2025

SAF MARKET OUTLOOK

By SkyNRG and ICF

Foreword

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It is with great pride that we present SkyNRG's fifth Sustainable Aviation Fuel (SAF) Market Outlook; this year's edition is particularly special as it has been developed in close collaboration with ICF.

We started the development of the Market Outlook in 2020 as an internal strategy document. We decided to make it available externally to help build a general understanding of the status of the SAF market and requirements to scale its production. This year's edition will also serve as input for the company's long-term strategy.

To capture longer-term dynamics, we have extended our analysis, underscoring the continued need to accelerate SAF production on multiple production pathways and grow the SAF production base towards 2050. To enable this, robust policy frameworks will be necessary in all main regions, along with additional support on top of mandates for offtakers, technology developers, and EPC contractors.

It has been our pleasure to work with SkyNRG in this flagship SAF Market Outlook report.

The SAF market is evolving rapidly across the world. With mandates now in effect in the EU and UK, and a wave of ambitious SAF policies emerging worldwide, momentum continues to build as we enter a new era for SAF. Hundreds of SAF production facilities have been announced, signaling strong investor and industry confidence. However, continued policy support and activity is needed to meet the long term SAF targets as highlighted in this report.

The SAF Market Outlook report has become a flagship reference for the SAF community – offering timely insights, trend analysis, and projections on how the industry is likely to evolve. It has been a privilege to collaborate with SkyNRG, a pioneer and leader in the field, on this report and to continue to support the decarbonization of aviation.

Dan Galpin
Global Aviation Lead - ICF

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Reading guide

Within the Sustainable Aviation Fuel (SAF) industry, a variety of terms are used for policies and demand drivers. In this report we use the following definitions: 1. **Mandates**: policy enforced with legislation and penalties; e.g UK and EU). 2. **Voluntary market**: made up of 2a: **Government targets**: legislative targets typically supported with incentives; e.g. U.S. SAF Grand Challenge and 2b: **Aircraft operator and corporate commitments** (e.g. KLM, DHL or Microsoft).

Executive Summary

Introduction

2025 marks the year the Sustainable Aviation Fuel (SAF) market reaches maturation. The start of this decade characterized adolescence, with the setting of ambitious targets, commercialization of technologies, and building of experience. Since then, the global SAF market has continued to grow rapidly. Supplied volumes doubled to 1 Mt (0.3 Bgal) in 2024[1] compared to 2023 levels, the EU and UK mandates started in January 2025, and approximately 60 airlines set specific SAF targets for 2030. As investment continues to flow into the industry, SAF is strengthening its role as the cornerstone for the decarbonization of the aviation industry.

Alongside this momentum, several challenges are becoming evident. The number of delayed or cancelled projects has noticeably increased, slowing the growth in announced capacity. This trend is likely driven by weaker short-term market conditions, continued (perceived) uncertainty around policy incentives, and recent trade dynamics.

The dominance and reliance on the HEFA technology has become more evident, representing ~82% of all announced capacity up to 2030. As this report shows, the reliance on limited volumes of sustainable and scalable HEFA feedstocks creates a stark risk that the SAF industry will struggle to continue growth after 2030, unless efforts are focused to ensure alternative pathways are developed and commercialized.

This report shows that, although a 'HEFA tipping point' is in sight, SAF can and will play a major role to reach a net-zero aviation industry. The considerable efforts over the past decade have built a solid foundation for the SAF industry, showing production is safe, scalable, and sustainable. However, after 2030, demand is set to outpace the HEFA SAF production potential, urging the industry to shift towards a more diversified set of SAF policies and pathways. This report provides an evidence-based assessment of the progress and pitfalls, which we hope can help focus efforts through the next pivotal years.

Global SAF Market

SAF demand reaches a critical inflection point in 2025, with the official start of blending mandates under both ReFuelEU Aviation and the UK SAF mandate. These policies are expected to drive significant demand growth, with approximately 0.9 Mt (0.3 Bgal) of SAF demand in the EU and 0.25 Mt (0.1 Bgal) in the UK in 2025. Alongside momentum in the voluntary market and continued deployment in Singapore, British Columbia, China, and the US, total SAF demand is projected to approach 2 Mt (0.7 Bgal) this year.

Extrapolating current trends to 2030, global SAF demand is expected to grow to 15.5 Mt (5.1 Bgal) by 2030. Of this demand, 4.4 Mt (1.5 Bgal) is projected to come from mandates already in place. The remaining 11 Mt (3.6 Bgal) is expected to be driven by a combination of incentives, mandates under development, and voluntary action.

Around 60 airlines have committed to using 10% SAF by 2030, which is equivalent to roughly 13 Mt (2.3 Bgal) of voluntary demand. As many of these commitments will largely overlap with governmental targets, they play a key role in maintaining momentum and translating policy ambition into actual market uptake. Similar sized Scope 3 targets have been set by corporates, supporting the airline commitments.

The 2030 announced SAF capacity grew to 18.1 Mt (6.0 Bgal) — an increase of 1 Mt (0.3 Bgal) compared to last year's Market Outlook. Despite this growth, major delays and cancellations have occurred in the EU, UK, and U.S. on the shorter term. These are likely driven by exposure to market volatility caused by ongoing policy uncertainty in the US, regional oversupplies, lower fossil prices and broader macroeconomic headwinds.

Although the 2030 demand targets could be met by the projected capacity, the supply-demand balance remains fragile. Beyond 2030, SAF demand is expected to nearly triple to 40 Mt (13.2 Bgal) by 2035, driven by accelerated mandates. With expected SAF capacity being 18 Mt (6 Bgal) in 2030, this creates a 26 Mt (8.6 Bgal) gap to be addressed in just five years. Co-processing and renewable diesel is expected to contribute up to 6 Mt (2 Bgal), but the majority will need to come from additional capacity.

The rapid growth in demand and supply creates a critical inflection point: the HEFA tipping point. Today, ~82% of SAF projects rely on HEFA due to its cost and maturity, but feedstock limits mean HEFA capacity growth is restricted and falls short by 2030 to meet further SAF growth. The industry will therefore increasingly rely on advanced SAF pathways to supply the growing SAF demand. Without strong policy action to commercialize the advanced technologies and feedstocks that can sustainably scale to fill this gap, the SAF supply will stagnate, and the sector will remain dependent on unsustainable feedstocks.

In contrast, when coordinated action is taken in the form of clear policy signals, corporate demand commitments, investment de-risking and infrastructure build-out, a durable and sustainable SAF market can be achieved. This would require a joint effort to unlock the technical potential of underused feedstocks like wastes, residues, captured CO2, and green hydrogen. This presents strategic opportunities to enhance energy security, strengthen rural economies, and accelerate renewable energy development. As jurisdictions expand SAF capacity, these broader advantages will be critical to building resilient, future-ready fuel systems.

Global SAF capacity by technology

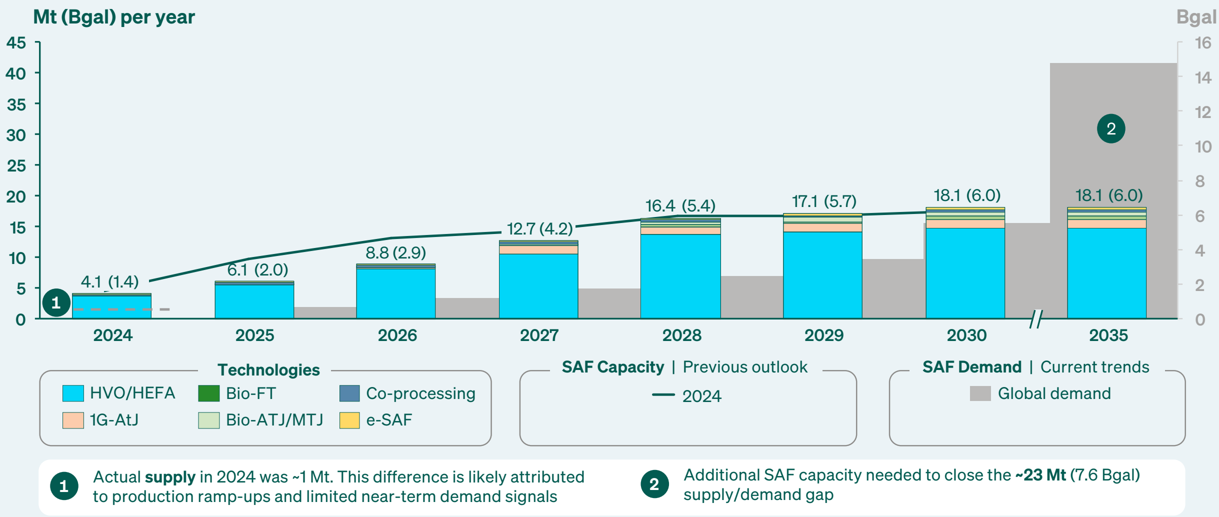


Figure 1: Global SAF capacity is expected to grow to 18.1 Mt (6.0 Bgal) by 2035, leaving a supply gap of ~23 Mt (7.6 Bgal)

Regional SAF Market Trends

European Union & United Kingdom

→ In the EU and UK, SAF demand is largely driven by binding blending mandates. This year marked the official launch of the ReFuelEU Aviation regulation in 2025, which is a key catalyst for market growth. Mandated SAF demand in the EU and UK is expected to reach 1.1 Mt (0.4 Bgal) in 2025.

