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Decarbonisation: why and how

AFRAA 54th AGA and Summit

Dakar, 12 December 2022

Corrin Higgs

Environment and Sustainability Marketing Director

AVIATION BENEFITS BEYOND BORDERS

2018/2019 Snapshot
Published 2020

Worldwide

87.7 million
Jobs supported by aviation worldwide.

$3.5 trillion
Aviation's global economic impact (including direct, indirect, induced and tourism catalytic).

4.1%
Global GDP supported by aviation.

35%
Air transport carries around 35% of world trade by value and less than 1% by volume.

Africa

7.7 million

$63 billion

ATAG
AIR TRANSPORT ACTION GROUP

Our purpose

We pioneer sustainable aerospace for a safe and united world

Sustainable together we are

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IATA – ATAG – ICAO Net zero commitment

October 2021

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

October 2022

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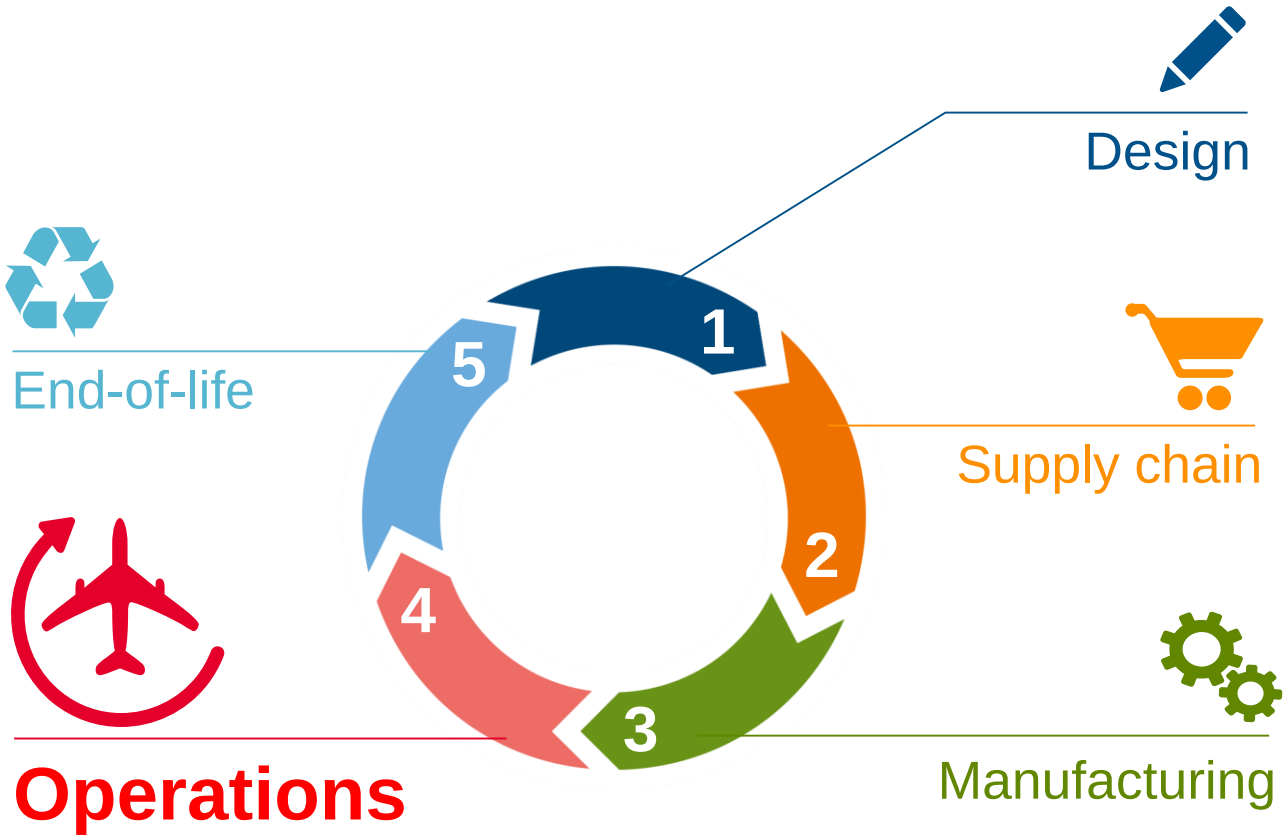
Sustainability is required across the entire lifecycle



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Our carbon footprint ~ your carbon footprint

