‘Green is only a colour’

Mark Robinson - Head of Widebody Business Performance
Airbus

Airbus & Sustainability
London – May 2023

AIRBUS

The countdown to ZEROe

IATA – ATAG – ICAO Net zero commitment

October 2021

October 2022

Target aligned with the objectives of the Paris agreement to limit global warming to 1.5°C.

Science Based Target initiative

WORLD RESOURCES INSTITUTE

CDP

WWF

United Nations Global Compact

together we are Sustainable

IATA - International Air Transport Association
IACO – International Civil Aviation Association
LTAG – Long Term Goal Aspirational Targets

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Reminder on scope 1, 2, 3: total GHG emissions across the value chain

Airbus has to report its total GHG emissions under this classification

Source: GHG emissions protocol, Airbus data

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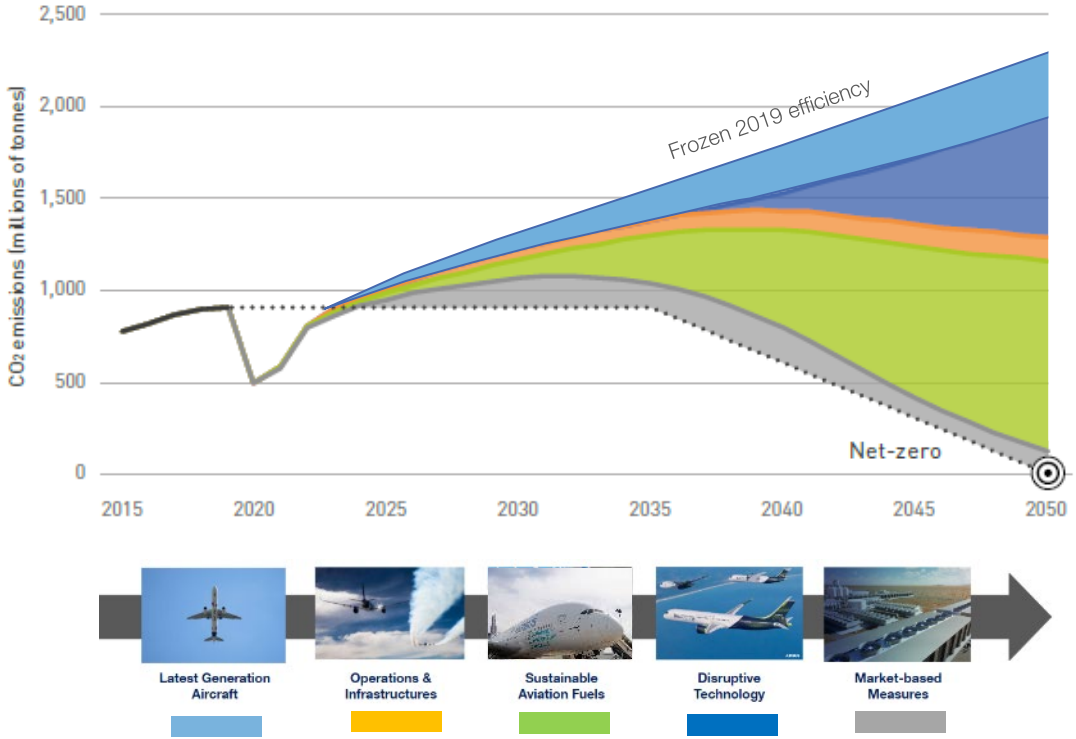
There is no single solution to decarbonise aviation

Airbus supports the ATAG most ambitious technology scenario



> ATAG CO_2 Roadmap based on most ambitious technology scenario & central traffic growth scenario: 3.1% CAGR 2019-2050

Latest generation aircraft

- Up to 25% lower unit fuel and CO_2 vs. previous generation- across the entire Airbus Family
- Only 25%* of passenger in-service fleet are latest generation aircraft
- A350F will be the first latest generation freighter on the market

* Western built passenger aircraft above 100 seats – pax aircraft only - Year end / / New generation: A220, A320neo Fam., A330neo, A350, 737Max, 777X, 787 Previous generation: A300, A310, DC 9, DC10, 707, 727, 737, 747, 757, 767, 777, MD11, MD80, MD90, F100, A320 Fam., A330, A340. Status ar at end 2022.