→ However, over the past year, several SAF projects came online ahead of strong policy-driven demand, contributing to a regional oversupply. This dynamic was particularly felt in the EU, where price pressure emerged in the year ahead of enforced blending mandates. This regional oversupply and associated price reduction led to short-term project delays and cancellations. As a result, we identified a 0.7 Mt (0.2 Bgal) decrease in forecasted 2025 capacity compared to last year's market outlook.

→ Looking ahead, a supply demand shift is coming. The mandated SAF demand in the EU and UK is expected to reach approximately 4 Mt (1.3 Bgal) by 2030 under the *Current Trends* demand scenario. Based on current announcements, SAF production capacity in the EU and UK is expected to reach 3.8 Mt (1.3 Bgal) by 2030, which means it is just 0.2 Mt (0.07 Bgal) below projected demand. However, only 30% of these projects is currently operational or under construction, and the gap may increase if many of the announced projects cannot reach financial close and complete construction and commissioning in time. This could increase Europe's reliance on imports. Mandated demand is set to triple to 12 Mt (3.9 Bgal) by 2035, requiring a rapid and steep ramp up of capacity and supply post-2030.

→ Supply of e-SAF remains in early stages of development, with 0.15 Mt (0.05 Bgal) of capacity in advanced planning and significantly more in feasibility stage. This is below the estimated minimum requirement of 0.6 Mt (0.2 Bgal) by 2030 and 2.4 Mt (0.8 Bgal) by 2035. This means that, considering project development timelines of 3 – 4 years, financial investment decisions will have to come in by late 2026 to have sufficient certainty that ReFuelEU sub-targets can be met.

Asia

→ SAF demand in Asia is expected to increase significantly to 3.7 Mt (1.2 Bgal) by 2030, and 10.9 Mt (3.3 Bgal) by 2035. China represents a key proportion of Asia's production – accounting for 45% of regional capacity. Capacity announcements grew faster compared to other regions with 22 new facilities added, now totaling to 5 Mt (1.9 Bgal) in 2030, compared to 3.6 Mt (1.2 Bgal) last year.

→ With expected capacity higher than regional demand, Asia is expected to remain an exporting region. This is supported by the fact that most facilities are EU RED-compliant. Recent developments around fuel certification and industry rumors over a Chinese consumption mandate could change this dynamic.

United States

- In the United States, SAF demand is shaped by a complex mix of federal policies, state-level fuel standards, financial incentives and voluntary demand. The federal SAF Grand Challenge, established under the Biden Administration, set a target of producing 9.1 Mt (3 Bgal) of SAF annually by 2030. Despite recent changes in government leadership, support for SAF remains robust through a combination of policy mechanisms, including Renewable Fuel Standard (RFS) obligations, state-level Low Carbon Fuel Standards (LCFS) in jurisdictions such as California, and federal incentives like the 45Z tax credit introduced under the Inflation Reduction Act.
- However, some of these federal policies lack long-term certainty, especially when compared to the multi-decade operating lifetime for SAF facilities. For example, the 45Z tax credit is only legislated through 2027, with minor indications that it could be extended to 2030 based on recent bi-partisan proposals. As a result, actual SAF demand is expected to land between 5 Mt (1.7 Bgal) and 9.1 Mt (3 Bgal) by 2030, depending on how federal and state-level policies evolve in the coming years.
- SAF production capacity in the U.S. is forecasted to reach 5.6 Mt (1.9 Bgal) by 2030, with 61% of announced projects based on HEFA and 24% utilizing the AtJ pathway from corn ethanol. While corn ethanol holds strong potential in the US, its long-term market viability remains uncertain due to ongoing federal and state regulatory ambiguity in combination with its lower greenhouse gas performance. Additionally, the sector's reliance on imported feedstocks such as used cooking oil (UCO) may pose challenges amid rising trade tensions—particularly with China, a key UCO supplier—which could lead to tariffs or supply disruptions and increase pressure on limited available domestic alternatives.

Rest of World

- By 2030, capacity in the rest of the world (ROW) is expected to reach 3.1 Mt (1 Bgal), primarily driven by Latin American developments. Brazil alone will account for 64% of this capacity. The majority of supply will come from soybean oil, with tallow as the second-largest feedstock source.
- Latin America is focusing on local policies and feedstocks, with Brazil, Colombia, and Chile each announcing SAF roadmaps. Brazil's "Fuel of the Future" law, enacted in October 2024, mandates a 1% GHG intensity reduction in jet fuel by 2027, increasing to 10% by 2037. This law is expected to drive at least 0.2 Mt (0.07 Bgal) of SAF production by 2030, particularly supporting Brazil's large project supply
- The Middle East is rapidly developing expertise in SAF and is well equipped to play a role on SAF development with a strong aviation, renewable energy, and refinery cluster. Policies are still in development, and although we have not seen capacity project beyond the feasibility stage we believe this region can play an important role in the development of the SAF industry.

SAF Demand

How much SAF is needed to meet policies, targets and ambitions globally?

Introduction

SAF demand is shaped by a combination of regulatory obligations and voluntary commitments. Regulatory obligations are typically structured as a mandate that requires either (or both) a reduction in carbon intensity across the total fuel used, or the use of a specific volume of low carbon fuels. Voluntary demand is characterized by the use of SAF to meet optional targets, such as environmental, financial, and energy security objectives.

Forecasting SAF demand is complex for three reasons: Firstly, many targets and mandates are set as a percentage of fuel use, which varies with aviation activity, efficiencies, and the deployment of net-zero aircraft technologies (such as hydrogen and electric propulsion). A second complication is that many policies encompass multiple fuels, allowing incentives to be claimed or obligations to be met through the use of a range of technologies, such as SAF, renewable diesel, and others. The split between fuels is often determined by commercial criteria but may also be bounded as individual fuel markets are saturated and specific stakeholders seek to meet environmental objectives. Finally, the global policy environment is rapidly developing. The trend has been towards stronger ambitions, with many net-zero targets established in the first years of this decade, followed by the announcement and implementation of policies and contractual commitments. To accommodate these complexities, three different demand scenarios were modelled, which can be found in the Methodology section and in Figure 1.

Methodology

The ICF SAF Demand model addresses the demand modelling complexities by building a detailed country-level jet fuel demand forecast, projecting passenger and cargo traffic, expected improvements in aircraft fuel efficiency and changes in fleet composition. The existing and emerging SAF policies and targets in each country and region have been assessed and applied to the projected jet fuel use to forecast the SAF volumetric demand. To accommodate the uncertainties, ICF created three scenarios:

Existing Policies: Demand scales only to meet the requirements of policies that have already been implemented. This scenario shows the minimum volumes that could be expected if no additional policies are developed, and little voluntary demand materializes.

Current Trends: Demand reflects the achievement of targets that have been clearly committed to and are supported with policies or initiatives under development. This scenario aims to show a reasonable forecast if the industry continues to develop at the current pace.

Accelerated Actions: Demand assuming the adoption of additional policies and initiatives that accelerate progress toward aviation's' net-zero targets.

Global SAF Demand

By 2030, global SAF demand is projected to reach 15.5 Mt (5.1 Bgal) in the central scenario *(Current Trends)*. Our analysis estimates a range from 7.5 Mt (2.5 Bgal), based on currently implemented policies *(Existing Policies)*, to as high as 30.9 Mt (10.2 Bgal) in a scenario of accelerated voluntary action, policy developments, and technology advancements *(Accelerated Action)*.

By 2050, if no new policies are introduced beyond those already implemented, global demand for SAF is projected to reach approximately 72 Mt (24 Bgal), corresponding to a global SAF blend rate of **16%**.

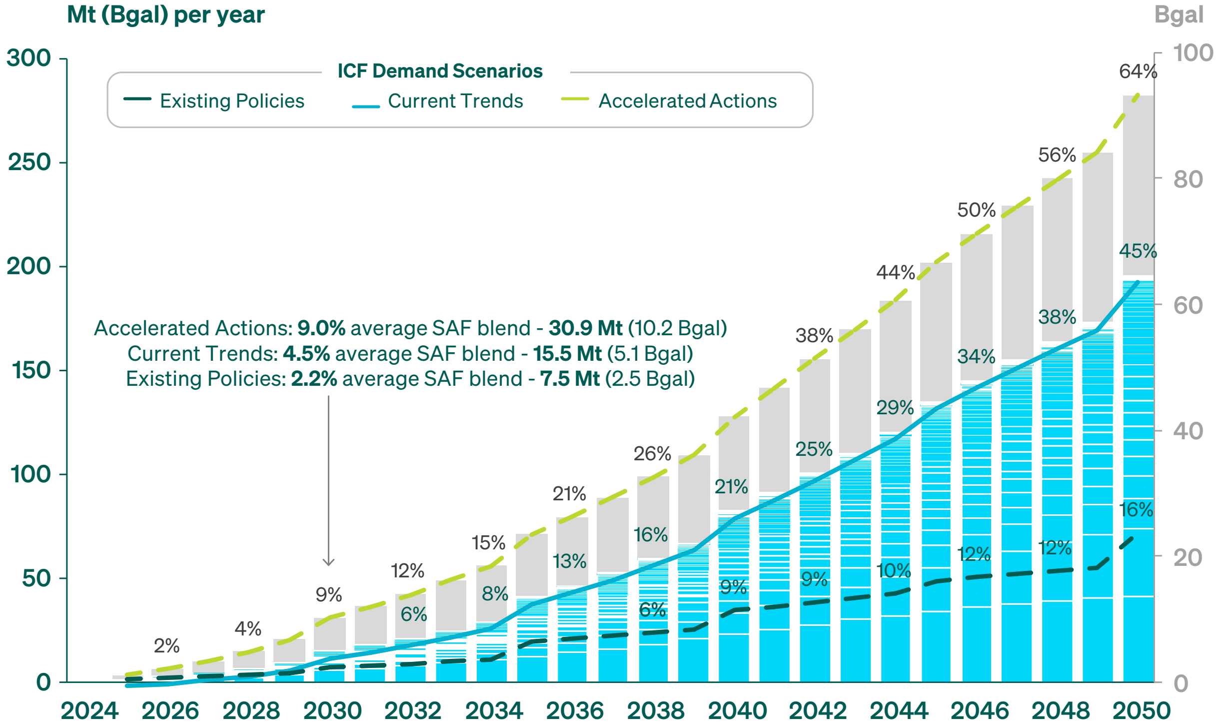
Under the *Current Trends* scenario, which assumes the realization of all announced targets, SAF demand is expected to grow to 196 Mt (65 Bgal) by 2050, corresponding to a global SAF blend rate of **45%**.

