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Media Briefing Update on Sustainable Aviation Fuels (SAF)

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Recap

Year	2019	2020	2021	2022
Estimated SAF Output (Mt)	<0.02	0.05	0.08	0.24 (300 million liters)
Global Jet Fuel (Mt)	288	157	182	254
SAF % of Global Jet Fuel	<0.01%	0.03%	0.04%	0.1%



In December 2022, IATA announced a tripling of SAF output with an estimated 300 million litres (240,000 tonnes) produced in the year

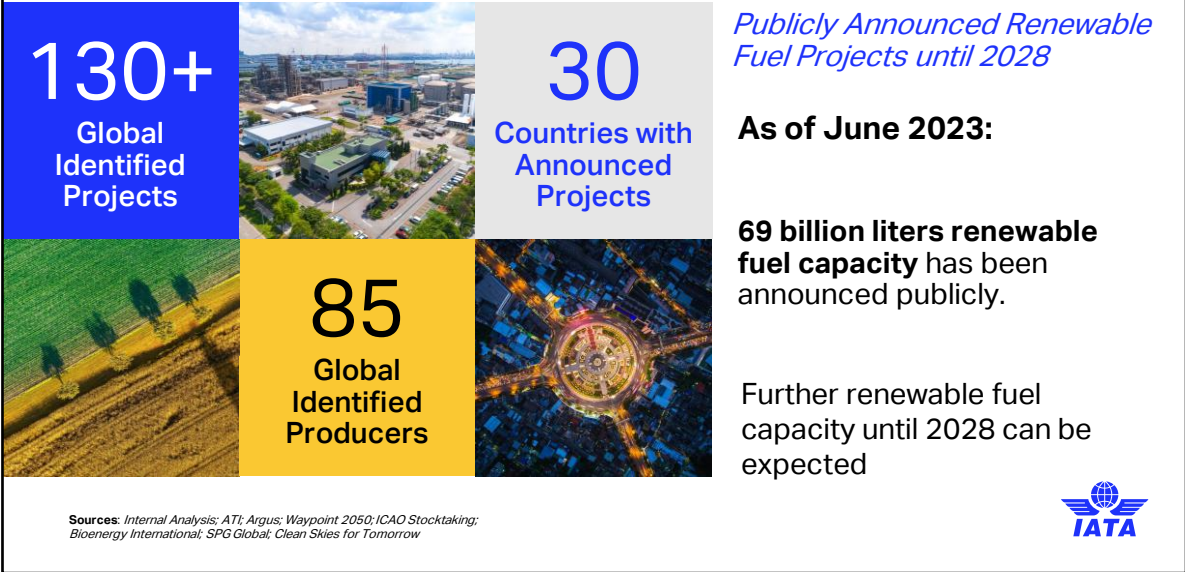
SAF production is continuing to make strong progress in the first half of this year, with output set to rise exponentially again in 2023.

Driving 2023's increase in SAF output will be the commissioning of new renewable fuel refineries, along with the expansion of capacity at existing facilities, spanning North America, Europe and Asia Pacific.

The following presentation will provide an update on:

- 1) The outlook for the refining capacity for renewable fuels (for which SAF would be one output of a suite renewable products)
- 2) The opportunity and need for diversification of SAF feedstock and pathways
- 3) The essential role of policy to support SAF production output.

Tracking Renewable Fuel Capacity



Based on IATA's research, over 130 relevant renewable fuel projects have been announced publicly by more than 85 producers across 30 countries.

Importantly each of these projects have either announced the intent or commitment to producing SAF within their wider product slate of renewable fuels.

At present, these projects represent an estimated total renewable fuel capacity of over 69 billion liters (55 million tonnes) by 2028, of which SAF output will be derived from. It's important to note that there is typically a 3-to-5-year lag period between a project announcement and its commercialization date, implying that further renewable fuel capacity out until 2030 can be expected.

Renewable Fuel Projects Operating 2023



This map shows the renewable fuel plants operating today or before the end of 2023 across the globe. They are in North America, Europe and in Singapore.

In 2023 we have a number of facilities coming on-line (they can be new facilities or conversions):

In the US: In Montana (Calumet), Martinez (Marathon) and Paramount (World Energy). Also we have the first Alcohol to Jet facility coming on-line in Freedom Pines (operated v Lanza).