Engaging the whole value chain

Scope 3

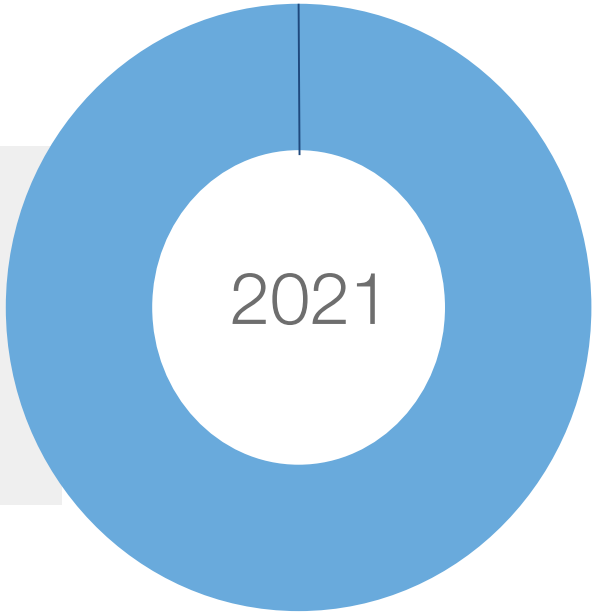
~475mt CO2eq

Airbus value chain footprint

~11 mt
Upstream (Scope 3)
Purchased goods and services

~464 mt
Downstream (Scope 3)
Use of sold products

~0.8 mt
Industrial Operations (Scope 1&2)



Aligning our approach to recognised standards

TCFD

Supporter of Task Force on Climate-related Financial Disclosures

CDP
DRIVING SUSTAINABLE ECONOMIES

A- rating in 2021 (stable year-on-year)

SCIENCE BASED TARGETS

Submitted for all Scopes in 2022 - pending validation

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Turning commitments into targets

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

24 airlines or groups setting emissions reduction target through SBTi, including **12 with net-zero target in 2050 or before.**

American Airlines, Air New Zealand, Lufthansa Group, Easyjet, jetBlue and Delta have their near term target approved by SBTi

Updated end October 2022

AIRFRANCE

Azul Linhas Aéreas Brasileiras

American Airlines

LATAM AIRLINES

UNITED

BRAATHENS Member of the SAS Group

FINNAIR

DELTA

easyJet

AIR NEW ZEALAND

GOL

Wizz

IBERIA

KLM

ANA

Lufthansa

JAL JAPAN AIRLINES

IAG INTERNATIONAL AIRLINES GROUP

AIRFRANCE KLM GROUP

EVA AIR

CARGOJET

jetBlue

RYANAIR

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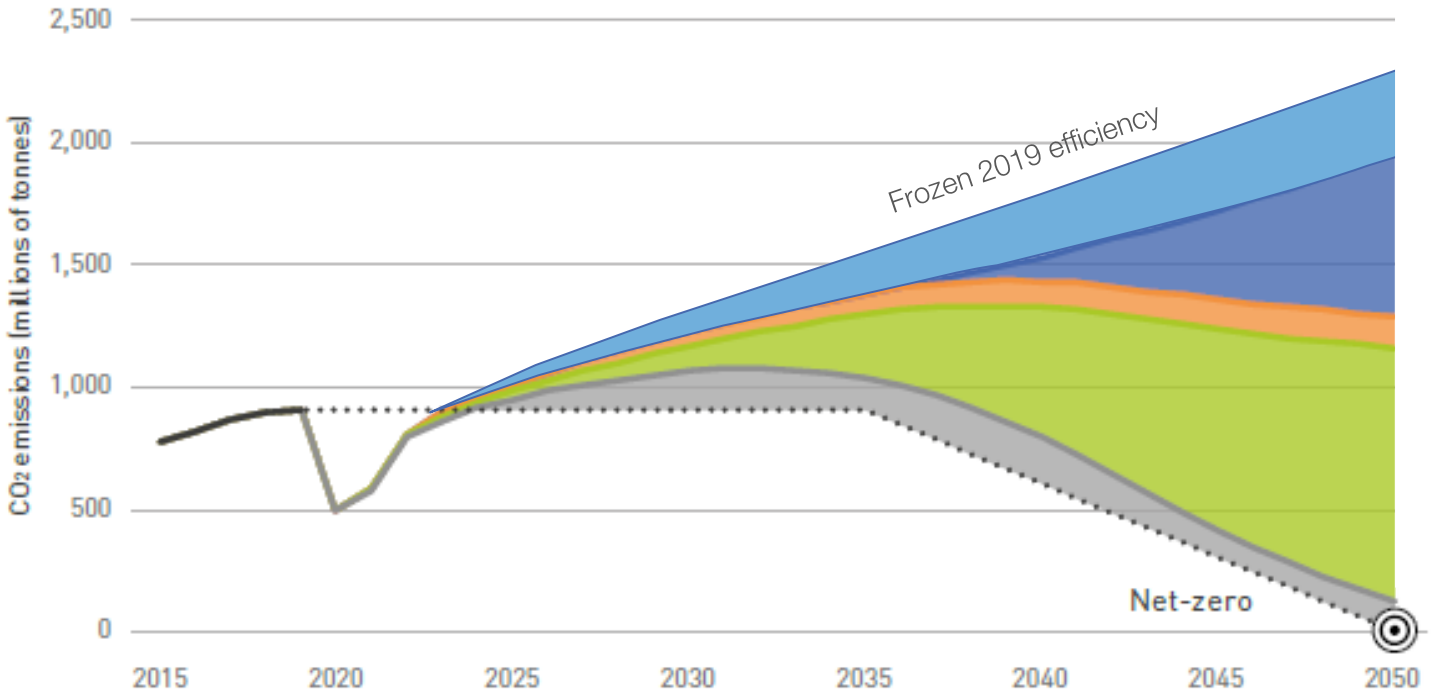
There is no single solution to decarbonise aviation