In the *Accelerated Actions* scenario, where additional, ambitious policies are introduced to align with global net-zero objectives, SAF demand could reach 282 Mt (93 Bgal) by 2050, corresponding to a global SAF blend rate of **64%.**

By 2050, assuming SAF with an average emission reduction of 80%, these SAF blending rates correspond with a 13% emissions reduction in the *Existing Policies* scenario, 36% in the *Current Trends* scenario and 51% in the *Accelerated Actions* scenario.

In the *Current Trends* scenario, the majority of 2030 SAF demand, 11.1 Mt (3.7 Bgal), arises from policy initiatives still under development with only 4.4 Mt (1.5 Bgal) of SAF demand from regions with existing mandates. This highlights the value of existing policies to create the market foundations, and the importance of continued work to develop additional policies to support SAF uptake.

Global SAF demand



Existing policies assumes that SAF demand only scales to meet policies that are currently in place. Current Trends assumes that all announced pledges and national targets are met, including those that do not currently have implementation plans. Accelerated Actions assumes additional policies coming in place to encourage net-zero and meeting of global targets, such as CAAF/3.

Figure 2: SAF demand expected to reach 15.5 Mt (5.1 Bgal) by 2030 under the Current Trends demand scenario

Voluntary commitments also play a critical role in accelerating the growth of the SAF industry. Airline and cargo carrier targets alone could drive demand of up to 13 Mt (4.3 Bgal) of SAF by 2030. While many of these commitments are expected to align with or reinforce government mandates, they are essential for securing long-term offtake agreements. When combined with a higher willingness to pay, they can also boost demand for non-HEFA SAF, helping unlock investment and scale up production. In parallel, corporate Scope 3 emissions targets—representing a similarly large demand opportunity—are vital to bridging the cost gap between conventional jet fuel and SAF. To fully activate this potential, voluntary commitments must be supported by clear guidance from sustainability frameworks such as the GHG Protocol. Without clarity on eligible SAF types, supply chain configurations, and accounting methodologies, long-term corporate offtakes remain challenging to justify.

By 2040, North America is expected to remain the leading region in terms of SAF demand, reaching approximately 25 Mt (8.5 Bgal). At that point, Asia is projected to reach parity, driven by rapid air traffic growth and emerging policy support. Beyond 2040, Asia will become the primary driver of global SAF demand, reaching approximately 70 Mt (23 Bgal) by 2050.

However, blend rates tell a different story: by 2050, the EU is projected to achieve the highest average SAF blend at 70%, followed by the UK at 60% and North America at 53%. Despite leading in absolute demand, Asia's average blend rate is expected to be 42%, reflecting the region's high overall fuel consumption. The rest of the world is projected to reach an average blend of 29%.

European Union

2025 marks the start of minimum SAF blending obligations under the ReFuelEU Aviation regulation (RFEUA),[2] generating a demand of approximately 0.9 Mt (0.3 Bgal) of SAF, corresponding to 2% SAF blend. This requirement rises steadily to around 2.8 Mt (0.9 Bgal) in 2030, 9.7 Mt (3.2 Bgal) in 2035, 17.1 Mt (5.7 Bgal) in 2040, and reaches approximately 36 Mt (12 Bgal) in 2050.

Within the overall SAF volume, the synthetic aviation fuel sub-mandate requires an average blending requirement of 1.2% over 2030 and 2031 – equivalent to 0.6 Mt (0.2 Bgal) per year. The minimum share for 2030 is set at 0.7%, translating to 0.3 Mt (0.1 Bgal). Synthetic SAF demand increases significantly thereafter, reaching over 2.4 Mt (0.8 Bgal) by 2035, 5 Mt (1.7 Bgal) by 2040, and approximately 18 Mt (6 Bgal) by 2050.

United Kingdom

The UK SAF mandate also came into effect in 2025,[3] generating an estimated SAF demand of approximately 0.24 Mt (80 Mgal) in its first year, based on an assumed average carbon intensity (CI) of 26.7 gCO_2e/MJ. As the scheme awards certificates based on emissions savings, the use of lower-CI SAF may result in fewer liters being required to meet the target.

By 2030, total SAF demand is projected to rise to around 1.3 Mt (0.4 Bgal), of which a maximum of 0.9 Mt (0.3 Bgal) can be fulfilled using HEFA SAF (as capped at 71% of the demand), and a minimum of 0.06 Mt (20 Mgal) must be derived from e-SAF.

By 2040, the mandate is projected to drive total SAF demand to approximately 3.1 Mt (1 Bgal), with a maximum of 1.1 Mt (0.4 Bgal) from HEFA SAF and at least 0.5 Mt (0.2 Bgal) from e-SAF.

United States

Under the Biden administration, the United States set an aspirational SAF production target of 3 billion gallons (9.1 Mt) by 2030 through the SAF Grand Challenge,[4] with the goal of replacing 100% of conventional jet fuel with SAF by 2050 (approximately 75 Mt). The extent to which this volume will be achieved depends heavily on the backing this ambition receives under the Trump administration, and how this translates to both the federal and state-level incentive schemes, as well as the strength of voluntary commitments.

To reflect this uncertainty and the evolving policy environment, a state-level assessment of SAF demand was conducted. The analysis considered jet fuel consumption by state and accounts for variations in policy support, distinguishing between states with established SAF measures, those where supportive policies are under active consideration and those with no such policies. Using this framework, SAF demand in the U.S. is expected to land between 5 Mt (1.7 Bgal) and 9.1 Mt (3 Bgal) by 2030, depending on how federal and state-level policies evolve in the coming years.

In the *Existing Policies* scenario, where only states with enacted SAF measures meet the Grand Challenge, long-term national SAF demand is projected to reach approximately 22 Mt (7.3 Bgal) by 2050. Under the *Current Trends* scenario, where states with either existing or proposed policies meet the targets and all others achieve a partial compliance, demand rises to over 41 Mt (14 Bgal). In the *Accelerated Actions* scenario, where all states meet the Grand Challenge, SAF demand reaches approximately 75 Mt (25 Bgal).

Asia

Singapore: A 1% SAF blend mandate by 2026 (0.05 Mt, 15 Mgal), with plans to increase to 3–5% by 2030,[5] equivalent to 0.15 - 0.2 Mt of SAF (50 – 70 Mgal). To support this initiative, Singapore will introduce a SAF levy on air ticket sales beginning in 2026. The funds collected through the levy will be used to centrally procure SAF[6].

China: A SAF blending mandate is expected to be introduced under the 15th five-year plan (2026–2030)[7]. While details are pending, the target could be as high as 15% by 2030, equivalent to approximately 7.2 Mt (2.4 Bgal) of SAF.

India: Plans to introduce a SAF mandate with a 1% blend by 2027 (0.1 Mt, 30 Mgal), increasing to 2% by 2028 (0.2 Mt, 70 Mgal)[8]. The blend is expected to rise to 5% by 2030, equating to approximately 0.6 Mt (0.2 Bgal).

Japan: A 10% SAF blend mandate by 2030 (1 Mt, 0.3 Bgal) has been announced but not yet formally adopted. The government is supporting uptake through financial incentives, including a 30 yen/liter tax credit to stimulate domestic production[9].

Malaysia: Under the 2023 National Energy Transition Roadmap, Malaysia has set a long-term target of a 47% SAF blend by 2050,[10] equating to approximately 2.6 Mt (0.9 Bgal).

Indonesia: Plans to mandate a 1% SAF blend for international flights starting in 2027, ramping up to 2.5% by 2030 (approximately 0.2 Mt, 50 Mgal), 12.5% by 2040 (approximately 1 Mt (0.3 Mgal), and 30% by 2050 (approximately 2.9 Mt, 0.9 Bgal)[11].

South Korea: Has introduced a SAF mandate requiring all international flights departing from South Korea to use at least 1% SAF in their fuel mix by 2027[12], equating to approximately 0.07 Mt (20 Mgal). South Korea also provides tax breaks and other incentives for local refiners who invest in sustainable aviation fuel production.

Rest of World

Canada: British Columbia (B.C.) is the first jurisdiction in North America to implement a mandate on SAF, with a volumetric requirement of 1% of jet fuel in 2028, increasing to 3% in 2030 (0.05 Mt; 20 Mgal)[13]. B.C. also requires jet fuel uplifted in the province to meet a CI reduction of 10% by 2030, which can be met through the use of physical SAF .

Brazil: Under the "Fuel of the Future" legislation (Bill 528/20), air operators must reduce emissions starting with a 1% reduction in 2027, increasing to 10% by 2037 (0.8–0.9 Mt, 0.3 Bgal), assuming average SAF lifecycle GHG reductions of 70–80%)[14].

