



PRESS RELEASE

HYDROGEN-POWERED AVIATION: PREPARING FOR TAKE-OFF

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Hydrogen as an energy source will play a key role in transforming aviation into a zero-carbon / climate-neutral system over the next few decades. Novel and disruptive aircraft, aero-engine and systems innovations in combination with hydrogen technologies can help to reduce the global warming effect of flying by 50 to 90%. Moreover, these innovations can help to meet the drastic reduction targets for aviation emissions set out in the EU Green Deal.

A new independent study, commissioned by Clean Sky 2 and Fuel Cells & Hydrogen 2 Joint Undertakings on hydrogen's potential for use in aviation, was presented at an event on 22 June which featured Adina-Ioana Vălean, the European Commissioner for Transport, and Patrick Child, Deputy Director-General of the Directorate-General for Research and Innovation at the European Commission, as keynote speakers, in addition to leading industry representatives Stéphane Cueille (CTO, Safran), Glen Llewellyn (VP Zero Emissions Technology, Airbus), David Burns (VP Global Business Development, Linde), Per Ekdunge (Executive Vice-President, PowerCell) and Rolf Henke (Member of the Executive Board, German Aerospace Centre - DLR).

The study found that hydrogen – as a primary energy source for propulsion, either for fuel cells, direct burn in thermal (gas turbine) engines or as a building block for synthetic liquid fuels – could feasibly power aircraft with entry into service by 2035 for short-range aircraft. Costing less than €18 [\$20] extra per person on a short-range flight, and reducing climate impact by 50 to 90%, hydrogen could play a central role in the future mix of aircraft and propulsion technologies.

Such disruptive innovation will require significant aircraft research and development, further development of fuel cell technology and liquid hydrogen tanks, and also investment into fleet and hydrogen infrastructure and accompanying regulations and certification standards to ensure safe, reliable and economic hydrogen-powered aircraft can take to the skies. Industry experts anticipate that it will take 10 to 15 years to make these important advancements, and consequently the research needs to start now. The study estimated that the first short-range hydrogen-powered demonstrator could be developed by 2028 if sufficient investments into R&I are made.

The technical challenges and unique characteristics of hydrogen as an on-board energy source make it best suited to commuter, regional, short-range and medium-range aircraft. For the next decades, long-haul air travel is likely to be based on liquid hydrocarbon fuels; but increasingly these too will need to be sustainable and these 'drop-in' fuels will also rely on hydrogen for their production.

According to the report, the following **policy actions** are needed:

1. An aviation roadmap to guide the transition. This needs to set clear ambitions, align standards, coordinate infrastructure build-up, overcome market failures, and encourage first movers.
2. A strong increase in long-term Research & Innovation (R&I) activities and funding. This would lead to legal and financial certainty for technology development.
3. A long-term policy framework should lay out the rail guards for the sector, including how climate impact will be measured and how the roadmap will be implemented.

Commissioner Adina-Ioana Vălean says “Hydrogen in aviation offers many opportunities for the transformation of our aviation sector. From production, to distribution, to new aircraft designs and large scale use, it provides numerous opportunities for European companies to be at the forefront of our industrial revolution in the years to come”.

“Research and innovation is vital to realise the full potential of hydrogen technologies for decarbonisation of aviation. The EU’s future Horizon Europe research and innovation framework programme is a fantastic opportunity to advance this agenda, working in partnership with industry and the research community. The excellent co-operation between the existing Joint Undertakings dedicated to Hydrogen Fuel Cells and Clean Aviation illustrates the need for close synergies between the two sectors as we work together on the ambitious objectives of the post-COVID recovery and the European Green Deal”, says **Deputy Director-General for Research & Innovation Patrick Child**.

“Our ultimate goal is to achieve climate-neutral aviation by 2050. Turning this ambition into reality requires the seamless integration of a range of important new technological advancements, one of which is hydrogen-powered aircraft. This comes hand in hand with priorities such as hybrid engines, more electric aircraft, ultra-efficient short- and medium-range aircraft and lighter airframes. The mix of these various game-changing technologies will help us to reach our final destination”, says **Axel Kein, Executive Director of Clean Sky 2 Joint Undertaking**.

“The cost of producing clean hydrogen came down in recent years thanks to cheaper renewable electricity and bigger and cheaper production technology. At the same time, fuel cell performance in terms of durability, capacity and cost has made big steps forward. This combination has now made it possible to look to such solutions for decarbonisation of the aviation industry and the results of the study are clear on the huge potential of hydrogen in aviation. The hydrogen and fuel cell sector is ready to work hand in hand with the aviation industry to design, test and produce the required components and make zero-emission aviation an everyday reality”, says **Bart Biebuyck, Executive Director of Fuel Cells & Hydrogen 2 Joint Undertaking**.

Download the full study on www.fch.europa.eu and www.cleansky.eu

BACKGROUND NOTE TO EDITORS

About Clean Sky 2 Joint Undertaking

Clean Sky, part of the EU’s Horizon 2020 programme, develops innovative technologies for more aerodynamic wings, lighter and more efficient engines, smarter systems, new aircraft configurations, and a more sustainable aircraft lifecycle. The purpose of the programme is to reduce CO₂ emissions and noise levels produced by aircraft. Bringing together more than 900 partners from industry, SMEs, research centres and academia for the best innovative results, Clean Sky is strengthening European aeronautics collaboration, global leadership and competitiveness.

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About FCH JU Joint Undertaking

A unique public-private partnership between the European Commission and Hydrogen Industry (Hydrogen Europe), the FCH JU contributes to the development of sustainable and globally competitive fuel cells and hydrogen technologies in Europe. By bringing together a wide range of industrial and scientific partners, it supports EU approaches on innovative hydrogen solutions for sustainable energy and transport applications, sectorial integration and energy storage thus contributing to the EU climate change goals and strengthening the EU industrial competitiveness.

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