Hydrogen: a critical brick for aviation sustainable future

SAFRAN

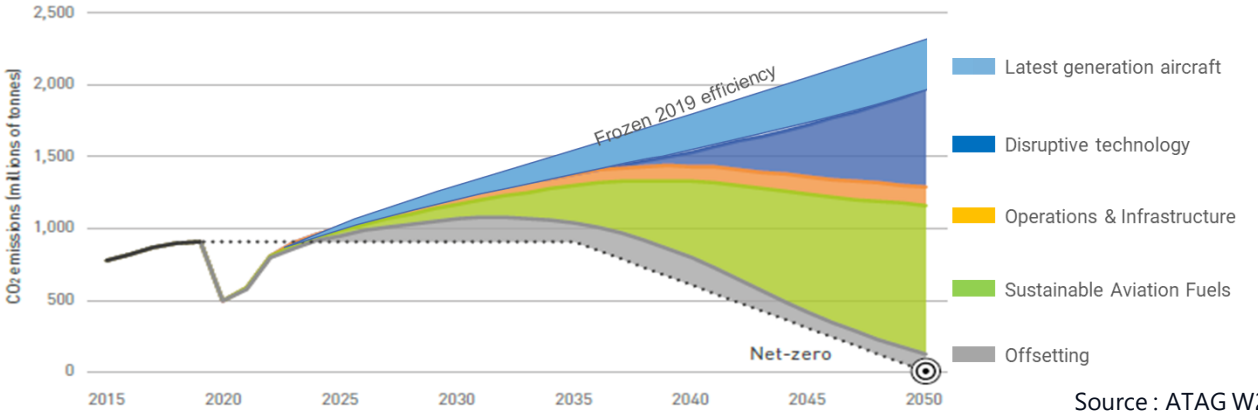
Aviation net zero emissions target

October 2021

October 2022

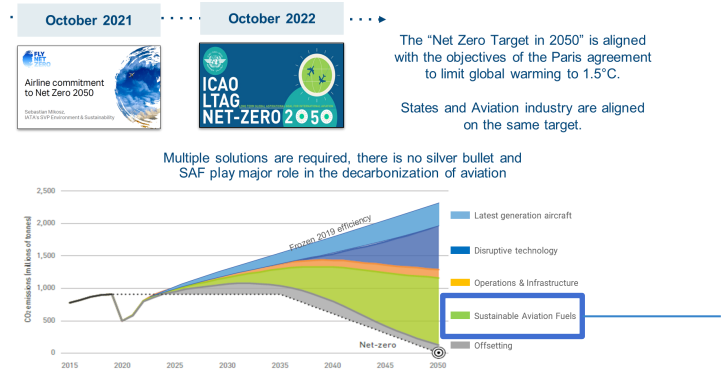
The "Net Zero Target in 2050" is aligned with the objectives of the Paris agreement to limit global warming to 1.5°C.

States and Aviation industry are aligned on the same target.



Source : ATAG W2050

Aviation net zero emissions target

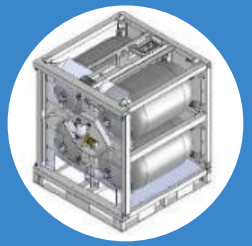


- SAF (Sustainable Aviation Fuels) play a major role in this decarbonization journey
- Bio-based SAF are mature and technically compatible with current and future fleets. They have to be developed immediately and massively
- Nevertheless, bioSAF will probably not cover the future energetical needs of aviation, due to biomass availability and strong competition between sectors.
- **Hydrogen-based solutions will be key for aviation sustainable future**

Hydrogen is key for Aviation sustainable future…
… but under several forms

« component » for bioSAF production

Combined with CO_2 in eFuels / PtL



Under LH_2 form (Fuel cell / H_2 combustion)

A global complementarity

Hydrogen is key for Aviation sustainable future…
… but under several forms

	 « component » for bioSAF production	 Combined with CO_2 in eFuels / PtL	 Under LH_2 form (Fuel cell / H_2 combustion)
Technical maturity	++ to +++ (variable according to pathway)	++	+
Compatibility with current fleet	+++ (100% SAF compatibility before 2030)	+++ (100%SAF compatibility before 2030)	0
Type of application	All segments	All segments	Regional Increasing to SMR
Cost	High Link to biomass type	Very high (high CAPEX, high OPEX (electricity + CO_2)	High but decreasing
Infrastructure	Compatible with current aircrafts and infrastructure	Compatible with current aircrafts and infrastructure	New aircrafts / New infrastructure

Main take-away

- Hydrogen technologies have to be developped
- Safran considering development of all of these pathways (BioSAF, eSAF, Fuel cell and H_2 combustion), in collaboration with relevant stakeholders
- Several complementary pathways, each one having specific potential, but also limits and bottlenecks
- A global alignment of the full ecosystem will be compulsory for the successful deployment of these technologies