Türkiye: A draft SAF regulation is in development, with the likely goal of 5% by 2030[15], equating to approximately 0.4 Mt (0.1 Bgal).

United Arab Emirates: Under the General Policy for SAF (December 2023), the UAE has set a voluntary target to supply 1% locally produced SAF by 2031 (0.1 Mt, 40 Mgal) to national airlines at UAE airports[16].

Chile: Plans to achieve a 50% SAF blend in its domestic and international flights by 2050, equating to approximately 1 Mt (0.3 Bgal) of SAF. Chile's SAF Roadmap 2050 states an aim to build an operational large-scale domestic SAF facility by 2030 to ensure that a significant proportion of the country's SAF needs can be supplied domestically[17].

SAF Capacity Outlook

What are the main SAF capacity development trends, and are we on track to meet demand?

Introduction

The global push for SAF continues to strengthen, though many operational SAF projects have come to terms with the harsh reality of early market development. While policy signals are generally strengthening and corporate offtake announcements continue, this past year has also seen more cancelled capacity compared to new announcements in some regions. An oversupply situation and less-than-anticipated long term commitments from the voluntary market have made some projects hard to justify, all while Asia is preparing itself to supply a surge of regional demand.

Jurisdictions worldwide are increasingly recognizing the geopolitical and regional development benefits of SAF. Strategically, investments in SAF capacity enhance energy security by reducing reliance on imported fossil fuels and improving resilience to global oil market volatility. Domestically, SAF is recognized to drive rural economic growth by creating new markets for agricultural residues and intermediate crops and supporting renewable energy infrastructure through e-SAF production while generating high-paying, skilled jobs through the construction and operation of refineries.

In this chapter, we take stock of where things stand on progress towards building out a global SAF capacity base. What can we realistically expect from the wave of capacity announcements? And critically—how do demand and supply-side forces interact to determine how much SAF actually comes online by 2030?

While regulatory certainty is a prerequisite for advancing SAF projects, it is just one piece of the puzzle. Project-level risks, including feedstock sourcing strategies, technology maturity, corporate governance and financing models all impact the likelihood of an announcement leading to steel in the ground. To estimate SAF capacity from public announcements, we apply the steps outlined in the *Methodology* section.

Methodology

Identified renewable fuel announcements with SAF ambitions

Cut-off date: 22 April 2025
Nr. of total facilities: 390

Excluded announcements with low probability of reaching production

- → Feasibility stage
- → No public updates in 2+ years
- → Characterized with high degree of compound risk and uncertainties

Adjusted SAF output when:

- → Market intelligence differs from public information
- → Only renewable capacity is known: apply average SAF yields based on licensed technology

This analysis focuses on projected SAF capacity by incorporating the nameplate capacity of each facility in the year it is expected to come online. For the purposes of consistency and comparability, we do not adjust for potential ramp-up periods or for facilities operating below full capacity. As such, the figures presented reflect theoretical maximum output, rather than actual production volumes. This is also why historical numbers are higher compared to actual SAF production in that year—it reflects the SAF capacity that was installed at the end of that year.

Global

Global SAF production capacity is projected to reach 18.1 Mt (6.0 Bgal) by 2030, marking a modest increase of 1 Mt (0.3 Bgal) compared to last year's outlook. This figure exceeds the expected demand of 15.5 Mt (5.1 Bgal) under a *Current Trends* scenario, suggesting that, if all announced projects come online as planned, the global market could reach a balanced supply situation by the end of the decade.

In the years leading up to 2030, the global market is likely to remain in oversupply, which may trigger further project delays, cancellations, or capacity reductions. Looking beyond 2030, the market situation could shift rapidly. Based on current announcements, there is a projected supply gap of approximately 24 Mt (8 Bgal) by 2035, meaning fuel producers will need to scale up quickly to keep pace with accelerating demand.

By 2030 – 2035, the supply of SAF could be further scaled by leveraging existing refinery assets:

- **Co-processing** of renewable feedstocks in conventional refineries: This route could yield up to 2 Mt (0.7 Bgal) of SAF, though its realization depends on factors such as refinery configuration, continued fossil fuel demand, and regulatory incentives for legacy energy providers.
- **Renewable diesel (RD) switching** to SAF: This pathway could add approximately 4 Mt (1.3 Bgal) of SAF supply. Its viability is influenced by evolving road transport policies that affect RD demand, as well as policy support and price signals that improve the relative economics of SAF production.

The remaining gap of approximately 18 Mt (5.9 Bgal) needed to meet *Current Trends* SAF demand by 2035 will require additional production capacity. This underscores the urgency of accelerating SAF project development and highlights the importance of early, clear demand signals from jurisdictions to de-risk investment and mobilize supply.

HEFA remains the dominant pathway for SAF production through 2030, accounting for approximately 82% of expected capacity. Compared to last year, there is a noticeable decline in announced e-SAF projects, alongside increased activity in Fischer-Tropsch (FT) and Alcohol-to-Jet (ATJ) pathways, utilizing both waste and agricultural feedstocks. This shift may reflect growing pricing volatility in lipid-based feedstock markets, prompting developers to pursue more stable and accessible alternatives.

Compared to last year's outlook, Asia's share of announced SAF capacity has increased significantly. In today's market (2025), Asian capacity accounts for 46% of the global total. The region also leads in projects that are either operational or under construction, representing over 40% of the global project pipeline. This suggests a high level of commitment from developers, likely supported by strong balance sheet financing and an ability to permit, build and execute quickly.

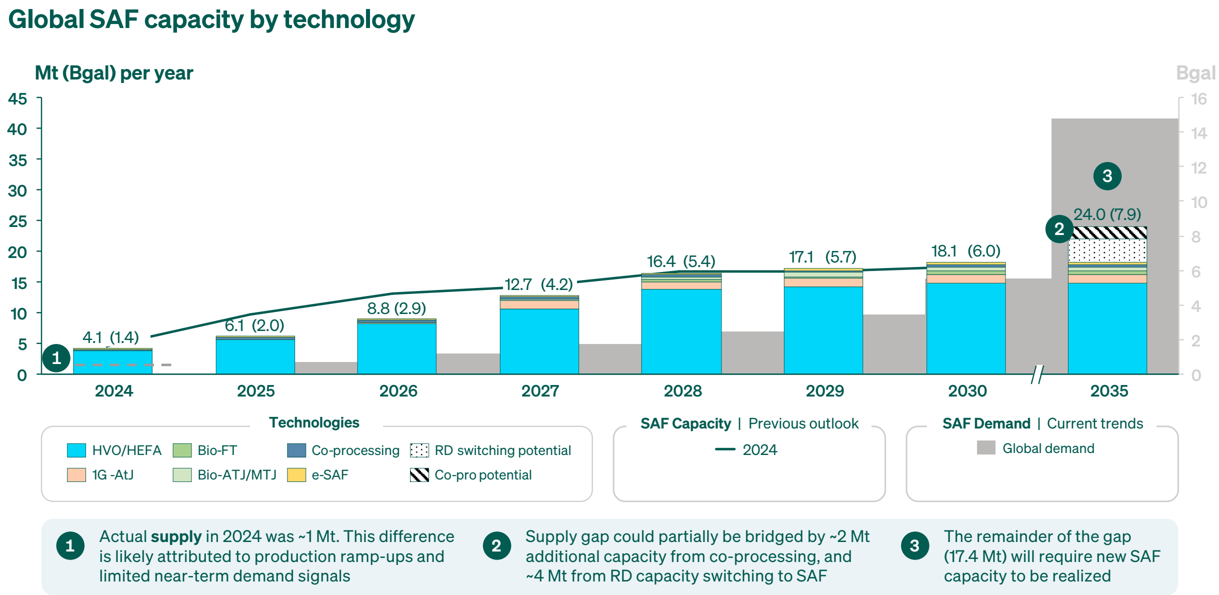


Figure 3: Global SAF capacity can reach 24 Mt (7.9 Bgal) by 2035, including additional co-processing and RD switching capacity

European Union

For the first time since this outlook was published in 2022, expected SAF production capacity in the European Union by 2030 has declined, now standing at **3.5 Mt** (1.2 Bgal) (see Figure 4), down from 3.7 Mt in last year's outlook. This marks a regional shift in momentum, with capacity cancellations last year exceeding newly announced projects[a].

Relative to the 2.8 Mt (0.9 Bgal) SAF demand mandated under ReFuelEU by 2030, expected capacity suggests an overcapacity of approximately 0.7 Mt (0.2 Bgal). Without stronger demand signals, either through voluntary commitments or enhanced regulatory measures, this surplus may lead to further project scale-backs or cancellations. Such a development would represent a missed opportunity, particularly in light of the 2035 targets, which require around 9.7 Mt (3.2 Bgal) of SAF under the general mandate, of which 2.4 Mt (0.8 Bgal) e-SAF. Strengthening demand signals in the near term could help facilitate a less volatile scale-up of SAF production capacity in the lead-up to 2035.

While bio-SAF faces challenges from weak demand signals, e-SAF in Europe finds itself in early stages of project development, relative to the 1.2% mandate by 2030. Based on current project statuses, we estimate that around 0.15 Mt (0.05 Bgal) of e-SAF capacity is in advanced stages of development—well short of the 0.6 Mt (0.2 Bgal) required. This leaves the sector with a 12 – 18 month window to advance projects and reach financial investment decisions to achieve operational readiness prior to 2030. Forthcoming EU legislative initiatives, such as the Sustainable Transport Investment Plan expected in Q3 2025[18], will need to introduce targeted financial de-risking instruments to accelerate project deployment. Without timely intervention, the mandate may be missed, forcing fuel suppliers to fall short or rely on e-SAF imports from outside the EU.