Airbus supports the ATAG most ambitious technology scenario



Latest Generation Aircraft

Disruptive Technology

Operations & Infrastructures

Sustainable Aviation Fuels

Market-based Measures

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

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Latest generation aircraft

- **Fleet replacement yields 20-40% CO2 savings**
- 80% of the current fleet is not to the latest standards

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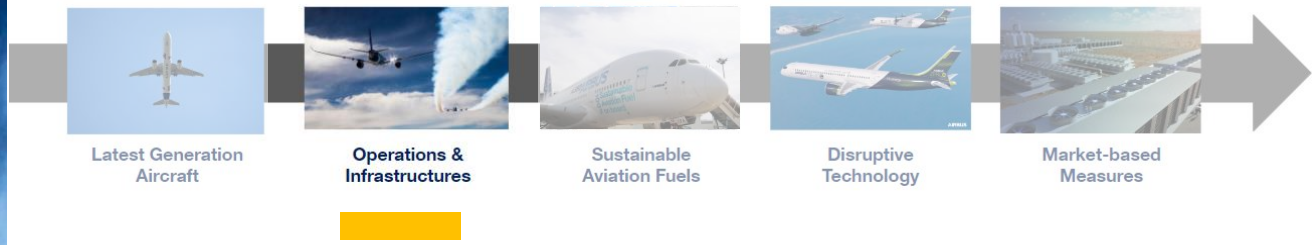

Operations & Infrastructures

- **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

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Sustainable Aviation Fuels

- **Flying with 100% SAF reduces lifecycle CO2 emissions by up to 85%**
- Moving from 50% blends to 100% for all Airbus aircraft by the end of decade
- Industrial uptake needed to increase SAF's availability
- Coalitions and partnerships to foster scale-up of SAF production