Operations & Infrastructures

- Increased efficiency of the current fleet, by up to 10%, with a range of solutions
- Upgraded aircraft systems
- Optimized flight trajectories
- Decarbonised on-ground operations
- Air Traffic Management

Sustainable together we are

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Sustainable Aviation Fuels

- Flying with 100% SAF reduces lifecycle CO_2 emissions by up to 85%
- All Airbus aircraft are already certified to 50%, certification up to 100% by end of decade
- Industrial uptake needed to increase SAF's availability
- Coalitions and partnerships signed to foster production of SAF

together we are Sustainable

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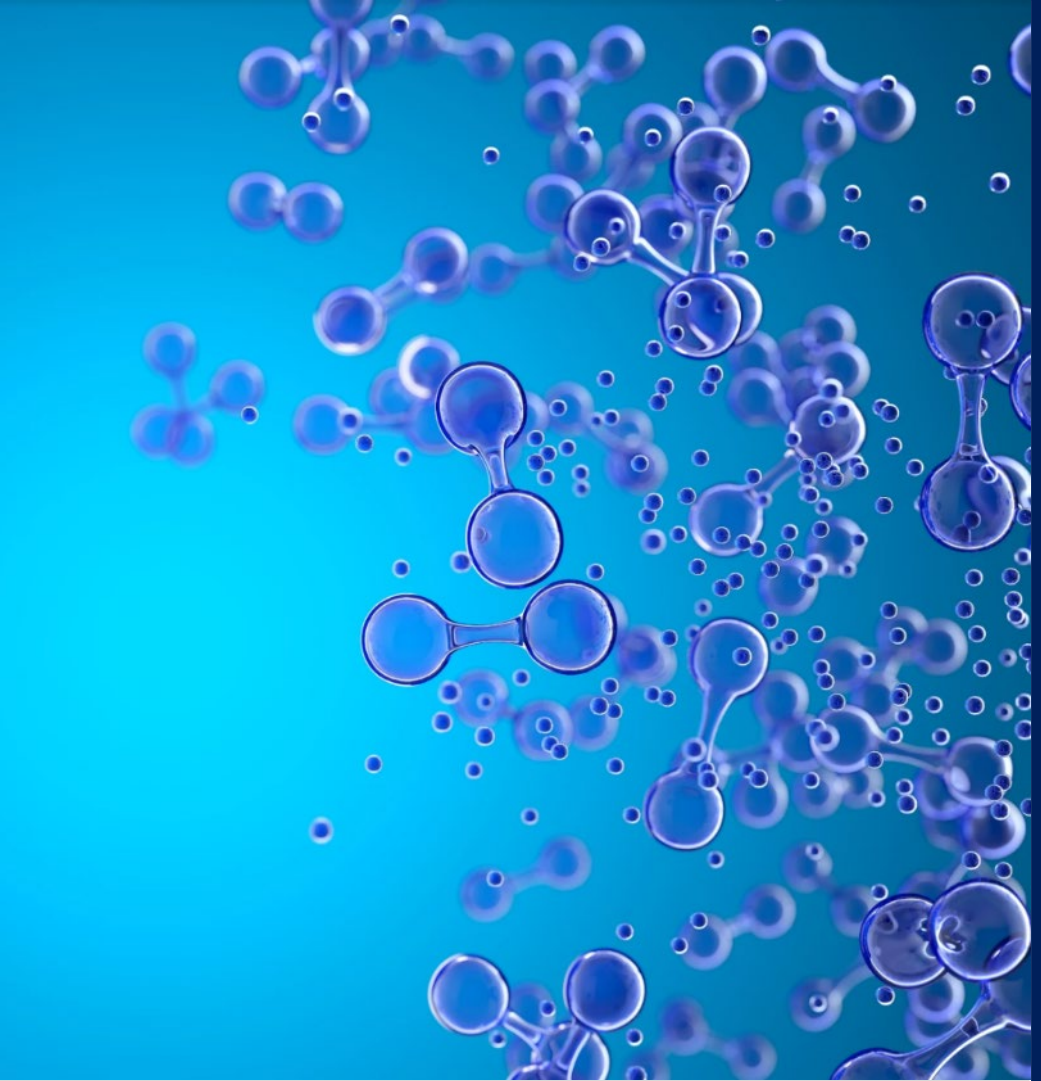
Disruptive technologies

