



# Sustainable Aviation Fuel

## What is Sustainable Aviation Fuel?

Sustainable Aviation Fuel (SAF) is an advanced liquid biofuel derived from biomass that is suitable to be blended with fossil jet kerosene. It is used in commercial aviation and can be produced from various feedstocks, including waste oil and fats, municipal and green waste, and non-food crops. There are several SAF technologies that can be blended with conventional jet fuel by up to 50 per cent and reduce emissions by up to 80 per cent on a lifecycle basis. These technologies are approved by the International Civil Aviation Organisation (ICAO) under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)<sup>1</sup>.

## Applications

SAFs are being produced and used in commercial flights regularly, however current volumes produced are less than 1 per cent of total jet fuel demand. In 2024, SAF production is expected to triple to 1.875 billion litres (1.5Mt), accounting for 0.53% of aviation industry's fuel requirement<sup>2</sup>.

The SAF market is forecast to remain immature until 2040 as it is not yet cost competitive. Results from the World Air Transport Statistics 2022 show that fuel and oil were the largest overhead expense for airlines and accounted for 28.7% of costs<sup>3</sup>. Unlike the land transport sector which can electrify, aviation has no near-term alternative to liquid hydrocarbon fuels.

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<sup>1</sup> [Carbon Offsetting and Reduction Scheme for International Aviation \(CORSIA\) \(icao.int\)](https://www.icao.int)

<sup>2</sup> [IATA - SAF Volumes Growing but Still Missing Opportunities](#)

<sup>3</sup> [IATA- Unveiling the biggest airline costs](#)

# Technology Pathways

The most commercially mature SAF technology platform is Hydrotreated Esters and Fatty Acids (HEFA) from the hydrotreatment of waste fats or vegetable oils. However, feedstocks for this process are becoming constrained globally. Due to advances in biofuel technologies, second generation ethanol and pyrolysis can use a wide range of lignocellulosic biomass as feedstock including forestry residues, woody perennial crops (mallees and blue gums) and crop residues. As a result, these pathways are expected to dominate SAF production volumes by 2050.

## Drivers and Opportunities

The International Air Transport Association has targets to cap emissions from 2020 and is aiming to reach net-zero emissions by 2050. Significant investments are being seen in Australia, with international airlines working with local industry to accelerate the opportunity.

SAF is considered the best opportunity to decarbonise the aviation sector as technological and economic barriers exist to the electrification or hydrogen fuel cell application to aviation.

**Bio jet fuels are the most promising way to decarbonize aviation, but are not competitive yet and lack policy support**

**10** Bio jet fuels

- Feedstock compatibility**
- Preferred processing method**  
Hydrotreatment (HEFA)
- Preferred market segment**  
Aviation
- Technical maturity**  
Low Average High

**Bio jet fuels – deep-dive**

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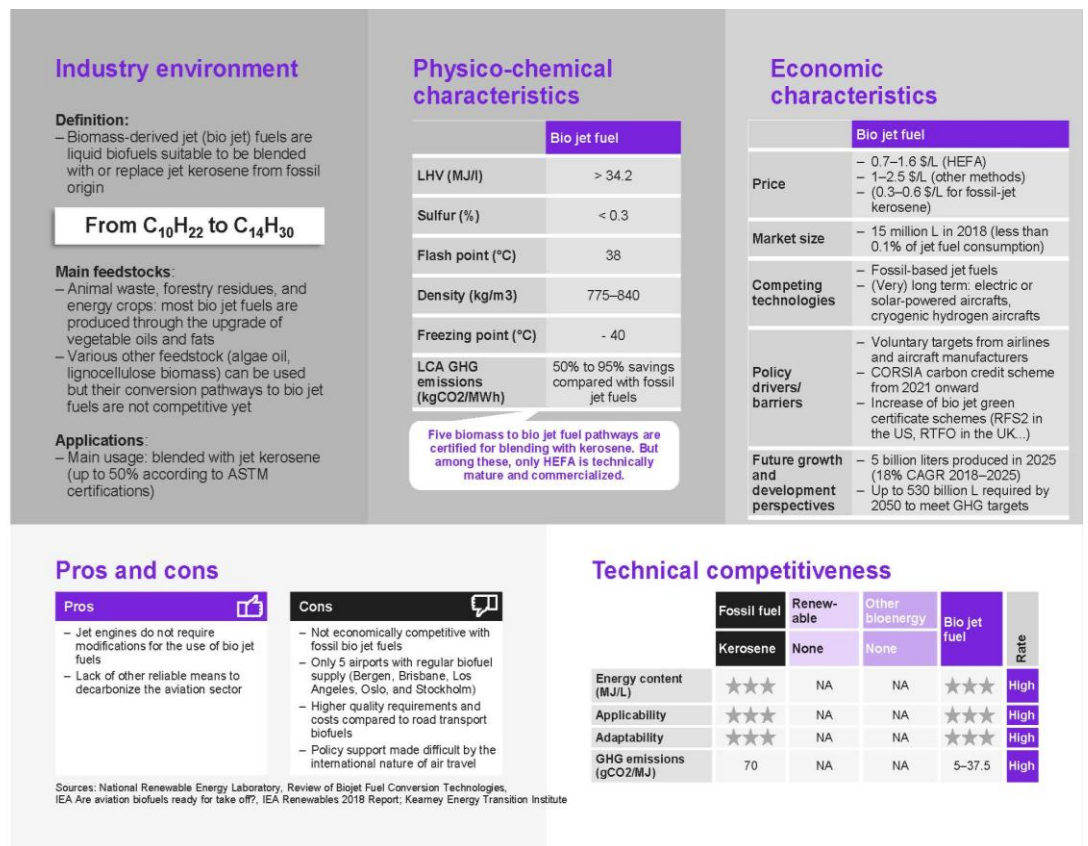


Figure 1. From Biomass to energy – Developing sustainable carbon circularity – looking at advanced application and business models, Kearney Energy Transition Institute, 2021

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