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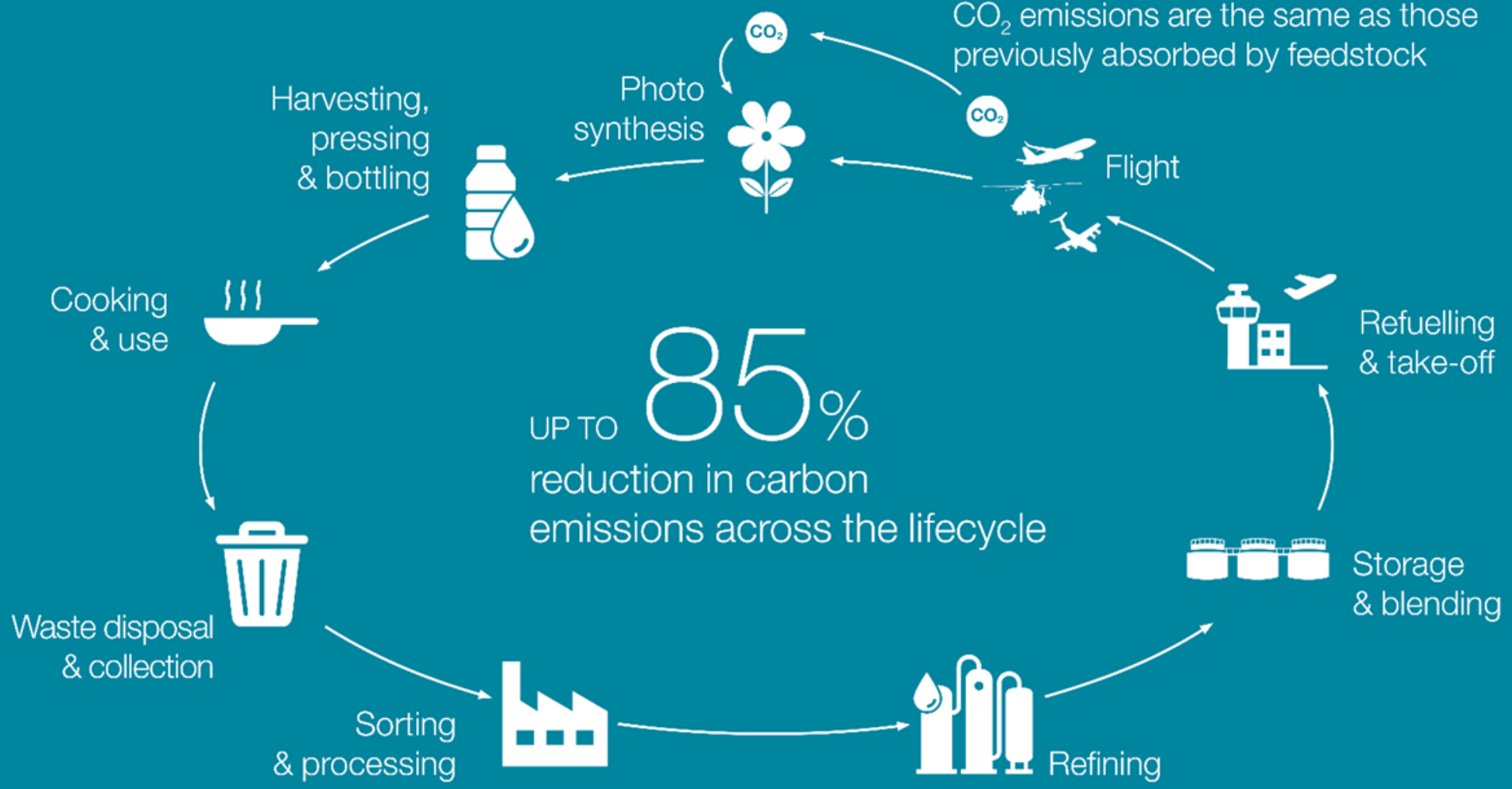
The Sustainable Aviation Fuel
carbon lifecycle



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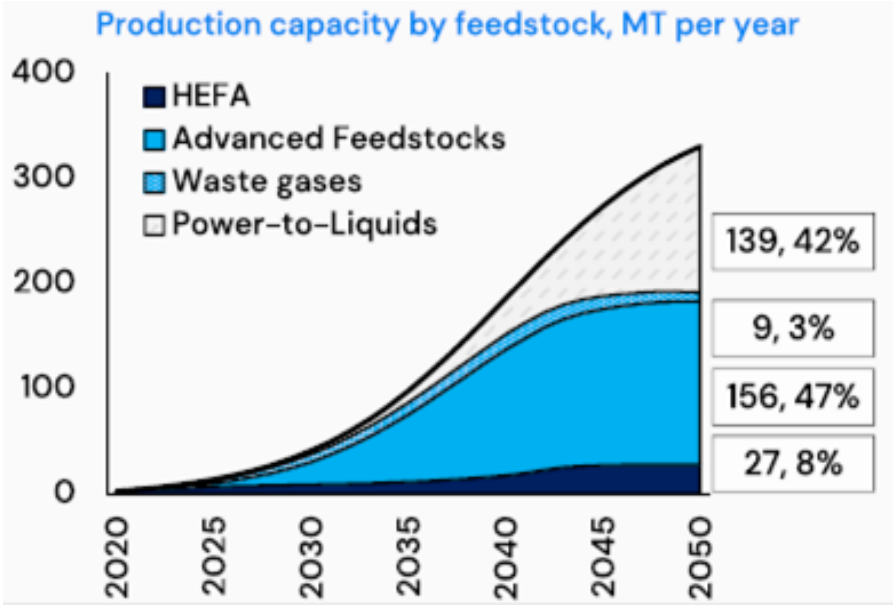
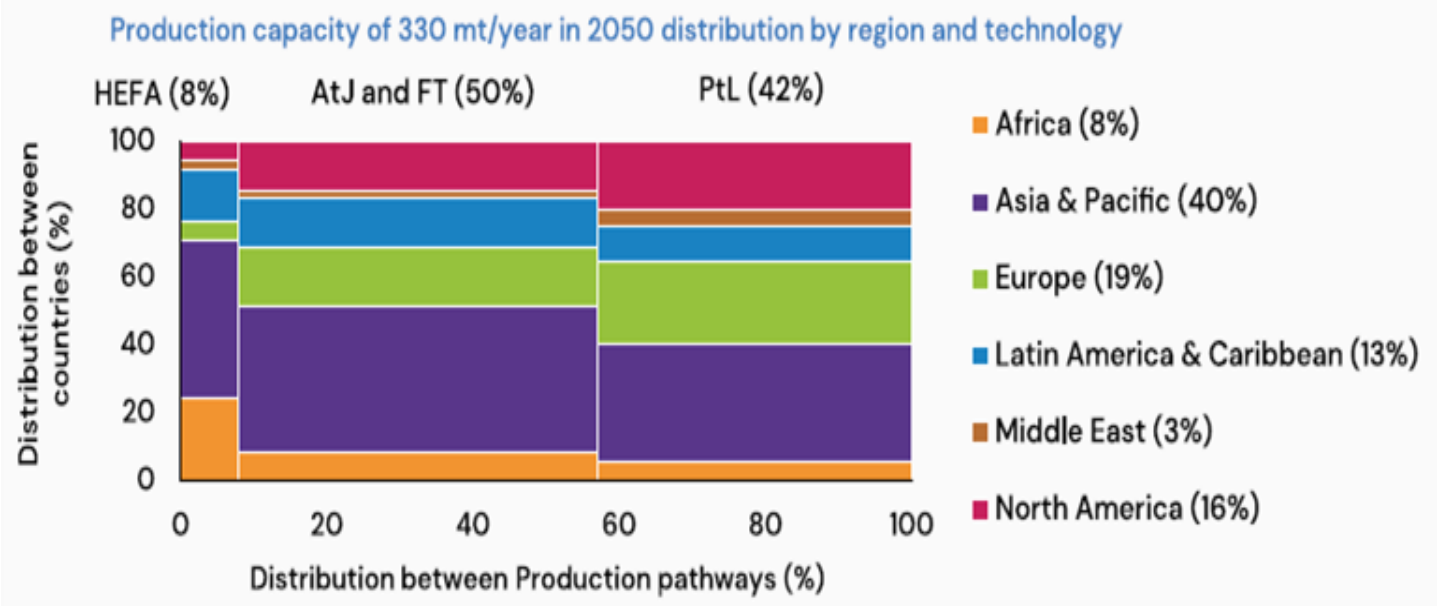
SAF Technologies and estimated timeline to market (industry view)

