



AVIATION CO₂ REDUCTIONS



STOCKTAKING SEMINAR

TECHNOLOGY · OPERATIONS · SUSTAINABLE AVIATION FUELS



Enabling a green aviation transition



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Enabling a green aviation transition:
SAF is the key enabler, today and tomorrow!

Recall our still-valid reasons for making the SAF commitment

- No equipment changes, no operational changes
- No distribution infrastructure changes
- No airport energy / fueling infrastructure changes
- No impact to surety of supply
- No limitation on potential volume (reaffirmed by multiple sources)
- No limitation on potential producers
- No changes to execution of aviation paradigm
- Enables the carbon reduction to start immediately, not in 2040+
- Enables other societal benefits
- Enables expansion to future SAF production approaches
- Enables advanced technology introduction at appropriate pace

SAF Fundamentals

SAF delivers in-sector, net GHG reductions, starting immediately, for entire fleet:

- 70%+ on a liter-to-liter neat basis; many will achieve greater than 100%

SAF maximum usage nearly unbounded, while Tech, Ops, Infra improvements are bounded

- Progression of conversion processes
- Progression of feedstock concepts (waste streams, purpose grown, C & H)
- Future pathways will need less, or zero, blending

Key issue for SAF expansion is closing price delta; addressed via:

- Increasing recognition of aviation imperative and lack of options
 - Societal insistence on sustainability and appropriately pricing CO₂
 - Targeted policy support
- Further progress on cost easily fostered
 - Learning curve improvements
 - R&D focus in industry, academia, government (tech, feedstock, supply chains)
 - Continued streamlining of qualification

In spite of slow start, let's not lose focus ... SAF meets the need!

Aviation will continue to use jet fuel for decades

- SAF foundational elements in place
- First 1B gpy (3M tpy) SAF (~1%) production committed
- Potential for acceleration a function of everyone's engagement
- Investment significant, but not inordinate to other approaches

SAF is a natural bridge to any other 2050+ paradigm; e.g. H₂:

- SAF need H₂ for their manufacture, preferably low carbon H₂
- H₂ use for SAF sets stage for later expansion to other concepts, including mid-term P-t-L development
- We can build bridges to radical technology development approaches by affirming the use of H₂ for SAF production today which propels us on our aviation decarbonization journey

SAF from multiple sources / methods

Aviation Fuels

Feedstock type	Conversion process
Lipids, lignocellulose, sugars, waste streams	Many: bio-chem, thermo-chem, and hybrid



	CO₂ reductions per flight	20%+ today 30-50%+ next 100%+ soon
	Level of finance required	Significant, but occurring
	Timeframe	2016 2026 2026-2050
	Main challenges	Cost versus conventional



Thank You

