



CLEAN AVIATION OVERVIEW AND CONTEXT

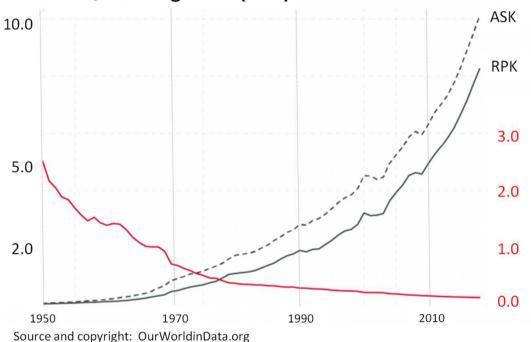




THE CRUX OF THE ISSUE

Phenomenal progress in efficiency. But growth has consistently outpaced these gains.

Seat-km / Passenger-km (1012)



1989 - 2019:

- Air transport system quadrupled
- Emissions doubled
- Superb efficiency gains but absolute emissions growth = *exponential*...

kg CO₂ per RPK

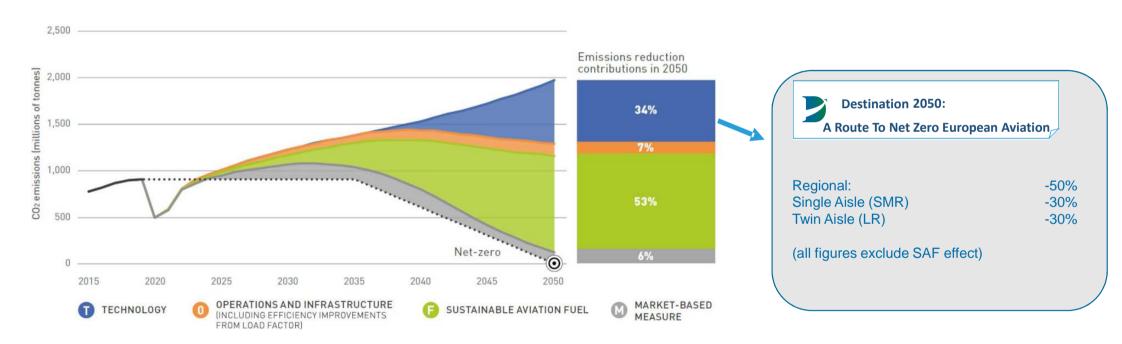
2018: 0.125kg CO₂ per RPK





EUROPEAN AVIATION SECTOR AND THE EUROPEAN GREEN DEAL

Committed to work towards a climate-neutral European aviation system by 2050.



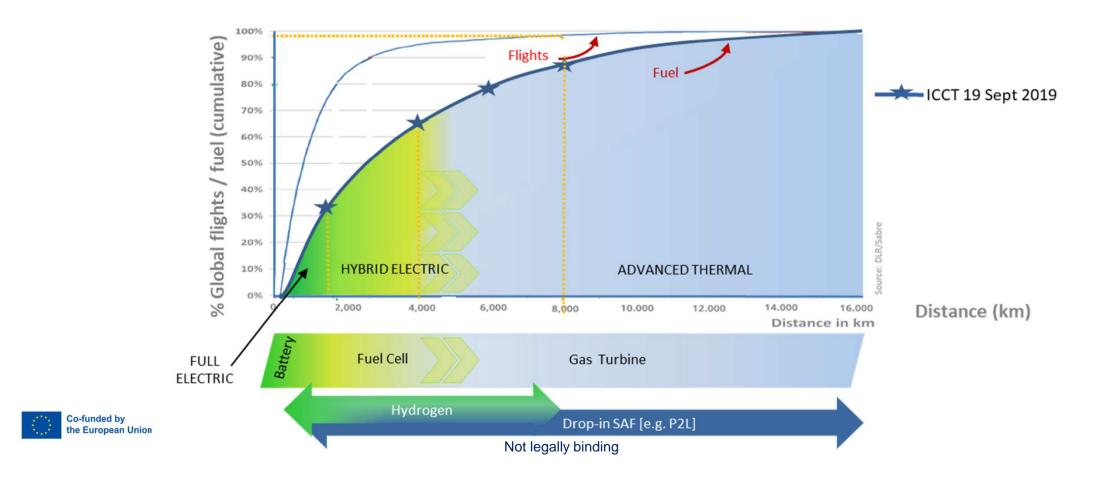
Source: ATAG report 2021





MORE DIFFERENTIATION WILL PROVIDE INCREASED SCOPE FOR DISRUPTION

1/3 of global emissions are from flights <1500km. 2/3 of global emissions from flights <4000km.





WHAT IS CLEAN AVIATION?