ICF Study for ATAG WP2050 Report





Several SAF pathways will contribute to the aviation Net Zero on different timelines pending industrial maturity

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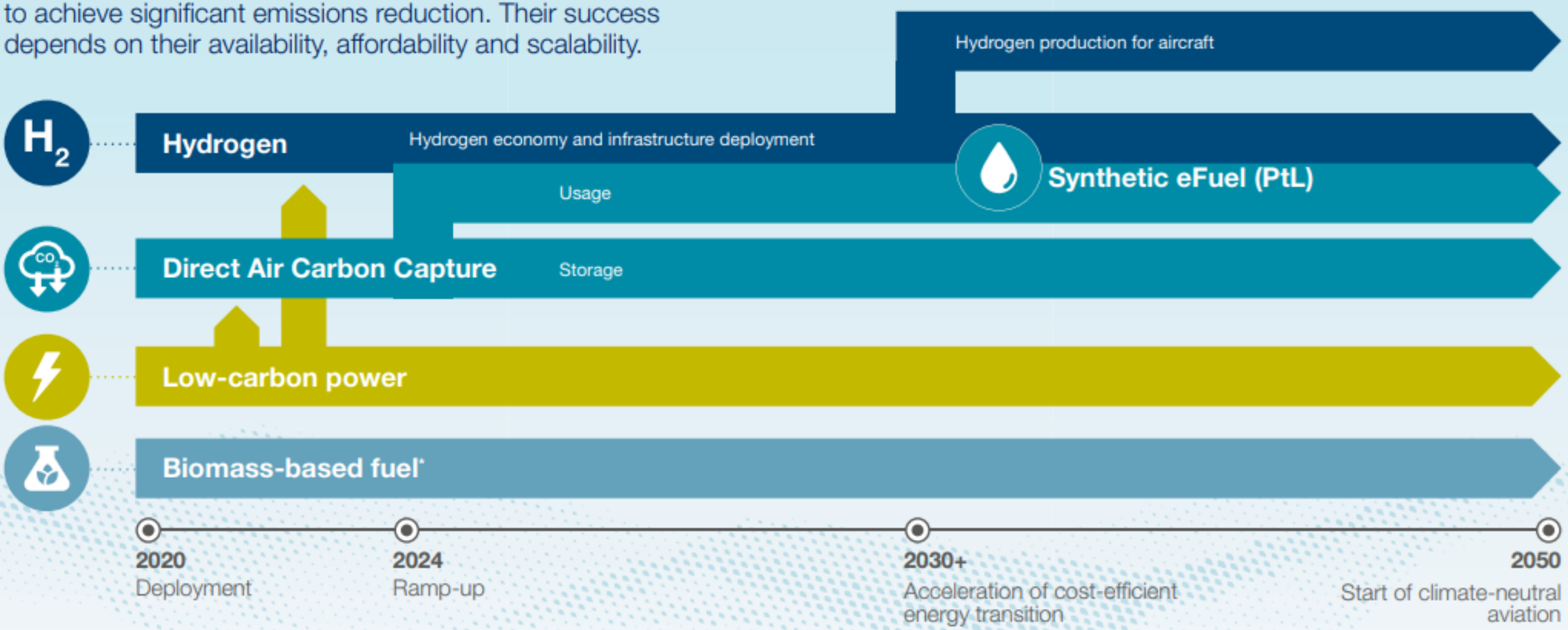
The road to zero: aviation's energy roadmap