In Italy: Livorno (ENI)

UK: Lincolnshire (Phillips 66)

Spain: Cartagena (Repsol)

Singapore (Neste)

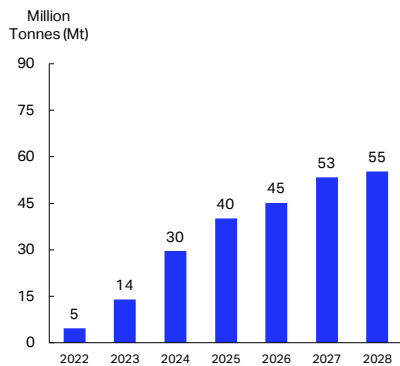
Renewable Fuel Projects Announced to 2028



Here is an overview of the geographical location of renewable fuel projects that are already operating together with the ones that will be operating in the coming years (till 2028). There is a much greater geographical spread of renewable fuel facilities coming on line between now and 2028. Together these would provide the combined capacity output of 69 million litres or (55 million tonnes) of renewable fuel capacity

SAF is only one output from the renewable fuel facility, others typically include Renewable Diesel and Naphtha but the actual slate of products output depends on the feedstock and pathway. The challenge is to ensure an optimal output of SAF understanding there will be competing products which often have favorable governmental incentives

Projected increase in Renewable Fuel capacity



Source: IATA

But ensuring SAF output requires support

- Optimization of refining facilities for SAF output
- Balanced incentives to facilitate SAF production
- Government / financing support for project development
- Diversification of feedstocks and production pathways



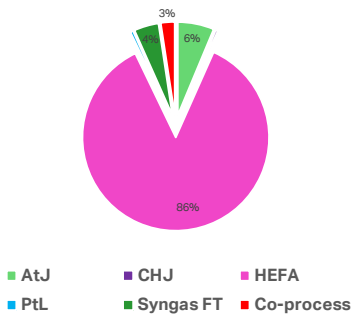
The projected increase in renewable fuel capacity shows a steady increase, however a SAF output isn't guaranteed.

To ensure that SAF gets produced in adequate quantities, support is needed to:

- Optimize refining facilities for SAF output
- Balanced incentives to facilitate SAF production
- Government/ financing support for project development
- Diversification of feedstocks and production pathways

Need diversification beyond HEFA pathway*

Total Renewable Fuel Capacity:
% Split by Pathway

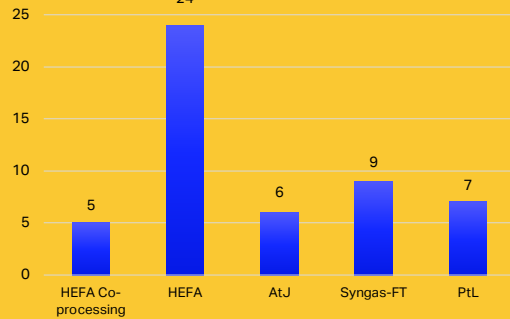


Source: IATA

* HEFA is most mature today but least scalable for future needs

Airline Offtakes starting to address this

Number of agreements



Source: IATA



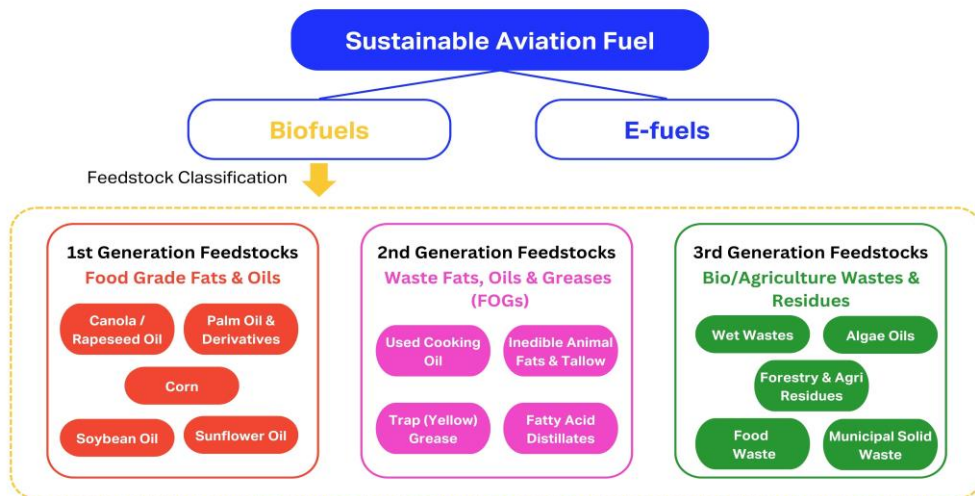
At present, it is expected that 85% of future SAF volume over the next five years will be derived from just one of nine certified pathways, HEFA, which is dependent on limited availability of feedstock such as waste fat, oil & grease feedstocks.