[a] Noticeably, the Shell Pernis project was paused indefinitely removing 430 kt from the total.

United Kingdom

Based on an inventory of project progress, we expect SAF capacity in the UK to grow to **0.3 Mt** (0.1 Bgal) by 2030 (see Figure 4), suggesting modest growth compared to the previous outlook (0.2 Mt). However, this is still 1.0 Mt (0.3 Bgal) short of meeting the 2030 blending mandate.

Announced SAF capacity in the UK is currently focused on FT and ATJ pathways, largely due to the HEFA-cap in place, which indirectly promotes investment in advanced bio-SAF. The cap could, in theory, allow for up to 0.9 Mt (0.2 Bgal) of HEFA-SAF annually, and volume would need to be met through a mix of domestic co-processing capacity and imports, primarily from the EU. Post-2030, the UK will have to accelerate the roll-out of advanced bio-SAF production to meet a demand of 1.9 Mt (0.6 Bgal) SAF, with a limited role for HEFA.

While the UK's Revenue Certainty Mechanism (RCM) is a much-needed de-risking instrument, many projects are awaiting the first auctions that are expected to take place in 2027[19]. This dynamic leads to project delays and risks falling short of the demand for advanced bio-SAF.

The UK's current e-SAF target of 0.05% (equivalent to 0.06 Mt or 0.02 Bgal) by 2030 is too modest to justify domestic production capacity in the near term. However, to meet the projected demand of approximately 0.3 Mt (0.1 Bgal) by 2035, development of domestic e-SAF production infrastructure would need to begin shortly after 2030.

United States

Despite some significant project cancellations in the US[b], SAF capacity is still projected to reach 5.6 Mt (1.9 Bgal) by 2030 based on current announcements (see Figure 4). This recent slowdown is likely driven by continued policy and economic uncertainty. While SAF enjoys solid bipartisan political support in the US, a lack of revenue certainty and prolonged delays in issuing definitive federal policy guidance have led some projects to withdraw or postpone investments.

Unlike many other regions, HEFA accounts for only 61% of the expected capacity by 2030, with a quarter of the total derived from corn ethanol-to-jet (ATJ), concentrated in a few large-scale projects. This is a general characteristic of the U.S. production landscape, where expected SAF capacity is dominated by a handful of large producers: just five producers are responsible for 60% of announced SAF capacity.

Recent federal regulatory proposals suggest that imported feedstocks be disadvantaged in the 45Z tax credit in the future[20]. As a result, SAF project developers are placing an even stronger emphasis on domestically sourced feedstocks, including corn, soybean oil, biogas and tallow, to ensure eligibility and de-risk investments.

Consistent with our previous outlook, SAF projects using corn ethanol as a feedstock continue to face risks related to their commercial viability. This is primarily due to their dependence on a potential loosening of the GHG accounting methodology underpinning 45Z tax credit eligibility, as well as the more favorable regulatory treatment of ethanol in road transport compared to its use in SAF production.

Based on an analysis of states that have introduced state-level support for SAF, combined with support from federal tax credits and the Renewable Fuel Standard, we expect voluntary SAF demand in the U.S. to reach approximately 5 Mt (1.7 Bgal) by 2030. However, to unlock the full pipeline of SAF projects in the U.S., the market needs stronger and more stable demand signals from the federal government.

[b] The largest reduction in announced SAF capacity is attributed to the BP Cherry Point project, which aimed to produce 450 kt (0.2 bgal).

Asia

Announced SAF capacity in Asia has increased significantly compared to our previous outlook, reaching 5.0 Mt (1.7 Bgal) by 2030 (see Figure 4). This growth is partly due to newly identified projects, and could be attributed to projects being missed in last year's outlook, but is primarily driven by a rapid increase in announcements from developers aiming to export or meet forthcoming regulatory targets across Asia-Pacific. China accounts for the majority of announced capacity in the region, representing almost half of the project pipeline.

This significant growth reflects developers' interest in capturing greater value further down the supply chain, leveraging the abundant availability of feedstocks, while also recognizing the higher profit margins that SAF offers in mandated markets compared to renewable diesel.

Nearly all of the capacity in Asia is utilizing regionally available waste oils, with 95% of announced capacity by 2030 selecting the HEFA platform to produce SAF. However, compared to last year the region has seen growth in announcements in e-SAF and advanced bio-SAF projects, notably one e-SAF project (0.1 Mt/y or 0.03 Bgal/y) that broke ground in 2024 in Heilongjiang, China.

Compared to the expected regional demand of 4 Mt (1.3 Bgal) by 2030, announced projects indicate a potential oversupply of 1.0 Mt (0.3 Bgal), highlighting the region's focus on exports. However, by 2035, regional demand is expected to increase significantly, highlighting potential for acceleration post-2030.

Latin America

SAF capacity in Latin America is expected to reach 2.4 Mt (0.8 Bgal) by 2030 (see Figure 4), marking significant growth from the 2.3 Mt (0.8 Bgal) projected last year. Major industry players, such as Acelén, have expressed interest in entering the export market[21], utilizing both waste-based feedstocks (such as tallow and bagasse for the EU/UK markets) and agricultural commodities (for the U.S. market). At the same time, regional demand for SAF is anticipated to rise, especially in Brazil.

SAF demand and capacity by region[C]

Figure 4: Regional SAF demand and capacity show undersupply in most regions by 2035, except for LATAM

[C] Canada and Middle East not included – expected capacity by 2030 is 0.5 Mt (0.2 Bgal) and 0.4 Mt (0.15 Bgal) respectively

Beyond the HEFA Tipping Point

How can we scale the market and build a resilient and sustainable SAF industry?

As jurisdictions are implementing policies that will drive SAF demand, we expect demand to rise sharply from approximately 15 Mt (5 Bgal) in 2030 to 196 Mt (65 Bgal) in 2050 under the Current Trends scenario. In such a demand surge, the key question is how to achieve sustainable and lasting growth. Currently, most demand, whether driven by mandates or voluntary markets, remains largely feedstock-agnostic with limited sustainability requirements that are primarily aligned with CORSIA guidelines. This creates a fundamental uncertainty in existing demand projections: which production pathways, and therefore which feedstocks, will ultimately drive the growth of SAF?

As outlined in earlier chapters, the current SAF landscape is predominantly shaped by HEFA technology, which accounts for 82% of projected global SAF production capacity by 2030. This dominance is primarily driven by the cost-effectiveness of the pathway and the commercial maturity of both the feedstock supply and processing technology. However, HEFA's long-term scalability is inherently constrained by the limited availability of sustainable oils and fats, which are also in high demand from other sectors, such as the food sector, exacerbated by a growing global population. Our analysis indicates that demand will exceed HEFA feedstock availability as early as 2030, marking a potential tipping point for the pathway. Beyond 2030, continued growth will require a strategic shift toward a broader mix of alternative feedstocks and production technologies beyond HEFA.

To explore how the SAF market might evolve after 2030, we modelled four distinct scenarios. Each highlights the critical role of scaling advanced pathways in achieving lasting and sustainable growth, and the negative environmental impacts of continuing business-as-usual. Realizing this vision will hinge on overcoming key challenges on the supply side, through unlocking new feedstocks, and the demand side, through robust policies and targeted incentives.

Methodology

Step 1: Model the SAF demand by sustainability requirements

- We classify projected SAF demand through 2050 according to sustainability categories: feedstock-agnostic SAF, waste-based SAF, advanced bio-SAF, and e-SAF. These categories are aligned with regional policy frameworks and follow the *Current Trends* demand scenario.
- For feedstock-agnostic demand, where no specific production pathway is mandated, we assume that supply will follow the cost merit order, influenced by both carbon intensity (CI) scores and available incentives. Under current conditions, this results in a preference for HEFA production.

Step 2: Asses the SAF production potential per pathway

- We estimate the global availability of major feedstock groups through 2050, focusing on:
  - → Oils and fats
  - → Sugars
  - → Biomass and its derivatives (e.g., ethanol, methanol, RNG)
  - → Hydrogen + CO_2
- We then estimate aviation's accessible share of these feedstocks and apply pathway-specific conversion yields to calculate total SAF production potential for each category.

Step 3: Determine the HEFA tipping point

- By comparing modelled HEFA-SAF demand against its production potential based on feedstock availability, we can identify the tipping point—the moment when demand for HEFA feedstocks exceeds supply capacity.

Step 4: Explore different SAF supply scenarios for after the tipping point

- Following the HEFA tipping point, we model four distinct supply scenarios to assess how the emerging supply gap after the tipping point could be filled. Each scenario reflects different assumptions about policy developments, technology adoption, and market dynamics, illustrating potential pathways for sustainable SAF scale-up beyond 2030.

The HEFA tipping point

To identify the tipping point of the HEFA pathway, we first modelled the SAF demand across individual jurisdictions (see Figure 5). Within each jurisdiction, demand was categorized based on the types of SAF eligible under local sustainability criteria. In general, we assume that—given a specific set of criteria—demand will be met by the lowest-cost SAF option that qualifies. Based on this approach, we distinguish four categories of SAF demand:

1. Feedstock-Agnostic SAF

In regions where policy frameworks emphasize carbon intensity (CI) reductions over feedstock eligibility, SAF demand is expected to be guided by performance-based eligibility criteria. Programs such as CORSIA[22] and the U.S. 45Z[20] tax credit require a minimum threshold for GHG emissions reduction, but without imposing strict feedstock limitations.