Multiple energy pathways must be accelerated simultaneously to achieve significant emissions reduction. Their success depends on their availability, affordability and scalability.



**A type of Sustainable Aviation Fuel (SAF) made of renewable feedstock (i.e. used cooking oil, waste, residue, etc.)

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Disruptive technologies

- **Ambition to bring a zero emission aircraft to the market by 2035**
- Hydrogen as a fuel for turbines and electric motors via fuel cells
- Hydrogen as an ingredient in synthetic SAF
- **Developing advanced solutions for hydrogen or kerosene fuelled aircraft** (aerodynamics / airframe / propulsion / hybridization)

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Introducing Airbus ZEROe

Turboprop

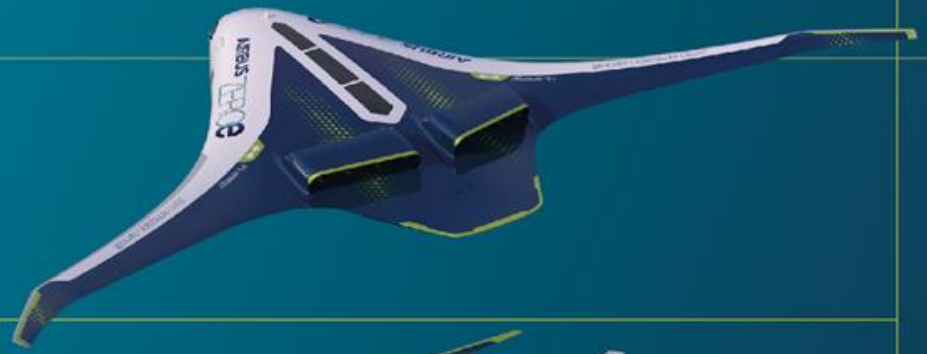
<100
Passengers

Hydrogen
Hybrid Turboprop
Engines (x 2)

1,000+nm
Range

Liquid Hydrogen
Storage & Distribution
System

Blended-Wing Body



<200
Passengers

Hydrogen
Hybrid Turbofan
Engines (x 2)

2,000+nm
Range

Liquid Hydrogen
Storage & Distribution
System

Turbofan

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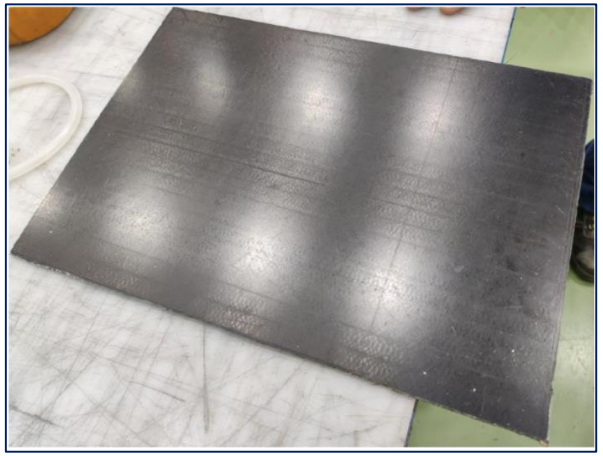
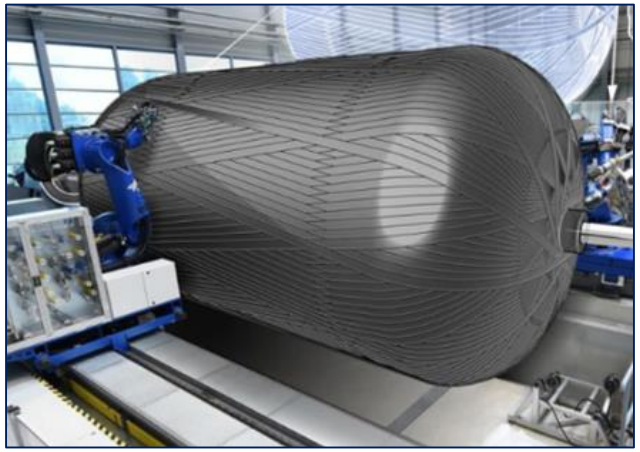
Zero Emission Development Centres