IATA identifies three main avenues to achieve SAF diversification:

1. Scale already certified SAF pathways, such as Alcohol-to-Jet (AtJ) & Fischer-Tropsch (FT)
2. Accelerated RD&D for SAF production pathways that are currently in development
3. Scale up of feedstock/feedstock conversion technology

Airline off take agreements are already supporting this diversification. We see increasing interest in securing production volumes for pathways using Alcohol to Jet or Fisher Tropsch. The volumes from these offtake agreements are significant. This is a good sign but the diversification must continue because the HEFA pathway represents the least scalable of SAF feedstock solutions.

Broad SAF Classifications



In fact, SAF and SAF feedstocks is on a journey: This is a journey to ensure we have scalability (create the volumes we need for the industry) while maintaining the integrity of a wide and stringent set of sustainability criteria (beyond emissions reductions):

- SAF need to demonstrate they do not promote nor add incremental water, land and chemical usage throughout their lifecycle.
- They need to verify they do not have negative effects on deforestation, soil productivity and biodiversity.

There are well-established, comprehensive and rigorous processes to verify the environmental integrity of SAF through Sustainability Certification Schemes, including the Roundtable for Sustainable Biomaterials (RSB) and the International Sustainability & Carbon Certification (ISCC), presently recognized in regulations through EU RED, UK RFTO and ICAO CORSIA. But the journey to uphold these criteria and ensure scalability defines the progress from 1st Generation Feedstocks (food grade fats and oils) to now when we are using 2nd Generation Feedstocks (Waste Fats, Oils and Greases) and well as the coming progression to 3rd Generation Feedstocks (Bio/Agriculture Wastes and Residues)

It is this 3rd Generation of Feedstock are the most attractive inputs for SAF production and scalability, 3rd Generation has the ability to achieve:

1. Restorative and/or Regenerative
2. Naturally Scalable and Globally Available
3. Lower Input Cost by Virtue of Natural Scalability

This is in parallel to the opportunities and scale-up potential from E fuels.

Critical Policy Support

Key policy incentives:

- Tax relief and tax exemptions on production, sale, or procurement
- Public capital support and loan guarantees for production facilities
- Feedstock subsidies or similar support mechanisms
- Financial market policies such as preferential treatment of tailored financial instruments
- Accounting policies, including amortization schedules
- Research and development programs and support.

Policy support in favor of renewable fuels should be balanced and not dis-incentivize the production of SAF



Appropriate policies and incentives will play a critical role in the scaling and diversification of SAF production. In this context, IATA calls for the harmonization of [policies](#) across sector and geographies, as a means of reducing barriers to entry for new players seeking to enter the SAF market; especially new technology and feedstock providers. Policies need to address both near-term and longer-term SAF deployment and provide the necessary certainty for producers and investors to allocate existing capacity to SAF as well as to develop new infrastructure. Policies should also look to promote research and development of new production pathways together with the associated supply chains. Given the nascent nature SAF market as well as the need to achieve scalability and diversification of feedstocks/production pathways, the focus of policies at this stage should on incentives to support innovation and project generation.

The physical output of SAF is only part of the story!

Projects that aggregate wastes or recultivate degraded land create numerous socio-economic co-benefits, which be **major factors for attracting investment**:

Sustainable Supply Chains	Job & Wealth Creation	Energy Security
Land Restoration	Biodiversity	Regional Development



SAF is the biggest lever for aviation's transition to net zero. But this key solution for aviation also offers broader benefits positively impacting sustainability, economic opportunity and energy security. Projects aimed at aggregating wastes or recultivating degraded land (3rd generation feedstock) have several positive socio-economic effects which become a major pull factor for attracting institutional and critically, government investment. Governments should be encouraged and supportive of projects related to 3rd generation feedstock SAF's because of the potential to:

- Develop sustainable supply chains at the regional level
- Create of local income and employment
- Support land restoration and/or regeneration
- Promote and foster biodiversity
- Aiding the development of localized energy independence and security

In conclusion

- SAF production is set for continued growth, based on renewable fuel capacity forecast

To ensure that this becomes a reality, we need:

- Production incentives for SAF outputs
- Continued focus on diversification of feedstocks and pathways for SAF production
- Already well-defined and stringent sustainability criteria for SAF supported by governments
- Early recognition of wider benefits of 3rd Generation Feedstock.