- Development, testing and maturity -based deployment of advanced technologies
- Ambition to bring a zero emission aircraft to the market by 2035
- Hydrogen as a fuel for turbines, for electric motors via fuel cells and to produce SAF
- Developing advanced solutions for hydrogen or kerosene fuelled aircraft (aerodynamics / airframe / propulsion / hybridization)



Why hydrogen?

Decarbonisation: H_2 emits no CO_2^* & has the potential to reduce non-CO_2 emissions (i.e. NOx) & persistent contrails
(*if generated from renewables via electrolysis)

Declining costs: the cost of producing H_2 is likely to decline over the next decades as it gets widely adopted by various industries. This will make decarbonised flying increasingly economical

Versatility: H_2 could be used as an ingredient of Sustainable Aviation Fuel* or directly on-board an aircraft through direct combustion or fuel cells
(*combined with captured CO_2 to produce Power-to-Liquid synthetic fuel)

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H_2 technology for aviation

- **Hydrogen combustion**: generating thrust by burning liquid hydrogen
- **Hydrogen fuel cells**: converting energy stored in H_2 into electrical energy to power electric motors
- **Synthetic fuels**: using a decarbonised fuel derived from renewable hydrogen & CO_2

Challenges to H_2 adoption

- **Technology compatibility**: bringing weight & cost down
- **Regulatory**: standardisation (technology & rules)
- **Infrastructure**: step-by-step transition and long term plan
- **H_2 availability & cost**: growth of renewable electricity and hydrogen ecosystem (supply/demand)

ZERO e Hydrogen combustion demonstrator

A380 multimodal test platform with its capacity to store large hydrogen tanks

Hydrogen combustion engine located along the rear fuselage

4 liquid hydrogen tanks stored in a caudal position

Liquid hydrogen distribution system

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ZEROe Fuel Cell demonstrator