Secure a successful product and industrial system co-design to ensure the maturity at Entry Into Service

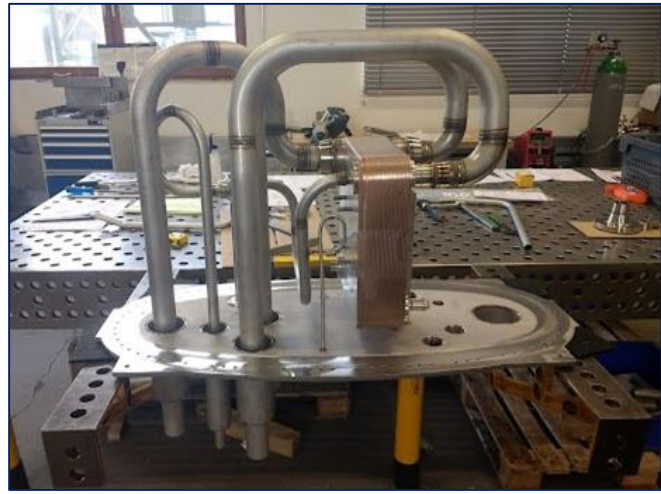
Filton: Hydrogen Test Bed



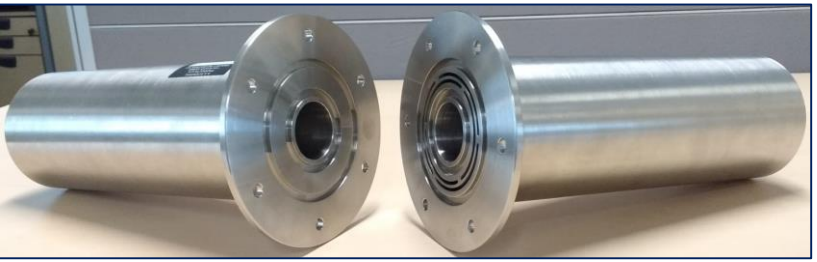
Stade & Spain: Cured thin ply coupon panel with "cryo-capable" material



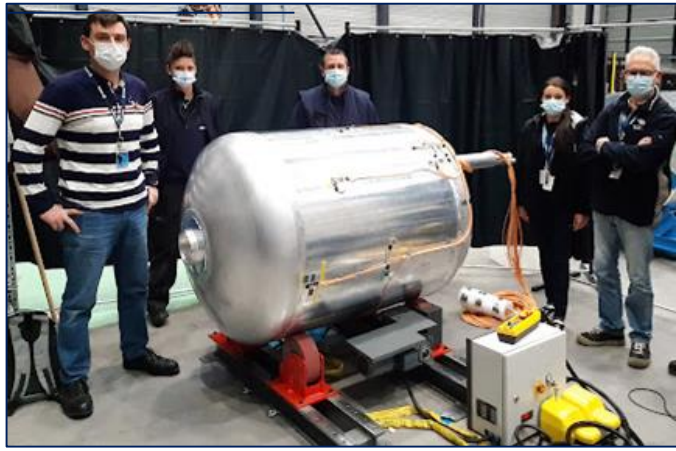
Stade: CFRP* tank components DMU



Bremen: First LH2 tank Pipe Module



Filton: Flanged pipes



Nantes: First LH2 tank manufacturing

*CFRP: Composite Fiber Reinforced Polymer

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A380 Propulsion Demonstrator