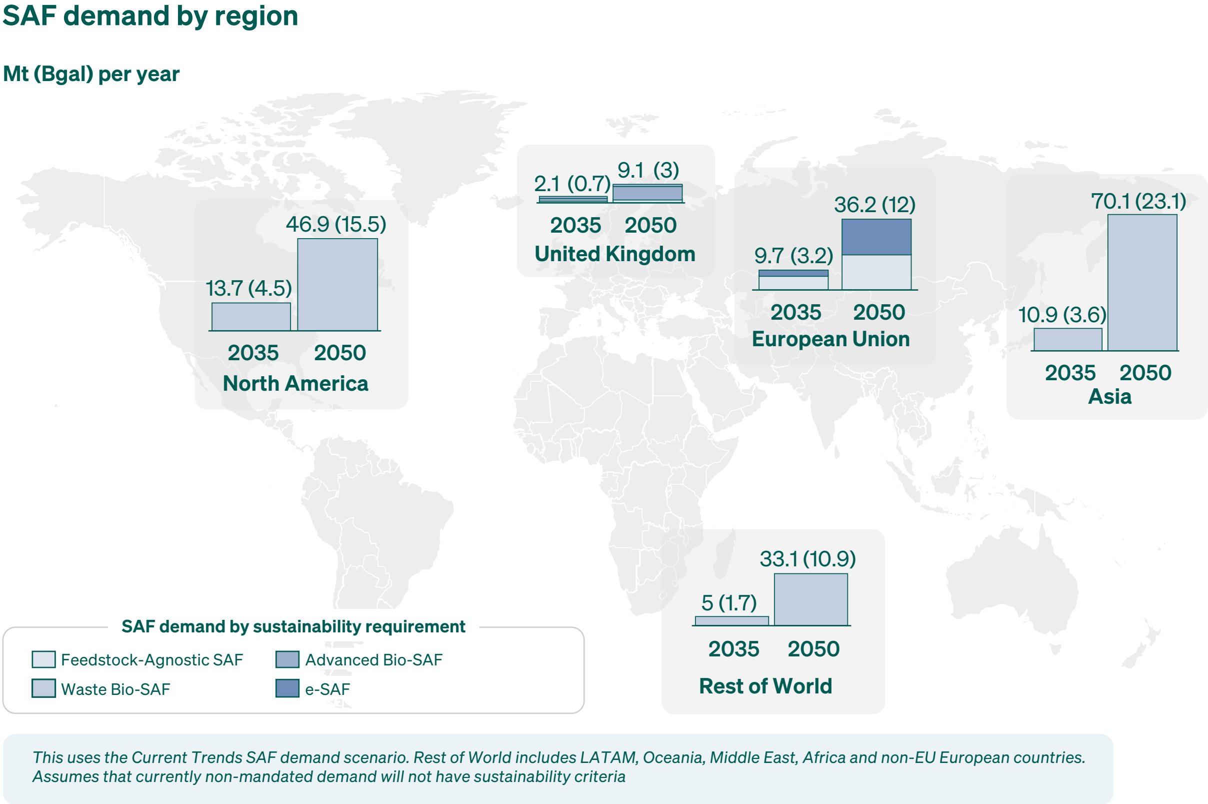


Figure 5: Modelling SAF demand by SAF type shows most demand is feedstock agnostic

While waste-based HEFA-SAF offers low CI scores[23], HEFA-SAF from virgin vegetable oils (e.g., soybean and canola oil) and ATJ-SAF from ethanol (e.g., corn and sugarcane ethanol) may also play a role in these markets. Eventually, it is assumed that the choice of SAF supply pathway will depend on the cost merit curve, provided that low cost crop-based feedstocks comply with CI-score thresholds and are accepted by voluntary buyers.

2. Waste Bio-SAF

In the EU, SAF must meet the sustainability requirements outlined in the Renewable Energy Directive[24], with further restrictions imposed under the ReFuelEU framework[25,26]. These regulations explicitly exclude feedstocks derived from food and feed crops. As a result, SAF demand outside of the synthetic aviation fuel sub-mandate is expected to be met primarily through HEFA-SAF produced from eligible waste-based feedstocks.

Similarly, the UK SAF mandate enforces strict sustainability standards and includes a cap on HEFA-SAF[3], limiting the volume that can be sourced through this pathway. Due to this cap, demand is expected to be met predominantly with SAF derived from waste oils and fats.

3. Advanced Bio-SAF

In the UK, the combination of a HEFA-SAF cap and the sustainability criteria under the RTFO[27] is driving demand toward non-HEFA SAF options. This demand is expected to be met by the next most cost-effective pathways, such as ATJ-SAF produced from wastes and residues, as well as RNG-to-SAF and Gasification + FT-SAF in the near to medium term. So far, only the UK, and to some extent the US, have established criteria and support schemes that support the development of such advanced (or cellulosic) biofuels.

4. e-SAF

Both the ReFuelEU Aviation[28] mandate and the UK SAF mandate[29] include sub-mandates for e-SAF, which take effect in 2028 in the UK and in 2030 in the EU.

Based on our SAF demand classification, the majority of global demand currently falls in the feedstock-agnostic category—accounting for approximately 75% (see Figure 6a). In combination with waste-based SAF demand in the EU, this portion of demand is expected to be met primarily via the HEFA pathway. To assess the feasibility of meeting this demand, we evaluated the **global availability of HEFA-relevant feedstocks.**

Multiple feedstock sources were considered (see Annex, Figure 8), including:

- Waste fats, oils, and grease (FOGs)
- Low indirect land-use change (iLUC) oils derived from cover crops
- First-generation vegetable oils from food and feed crops, such as soybean and canola

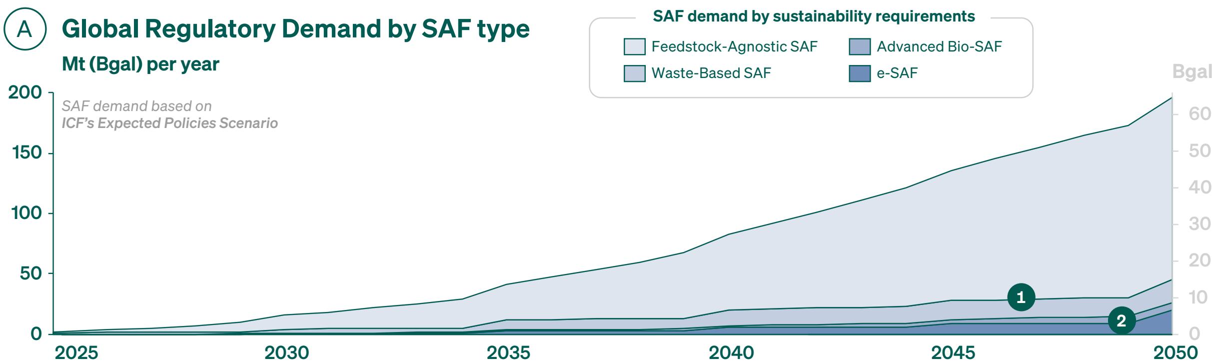
For each feedstock type, we assessed:

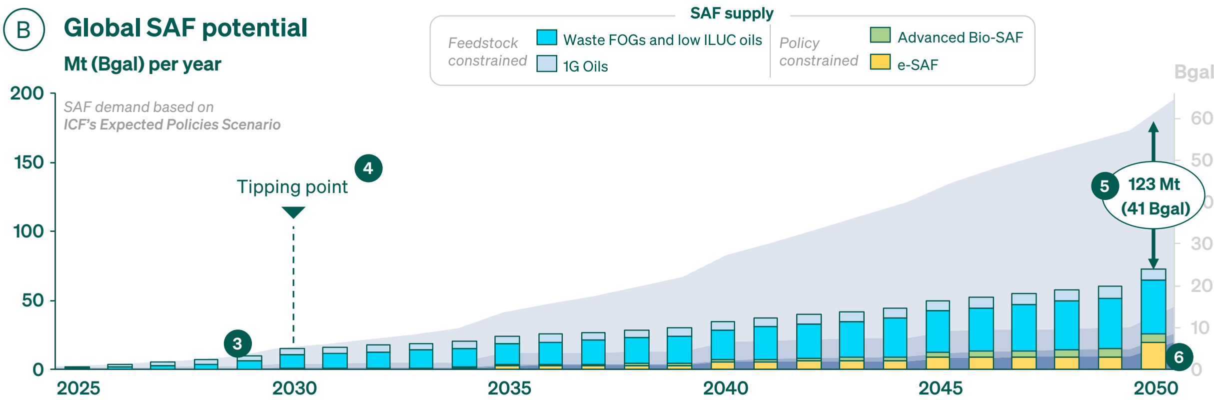
- **Projected growth from 2025 to 2050**, based on public data such as growth rates and efficiency gains.
- **Aviation's claim on the total feedstock pool**, accounting for competition from other sectors, such as food/feed and other transportation fuels
  - → For vegetable oils, a relatively modest aviation claim was assumed, starting at 6% in 2030 and growing to 10% by 2050. This cap was applied because, despite the large availability of vegetable oils, a higher claim would place significant pressure on global food markets, potentially distorting prices and increasing sustainability risks such as indirect land-use change.

Combining data on available feedstock and conversion yields, we estimate the HEFA-SAF production potential to be approximately 14 Mt (5 Bgal) in 2030, growing to around 47 Mt (16 Bgal) by 2050. This is by no means a static estimate, as it depends on a number of factors that are in flux, such as the renewable diesel claim on these feedstocks or crop growth rates.

