> savings a year.



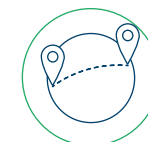
The COVID pandemic saw the earlier phasing out of older jumbo jets replaced by newer, more efficient aircraft. The next generation of fuel efficient aircraft technologies will include zero carbon propulsion solutions.



Hydrogen fuel cell aircraft are now in test flight phases in the UK and the testing of engines running on 100% hydrogen fuel has occurred with the ambition for hydrogen powered aircraft to begin entering service by the end of this decade.



UK SAF started production in 2022 in the Humber region and SAF blends have now been used on over 450,000 flights globally. A world-first 100% sustainable fuel test flight took place in November 2022 by the RAF and industry partners using a military transporter aircraft - an RAF Voyager.



The world's first fully CO<sub>2</sub> net zero transatlantic flight is planned for 2023, and will fly from London to New York, using solely SAF.

## DELIVERING NET ZERO CARBON

Delivering net zero carbon for aviation will be harder than for most sectors but it is achievable. However, it can only be delivered through an international approach, with substantial investment from industry and development of smart low carbon policies by the UK Government, working in partnership with the sector.

### WE ASK THE UK GOVERNMENT TO SUPPORT THIS ROAD-MAP IN THE FOLLOWING WAYS:

- Maximising short-term operational efficiencies by accelerating the UK airspace modernisation programme and completing by the end of the decade.
- Delivering commercial UK Sustainable Aviation Fuel (SAF) production at scale this decade by providing a price stability mechanism, alongside a SAF mandate and by prioritising access to UK sustainable feedstocks.
- Investing in zero carbon emission flight technology, by uplifting matched funding levels to the ATI programme through to 2031 - to drive efficiency improvements and the development of zero carbon emission technologies, alongside investing in the UK hydrogen supply and airport infrastructure.
- Addressing residual aviation emissions by accelerating the rollout of carbon removals, including them in the UK ETS scheme and ensuring aviation's fair share.

Delivering accelerated progress towards a UK-wide net zero CO<sub>2</sub> emission future requires aligning all of Government on a strategic plan, to ensure sufficient low carbon electrical and hydrogen generation is in place, to meet the increased energy demands with UK aviation receiving its fair share alongside other industries. Sustainable Aviation forecasts that UK aviation will require a maximum of an additional 147 TWh in additional renewable energy by 2050.