Open Fan Technology

Mature & accelerate the development of advanced propulsion technologies

cfm

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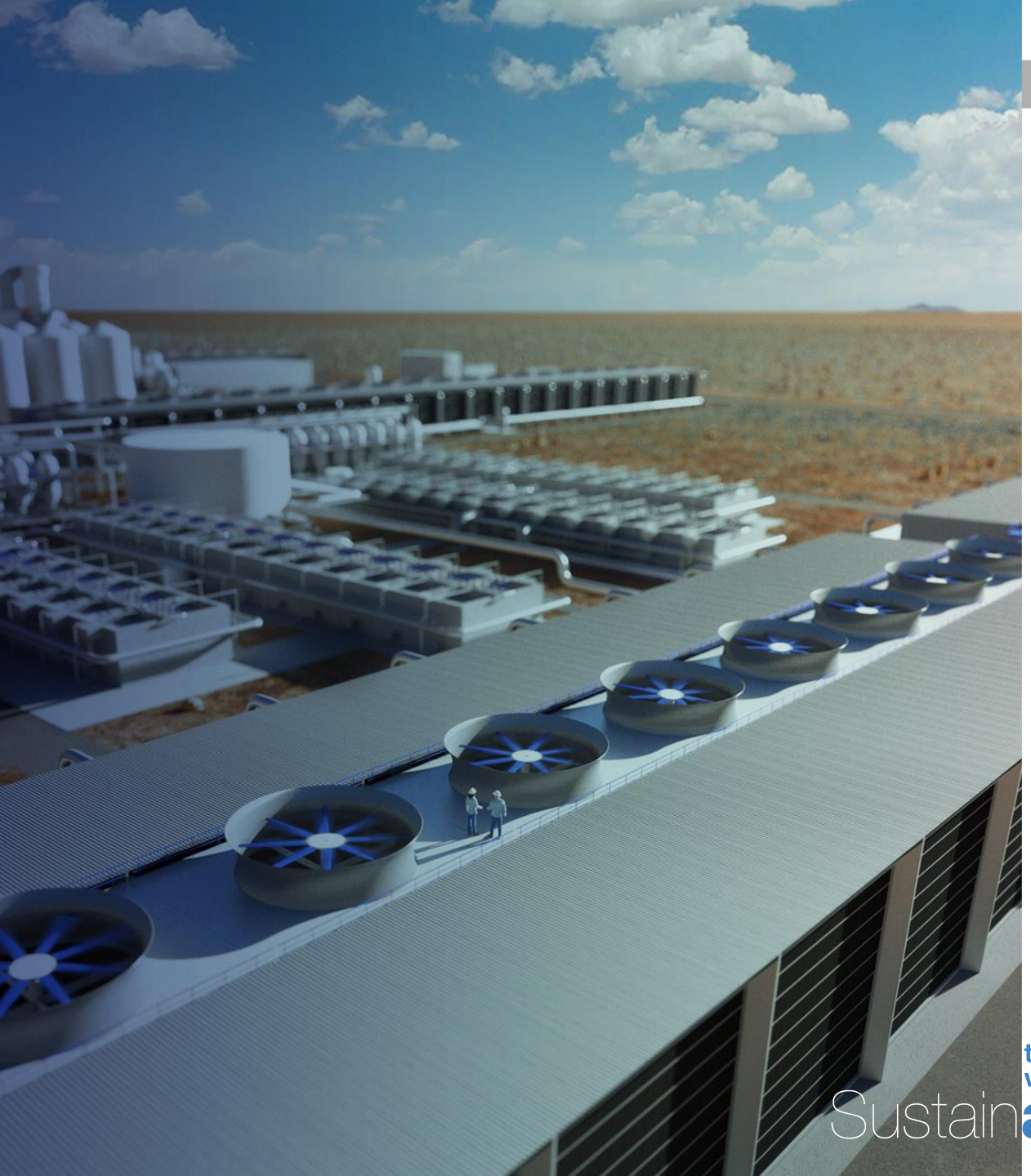


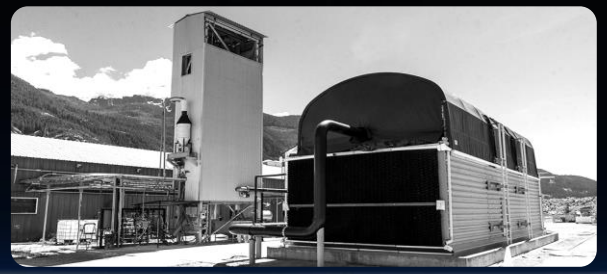
Market-based Measures

- 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.

Direct Air Carbon Capture

Carbon Engineering



Carbon Engineering (CE) is the developer of the Direct Air Capture (DAC) technology

1POINTFIVE

1PointFive (1P5) is a development company with a license to build CE's DAC technology

CE works with 1PointFive to build the world's largest DAC Plant in the Permian Region of Texas

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Airbus invests in Carbon Engineering and offers CE/1P5 DACCS solution at a competitive price for aviation.

Ambition

To have DACCS recognised

as a valid option for carbon accounting

in connection with CORSIA and EU-ETS

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Sustainable

together we are

- Following bold commitments with clear strategy and action
- Using all levers at our disposal, now and into the future
- Working together to achieve a thriving and sustainable industry

VC

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Thank you

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