A380 multimodal platform
to test and demonstrate all our hydrogen technologies

Megawatt power class

A fuel cell engine
located along the rear fuselage

Cryogenic liquid hydrogen tank
stored in the fuselage

Gaseous hydrogen distribution system

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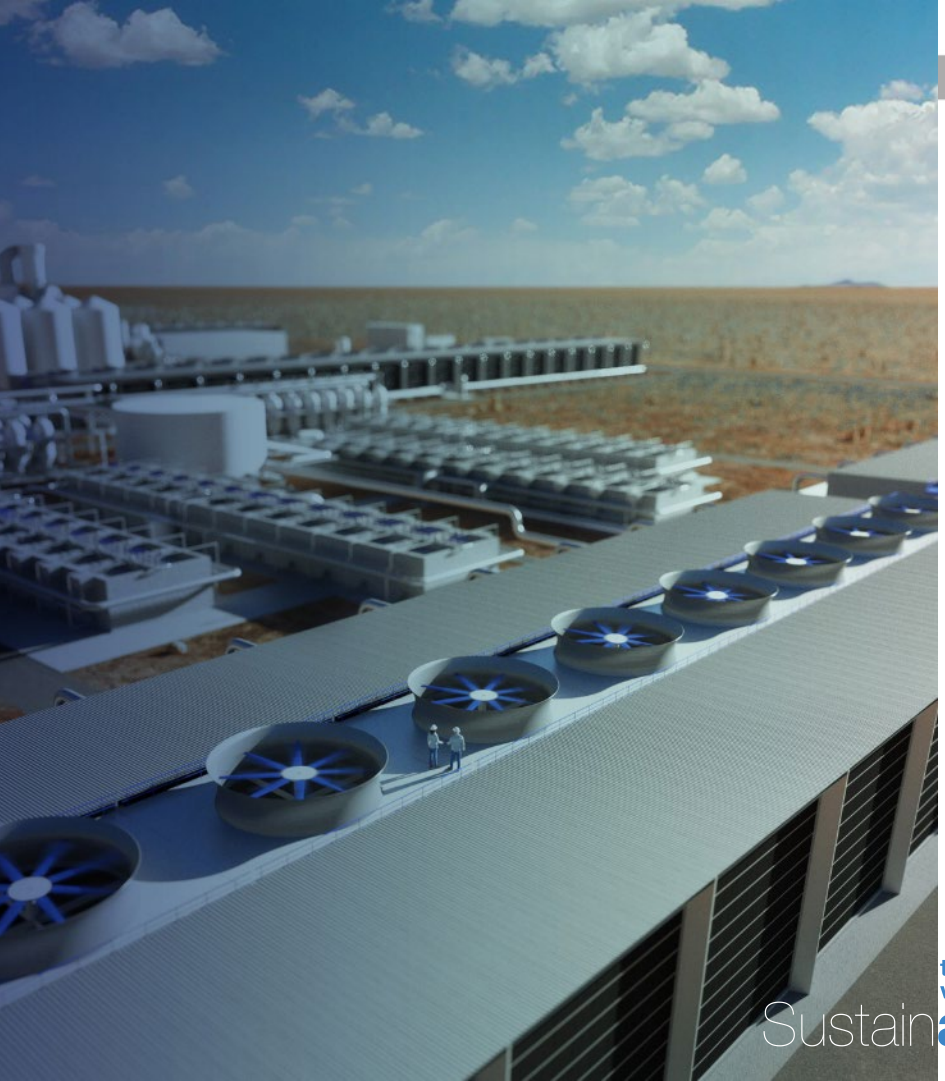
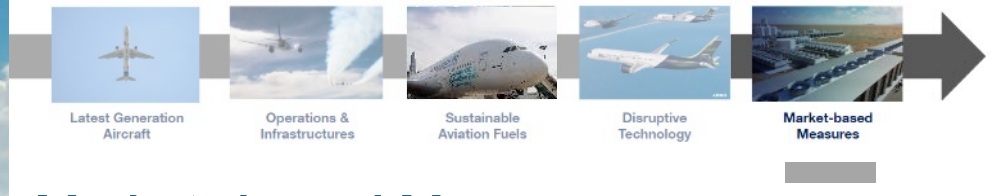




Market -based Measures

- Regulatory measures: European Union's Emissions Trading System (EU ETS) and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

- Voluntary measures: Airbus supports carbon removal credits from **Direct Air Carbon Capture and Storage** - and their future inclusion in regulatory frameworks.

Carbon Engineering
AIR CANADA
AIRFRANCE KLM GROUP
virgin atlantic
LATAM
IAG
Lufthansa
1POINTFIVE
easyJet
AIRBUS

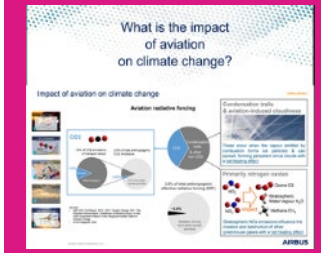
Climate Fresk

Build the fresk

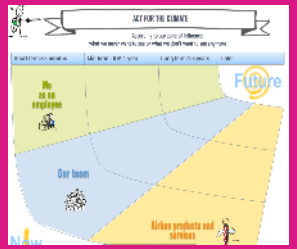
Impacts in Airbus

Share new ideas

Discuss & position 42 Cards to get the climate change mechanism & the overall picture



Share status of our industry to understand our impacts on and of Air transport



By small team, identify concrete actions in your perimeter as employee, team and business level

Select 5 IDEAS

Airbus Amber

> Include the ClimateFreskin a **global toolkit** on Sustainability aligned with Airbus Strategy for Sustainability

> **Engage employees** in the Sustainability journey → we can only act if we understand!