When overlaying 'waste-based' and ' feedstock-agnostic' SAF demand with the defined feedstock constraints, we identify that the **HEFA tipping point** could arrive as early as 2030 (Figure 6b). This indicates that, from 2030 onwards, the SAF market should scale primarily through non-HEFA pathways to meet the growing demand for SAF globally. By 2035, HEFA-based SAF is expected to cover approximately 20 Mt (7 Bgal) of the 'feedstock-agnostic' demand. The remaining gap of 16 Mt (5 Bgal) will need to be filled with SAF produced from alternative feedstocks. This gap is projected to widen substantially, reaching approximately 123 Mt (41 Bgal) of unmet SAF demand by 2050, at which point roughly a quarter of demand can still be met by HEFA.

This tipping point represents a structural shift in the SAF market. It signals the limitations of relying exclusively on the HEFA pathway and highlights that the sector is approaching a crossroads. Are we shaping an industry that only meets short-term mandates, or are we laying the groundworks for a SAF market that accommodates sustainable growth? To explore these questions and the trade-offs involved, the following section explores four distinct scenarios, each representing a different potential trajectory for the market. These scenarios help us better understand the stakes and what is required to create a healthy, scalable SAF industry.





1. The feedstock agnostic and EU waste-based SAF will likely prioritize HEFA pathways
2. The only strong demand for advanced bio-SAF and e-SAF comes from EU and UK mandates
3. As long as there is sufficient HEFA feedstock supply to meet SAF demand, HEFA will be the primary pathway, given its cost-effectiveness and maturity
4. By 2030, the HEFA feedstock potential will be outpaced by the global SAF demand, resulting in a growing supply gap after 2030
5. How the supply gap will be filled depends on several driving factors, such as policy requirements and costs
6. The e-SAF and advanced bio-SAF supply in this graph follow from specific mandates – actual potential is higher

Figure 6: Overlaying regulatory SAF demand by type with the HEFA supply potential indicates that the HEFA tipping point will be reached by 2030

Beyond the HEFA tipping point

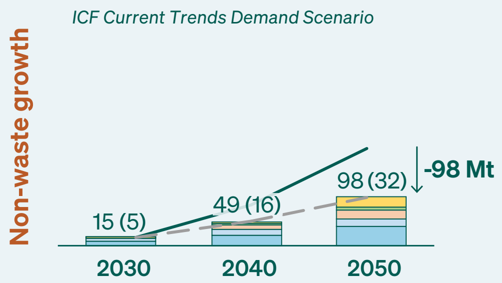
Each modelled scenario beyond the tipping point illustrates a distinct combination of SAF demand policies and sustainability requirements (see Figure 7).

In the ***non-waste growth*** scenario, SAF demand is limited to demand arising from current policies with minimal push for advanced production pathways. In the absence of strong sustainability criteria or economic incentives, the market relies heavily on commoditized, lower-cost feedstocks, such as first-generation sugars, alongside existing HEFA feedstocks. While this allows for some growth beyond the HEFA tipping point, this scenario is not preferred, seeing it results in low average emissions reductions[d] and poses risks around indirect land use change and related food market distortions.

Similar as in the non-waste growth scenario, the ***supply stagnation*** scenario sees advanced pathways remaining uncompetitive due to the limited regulatory support outside of the EU and UK, leading to this market not taking off. Project developers struggle to secure financing or long-term offtake agreements, while the deployment of infrastructure and novel technology stagnates. The broader decarbonization ecosystem, such as green hydrogen, also suffers, as there is little demand pull from the SAF sector.

Global SAF Supply Potential

Mt (Bgal) per year

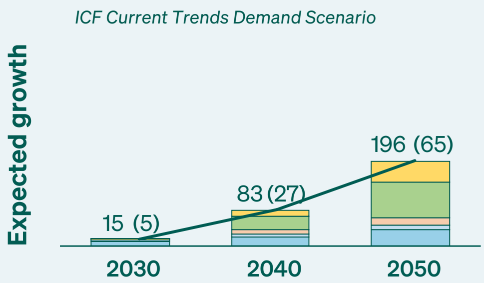


Impact

- Constrained SAF market with high risk of market distortion from increased land use for crop-based feedstocks
- Limited CO_2 impact: average reduction potential by 2050 is 54%[d] (165 Mt CO_2 avoided)

Regulatory drivers

- Limited support or demand-pull measures outside of EU/UK
- Relaxed sustainability requirements, leading market to accepting food- and feed-based SAF

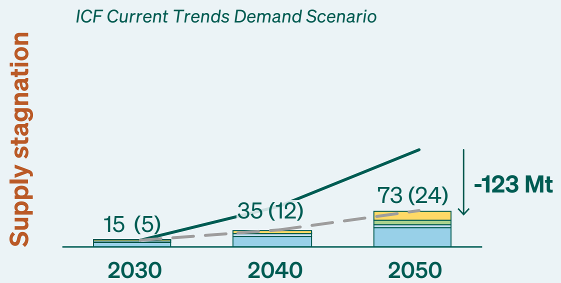


Impact

- Constrained SAF market, but lower risk of market distortion due to feedstock limitations
- Limited CO_2 impact: average reduction potential by 2050 is 69%[d] (160 Mt CO_2 avoided)

Regulatory drivers

- Limited support or demand-pull measures outside of EU/ UK
- Inclusion of sustainability thresholds, prohibiting use of food- and feed-based SAF

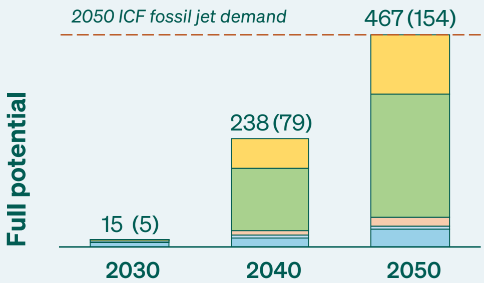


Impact

- Steadily growing SAF market, with strategic benefits to agricultural and renewable energy development
- Significant CO_2 impact: average reduction potential by 2050 is 70%d (432 Mt CO_2 avoided)

Regulatory drivers

- Commoditization of novel feedstocks and de-risking of novel pathways through blending mandates
- Strong focus on high-GHG performance feedstocks



Impact

- Unlocking all strategic benefits, including full independence from fossil resources
- Full potential CO_2 impact: average reduction potential by 2050 is 75%d (1,100 Mt CO_2 avoided)

Regulatory drivers

- Globally coordinated action towards full substitution of fossil jet fuel and complete valorization of available wastes and residues
- Strong focus on high-GHG performance feedstocks

Expected SAF supply per scenario

Waste and low ILUC oils | 1G sugars | $CO_2 + H_2$ | 1G oils | Waste bio-sources

SAF demand

ICF Current Trends | Demand addressed | 2050 ICF fossil jet demand

Figure 7: Overview of four SAF supply scenarios after the HEFA tipping point and their impact, driven by of policy developments

[d] Compares CO_2 emissions of 1 Mt of SAF to 1 Mt of jet fuel by 2050 - avoided Life cycle emissions are calculated using the CORSIA methodology and averaged default LCA and ILUC values for each feedstock group. SAF produced from $CO_2 + H_2$ assumed to achieve 80% emissions reduction.

Unlike the non-waste growth scenario, the supply stagnation scenario does include stricter sustainability requirements, such as excluding food- and feed-based feedstocks. Even though more SAF is produced in the non-waste growth scenario, average emission savings are lower leading to about the same overall GHG avoidance. In both scenarios, advanced pathways remain uncompetitive. As a result, the aviation sector would still rely heavily on external measures like carbon offsets.

The ***expected growth*** and ***full potential*** scenarios illustrate what is achievable when regulatory and market forces align to support widespread SAF deployment. In both cases, governments provide long-term certainty through binding mandates and strong incentives, while introducing clear sustainability criteria—such as HEFA caps and sub-targets to scale up advanced pathways, particularly between 2030 and 2040.

Policy interventions in the 'expected growth' and 'full potential' scenarios enable a robust and scalable SAF market, increase investor confidence, reduce project risks, and accelerate cost reductions through scaling and innovation. Under the expected growth scenario, emission savings reach approximately 432 Mt of CO_2 avoided by 2050. The Full Potential scenario explores a more ambitious path: full replacement of fossil jet fuel with SAF by 2050, enabled by global mandates for 100% SAF usage. This would result in up to 1,100 Mt of CO_2 reduction.

To evaluate the feasibility of the last two scenarios, we assessed the **global availability of the necessary feedstocks** and compared them to the aviation claim that is needed in both scenarios (see Annex, Table 2).

These results show that the available feedstock base is sufficient to meet even the most ambitious demand scenario—if we can unlock these feedstocks:

- Unlocking **waste-based biomass** requires coordinated investment in collection and pre-processing infrastructure, particularly in feedstock-rich regions like Asia, Latin and North America[30]. Due to feedstock variability and limited infrastructure, both technology and supply chains must be adapted or developed to enable scalable, cost-effective conversion[31,32].
- For **CO_2 utilization**, especially biogenic sources, strong economic and policy incentives are needed to shift carbon from storage toward SAF production[33]. Mechanisms should target biomass power and industrial bioprocesses to ensure reliable capture and supply.
- Scaling **green hydrogen** will require rapid deployment of renewable energy and electrolyzer capacity, backed by permitting reforms and subsidies. Policymakers must prioritize hydrogen for sectors like aviation, particularly in high-potential regions such as Northern Europe, Brazil, Canada, Australia, and the Middle East.

