Aviation Industry Committed to Zero Carbon 2050

ESTONIAN HYDROGEN DAYS 2021

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President ERA
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Climate Change Concern is Growing

- **Paris Agreement**: Limit global warming to 2°C, pursue efforts to limit to 1.5°C
- **IPCC**: Limiting global warming to 1.5°C requires net zero CO\(_2\) by 2050
- **European Green Deal**: Ambition for climate-neutral EU by 2050
- **Aviation Round Table**: EU aviation commitment to net zero CO\(_2\)
- **Destination 2050**: A roadmap towards net zero CO\(_2\)

Project indicated and commissioned by A4E, ACI EUROPE, ASD, ERA and CANSO

Work performed by research and consulting team of NLR and SEO
Decarbonisation Roadmap for European Aviation

All flights in scope

![Graph showing decarbonisation roadmap for European Aviation]

- Hypothetical reference scenario
- Improved technology (kerosene)
- Improved technology (hydrogen)
- Economic measures

Effect of hydrogen on demand
Effect of sustainable aviation fuels (SAF) on demand
Effect of economic measures on demand

Net CO$_2$ emissions
Improved ATM and operations

Decarbonisation targets:
- 20% reduction by 2030
- 50% reduction by 2040
- 80% reduction by 2050
Aircraft & Engine Technology

- By 2035, aircraft with highly efficient propulsion systems and 30% less fuel consumption, could become available.

- By 2035, hydrogen-powered aircraft suitable for short-range intra-European route should have the potential to reduce CO\textsubscript{2} emissions by 100% as these aircraft progressively enter service.

- Development of more fuel-efficient aircraft, engines and optimised range and capacity of hybrid-electric rotorcraft and regional aircraft would reduce CO\textsubscript{2} emissions per flight by 50% compared to 2018. These rotorcraft and regional aircraft should enter service between 2030 and 2035.
Policies & Actions Needed

• Industry will develop more energy-efficient aircraft and bring these into operation through continued fleet renewal.

• EU and national governments should stimulate further developments & deployment of innovations by funding research programmes and promoting carbon removal technologies (Clean Aviation, SESAR partnerships, etc.).

• Industry will develop hydrogen-powered and (hybrid)electric aircraft and supporting (airport and heliport) infrastructure and bring it to the market.

• EU and national governments should support industry investments through incentives or by reducing risk through a consistent and stable policy framework.
Sustainable Aviation Fuels – Up to 83% total fuel consumption in Europe by 2050 possible

- SAFs deliver a major contribution to achieving net zero carbon emissions in 2050

- Key challenges to reap the potential of SAFs:
  - Economic viability
  - Sustainability
  - Supply potential
Decarbonisation Roadmap for European Aviation

All flights in scope

- Aircraft & Engine Technology: 38%
- Effect of Aircraft & Engine Technology on demand: 12%
- ATM & Aircraft Operations: 46%
- Sustainable Aviation Fuels: 10%
- Effect of Sustainable Aviation Fuels on demand: 2%
- Economic Measures: 2%
- Effect of economic measures on demand: 1%
Johan Lundgren  
Chairman A4E  
CEO easyJet

Jost Lammers  
President, ACI EUROPE  
President & CEO, Munich Airport

Alessandro Profumo, ASD  
President, CEO of Leonardo

Raine Luojus  
Chair EC3, CANSO Europe  
CEO Fintraffic ANS

Jan Palmér, President,  
ERA, CEO of Xfly

A4E  
AIRLINES FOR EUROPE

ACI  
AIRPORTS COUNCIL INTERNATIONAL

ASD  
AEROSPACE AND DEFENCE INDUSTRIES ASSOCIATION OF EUROPE

canso  
european airports and air navigation services operators

era  
european region airlines association
We are committed
As a Capacity Provider we must be able to offer carbon zero services in the foreseeable future

Jan “Palle” Palmér
CEO Xfly
Our fleet

**Bombardier CRJ 900 NextGen**
- Seats: 88
- Range: 2,774 - 3,338 km
- Fuel/Seat km: 0,394 l/10 km

**Embraer 190/195**
- Seats: 118
- Range: 3,990 km
- Fuel/Seat km: 0,328 l/10 km

**ATR 72-600**
- Seats: 70
- Range: 1,528 km
- Fuel/Seat km: 0,253 l/10 km
What do we do in Xfly?

- For our Regional Jet aircraft (CRJ900 & E190/195) we will follow the development of SAF and H2 power solutions.
- However, for our ATR72-600 operations we have activated ourselves a lot more concrete. We are looking into two new different concepts, possible to be ready already within 4-5 years:
Multi-modal transport
Road, rail, and sea

H2 module loading operations
No new equipment needed

Production and filling
With green power

Reverse logistics
Inspection and reuse

Universal Hydrogen
Really promising but challenging

• New H2 - Electric Engine Technology to be approved
• Chose Technology solution
• Aircraft conversion investment – 20 years lifetime
• Supply and Logistic of H2
• Price of H2 and incentives to neutralize “old technology” competition
• How to compensate lease cost, number of seats, shorter range, etc..

• Xfly will not be able to convert to zero carbon without a lot of support from a big number of other stakeholders, but we are committed to do our part
Xfly has applied for 20 Meur funding

• We have joined the European Clean Hydrogen Alliance
• We have issued an initial project plan to find suitable partners within EU
• The goal of the project is to validate the required technological set-up and convert an ATR 72-600, a 70-seat twin engine turboprop to hydrogen
• We will only be one part in a lot bigger project involving other institutions to make it really happen

• Xfly is committed and wide-open to cooperate for cleaner aviation in Europe

One ATR72-600 is producing typically more than 10,000 tons of CO2 emission annually
Thank you for your attention!

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