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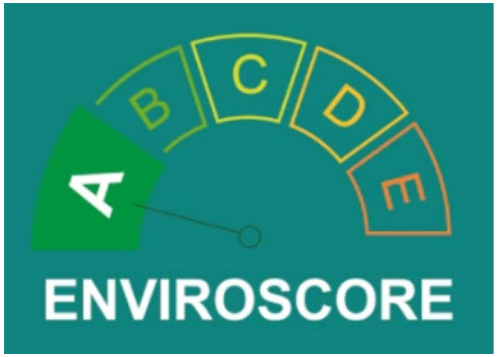
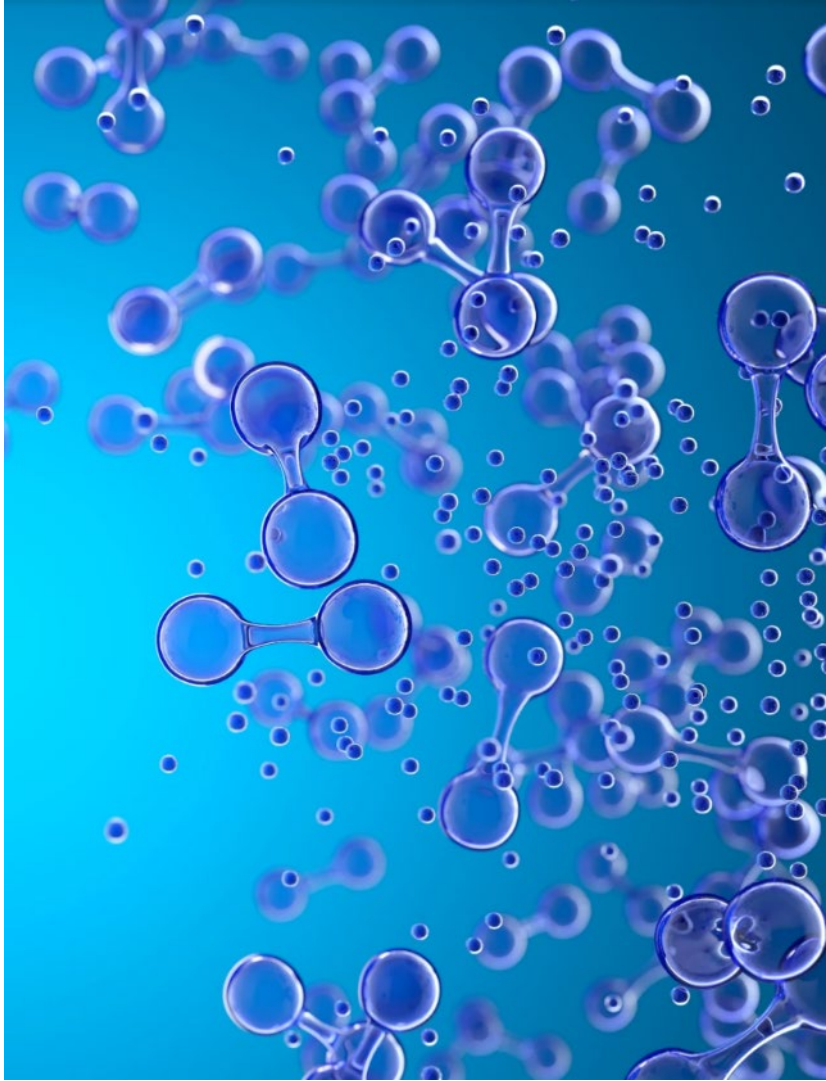
Project Enviroscore

- Water
- Energy
- CO_2
- VOC and air emissions
- Waste and raw materials





Conclusion

- Crisis Drives Change
- No Single Solution to DeCarbonise Aviation
- Coordinated Accelerated Cross Sector Approach
- Aviation has a Credible Path in Place but a lot more work to be done

Survey

Name a European capital city beginning with the letter “L”

L_____

Survey Results

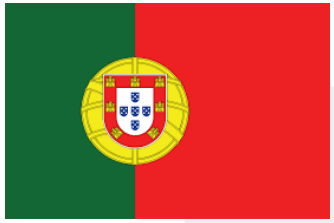
UK Participants

4th Place - **Ljubljana** 2%

3rd Place - **Luxembourg** 10%

2nd Place - **London** 37%

1st Place - **Lisbon** 51%



Continental Participants

4th Place - **Ljubljana** 2%

3rd Place - **Luxembourg** 12%

2nd Place - **Lisbon** 32%

1st Place - **London** 54%