Realizing a resilient and future-proof SAF market

As shown, the 'non-waste growth' and 'supply stagnation' scenarios will fail to meet demand and emission reduction ambitions, while the expected growth and full potential scenarios do. This shows that a mature and durable SAF market is achievable, but turning that potential into reality requires coordinated, collective action. To support this transition, we identify a range of regulatory, financial, and innovation levers, spanning both supply and demand, that can be pulled already today. These are not standalone interventions: they are mutually reinforcing tools that need to work together to deliver a long-term and sustained market impact.

> *“Pulling these levers in harmony means unlocking strategic opportunities to enhance energy security, strengthen rural economies, and accelerate renewable energy development.”*

Regulatory certainty remains the cornerstone of a healthy SAF industry, enabling continued growth and ensuring the sector can scale to meet evolving market demands. Long-term policy signals, such as binding GHG intensity targets and SAF blending mandates, give developers and investors the confidence to act. Corporate commitments, including SAF certificate procurement and long-term sourcing strategies, can further reinforce this certainty. Corporate commitments should be strengthened by clear guidance from frameworks like the GHG Protocol. Without clarity on eligible SAF types, supply chain configurations and accounting standards, long-term corporate investment into SAF remains challenging.

However, regulation should always be supported by enforcement. For SAF markets to operate with integrity and predictability, regulatory frameworks must include clear guidance and compliance mechanisms, such as credit trading, banking, or pooling systems. At the same time, credible penalties for non-compliance are essential to ensure mandates are taken seriously and market signals are not diluted.

Sustainability criteria must guide SAF scale-up more than it does today and these can work together with national priorities, such as energy autonomy and supporting the agricultural base. Sub-mandates for advanced and waste-based pathways, HEFA caps, and exclusions for high-iLUC feedstocks help ‘future-proof’ SAF production and ensure it is aligned with the net-zero goals of the aviation sector.

Financial de-risking of SAF project development is critical to scaling new technologies. Instruments like revenue guarantees, concessional capital, and targeted grants can unlock private investment and reduce risk for early-stage projects.

Further maturing feedstock supply chains to commoditized markets further needs to remain a top priority. Many advanced SAF feedstocks, such as captured CO2, are underutilized or hard to access. Certification, incentives for collection, infrastructure investment, and support for climate-smart practices like intermediate cropping can help unlock a sustainable and scalable supply.

Finally, advancing new technologies will require continued public support. Co-funding for demonstrations, as well as sustained investment in R&D, will help reduce costs and improve performance – shortening the time to market for future SAF production pathways.

Bringing these efforts together requires shared responsibility. Governments, corporates, investors, and regulators each have distinct roles to play – but their actions must be aligned and simultaneous. Pulling these levers in harmony means unlocking strategic opportunities to enhance energy security, strengthen rural economies, and accelerate renewable energy development. As jurisdictions expand SAF capacity, these broader advantages will be critical to building resilient, future-ready fuel systems.

List of Abbreviations

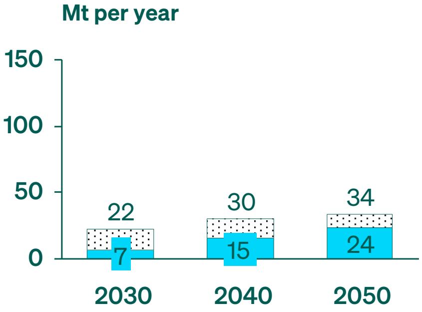
ATJ	Alcohol-to-Jet
Bgal	Billion Gallons
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DAC	Direct Air Capture
EU	European Union
FID	Final Investment Decision
FT	Fischer Tropsch
GHG	Greenhouse Gas
HEFA	Hydroprocessed Esters and Fatty Acids
iLUC	Indirect Land-Use Change
LCFS	Low Carbon Fuel Standards
Mt	Million Tonnes
PtL	Power-to-Liquid
R&D	Research & Development
RFS	Renewable Fuel Standard
RNG	Renewable Natural Gas
RTFO	Renewable Transport Fuel Obligation
SAF	Sustainable Aviation Fuel
UCO	Used Cooking Oil
UK	United Kingdom
U.S.	United States

Annex

European Union	Asia	LATAM
Austria	Bangladesh	Antigua and Barbuda
Belgium	Bhutan	Argentina
Bulgaria	Cambodia	Bahamas
Croatia	China	Barbados
Cyprus	Egypt	Belize
Czech Republic	Hong Kong	Bolivia
Denmark	India	Brazil
Estonia	Indonesia	Chile
Finland	Japan	Colombia
France	Kazakhstan	Costa Rica
Germany	Kyrgyzstan	Cuba
Greece	Laos	Dominica
Hungary	Macao	Dominican Republic
Ireland	Malaysia	Ecuador
Italy	Maldives	El Salvador
Latvia	Mongolia	Grenada
Lithuania	Myanmar	Guatemala
Luxembourg	Nepal	Guyana
Malta	North Korea	Haiti
Netherlands	Pakistan	Honduras
Poland	Philippines	Jamaica
Portugal	Singapore	Martinique
Romania	South Korea	Mexico
Slovakia	Sri Lanka	Nicaragua
Slovenia	Taiwan	Panama
Spain	Tajikistan	Paraguay
Sweden	Thailand	Peru
	Turkmenistan	Saint Kitts and Nevis
	Uzbekistan	Saint Lucia
	Vietnam	Saint Vincent and the Grenadines
		Suriname
		Trinidad and Tobago
		Uruguay
		Venezuela

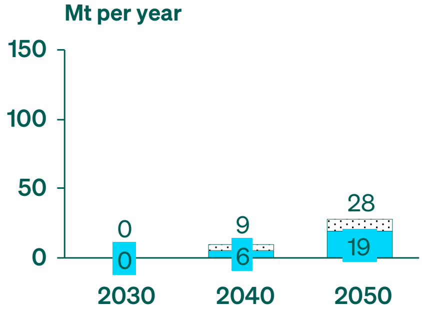
Table 1: Regional classification used throughout the outlook. Countries not listed are included under rest of world, except for the U.S., which is treated as a separate category

Waste oils availability



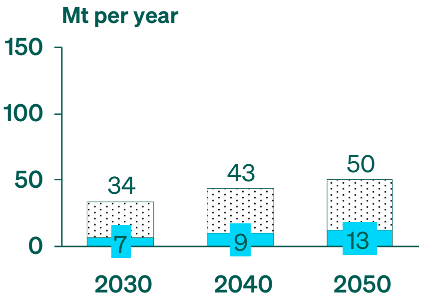
- Based on industry estimates[34,35], insights from internal experts and partners
- Growth is driven by annual population increase and improvements in collection efficiency
- Aviation claim expected to grow, reaching 70% in 2050, driven by electrification in other modalities

Oil cover crops availability



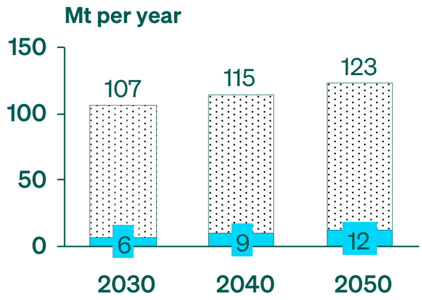
- Based on industry estimates[36], insights from internal experts and partners
- Assumed a 5-year roll-out from 2030 onwards to become available, and reaching full potential by 2050
- Aviation claim expected to grow in line with industry trends, reaching 70% by 2050

Animal fat cat 1,2 & 3 availability



- Based on industry estimates[37], and insights from internal experts
- Growth rate is based on expected industry growth, while accounting for sustainability trends
- Aviation claim expected to grow in line with industry trends, reaching 25% by 2050

Vegetable oils availability



- Based on industry estimates on soybean oil[38] and canola oil[39] and insights from internal experts
- Aviation claim expected to grow to 10% by 2050, limited by market distortion concerns and constraints in growth of agricultural acreage

Aviation claim

Figure 8: Based on the different HEFA feedstock availabilities and their conversion factor to SAF, the HEFA SAF potential is estimated to be14 Mt (4.6 Bgal) in 2030, growing to 47 Mt (15.5 Bgal) by 2050

Feedstock	Total availability in 2050 (Mt)	Aviation claim - expected growth scenario (%)	Aviation claim – full potential scenario (%)
Waste bio-resources[40]: residues, MSW, cover crops	7116 Mt	3.2%	11.3%
CO_2[41]: from biogenic sources and DAC	1152 Mt	9%	22%
Hydrogen[42,43]: green and low-carbon	280 Mt	10%	24%

Table 2: Aviation claims needed to enable the expected growth and full potential scenarios stay well beneath the total feedstock availability

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About SkyNRG
SkyNRG is a global leader in Sustainable Aviation Fuel (SAF). Since 2009, the company has been scaling up SAF demand and production capacity for the industry to meet its 2050 net zero commitment[h]. SkyNRG was the first in the world to supply SAF on a commercial flight flown by co-founder and shareholder KLM in 2011. To date, SkyNRG has supplied SAF to over 40 airlines across the world and is now developing dedicated production facilities to support the shift from fossil jet fuel to sustainable aviation fuel. As a certified B Corp™ SkyNRG prioritizes producing the most responsible and sustainable SAF worldwide. Recognized as a sustainability leader, it maintains an independent Sustainability Board, which advises the company on feedstocks and provides strategic guidance on wide-ranging sustainability issues. SkyNRG operations are certified against the RSB EU RED, CORSIA, and Book & Claim standards.

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