- Ambitious goals set on EU-Level (European Green Deal) iaw Paris Agreement
 - 2030: "cut emissions by at least 55%"
 - 2050: "Europe to become the world's first climate-neutral continent"
- New fuel/energy options, disruptive technology and innovative aircraft architectures needed to pave the way towards climate-neutrality
- Clean Aviation is an Institutionalised European Partnership [Art 187
 TFEU] that can pull together the required resources and commitments,
 and adequately reduce the industrial risk for transformative research
 and innovation





CLEAN AVIATION – LINCHPIN IN EUROPE'S R&I FOR THE TRANSITION

Hybrid-electric and full electric architectures

Disruptive technologies to enable H2- powered aircraft

Ultra-efficient aircraft architectures

Low Emission Hybrid-Electric Regional Aircraft

Zero Carbon Hydrogenpowered **Short Range** Aircraft

Low Emission Short /
Medium Range
Commercial Aircraft

Long Range Aircraft Concepts progressing towards climate neutrality

Flight demonstration in Clean Aviation JU and Impact by 2035

Development of disruptive Development of disruptive



Not legally binding





together with new fuels/energy



>>>>>>> Skip-a-Generation level technology leap needed by 2030: 30-50% gains in trip energy efficiency

>>>>>>> Keep pushing the envelope in all 'traditional' aeronautical sciences

>>>>>>> Non-aeronautical sciences and disciplines will need to bring key enablers

>>>>>>> Rapid transition to SAF and adoption of new non dropin energy sources (e.g. Hydrogen)

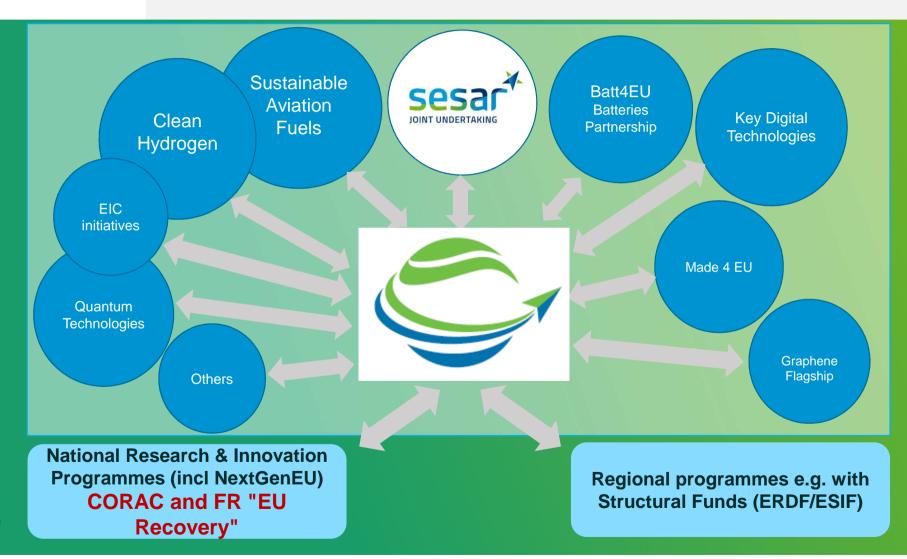
Digitalisation and innovative certification for lower development cost and reduced 'time to market'

Revolutionised production system to meet aggressive deployment targets and contain acquisition costs

>>>>>>> Life-cycle aspects and recyclability cannot be forgotten



INTEGRATED APPROACH NEEDED — INCLUDING STRONG SYNERGIES WITH NATIONAL INITIATIVES





THE PROGRAMME SETUP IN A NUTSHELL

EU Funding 1.7bn€¹ Private Funding >2.4bn€

Synergies

Other EU Partnerships

Other EU Prgms / Funds

National/Regional R&I e.g.

CORAC and FR "EU Recovery" funds

2022 2025/2026 2028 2030

PHASE I:

Develop concepts, technology options and trade studies

~45% of total budget

Large 'big bang' 1st Call Q1/2022

CEI for additional members in 2023

Further (modest) complementary 2nd Call Q1/2023

Configuration of PHASE II to emerge by Q4/2024

PHASE II:

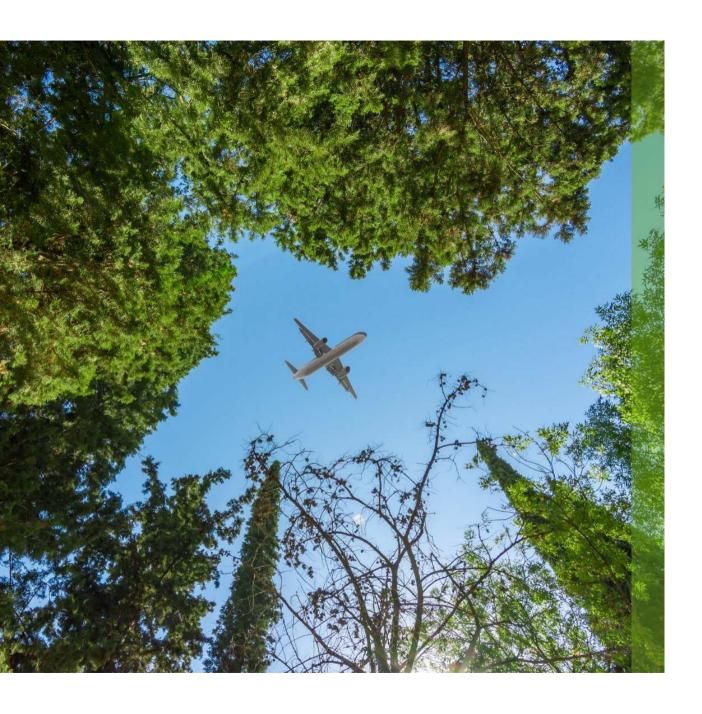
Accelerate technology maturation through integrated demonstration

~55% of total budget

Large Call ~Q1/2025 (projects to launch w/in 2025) CEI may be considered for demo prep/build phase Further (modest) Calls 2026 up to max. 2027 (TBD) Target maturity to enable EIS 2035: TRL6 ~2028?



Revision possible in case of additional associations to Horizon Europe Not legally binding





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www.clean-aviation.eu

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