Global Feedstock Assessment for SAF production

9 December 2025

Global Media Day

IATA

Goof afternoon and once again welcome to this session on "Global feedstock assessment for SAF production." The overview of assessment is outcome of IATA's led study with Worley Consulting to gain;

- clear visibility into realistic SAF feedstock availability by region
- technology assessments across all SAF pathways, including technology and commercial readiness
- a review of the current regulatory environment
- regional profiling to identify challenges relating to scalability, economics and markets.

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Key take-aways

- There is **sufficient sustainable aviation fuel (SAF) feedstock** to allow industry to achieve net zero CO_2 emissions by 2050.
- There are however significant barriers for utilizing that feedstock, including the **pace** of technology rollout and **competing uses** for the identified feedstock
- As a hard-to-abate sector, **air transport should be prioritized** for feedstock access and availability.
- HEFA technology represents **the only commercially scaled** SAF production pathway – more needs to be done to fully utilize this.
- Biomass has the potential to produce more than 300 Mt of bio-SAF annually by 2050. **Significant e-SAF production will be required**, although it is vital that this is cost effective.
- Our core Global SAF Forecast for 2050 highlights the need to **accelerate technology rollout** to bridge the gap to 500 Mt.

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Let's start with what we concluded through this study….at an overarching level, we looked to address 3 key questions;

1. What feedstock resources do we have? 2. What challenges need to be addressed to harness their potential, and 3. How far can we go to meet 2050 objectives….

Regarding the first question, we noted that sustainable feedstock availability is no longer the limiting factor, then where is the issue?

We have different technologies at various stage of deployment, the challenge is turning this potential into commercial SAF at scale, with the aid of novel technologies at an accelerated pace.

To see how far we can go, the good news is that we noted that>300 Mt of Bio-SAF could be produced by 2050, and e-SAF will be inherently essential in the long term.

To diversify from existing HEFA pathways, the study emphasizes the importance of achieving economies of scale and efficiencies, expanding production infrastructure, and coordinating regionally to unlock SAF at scale.

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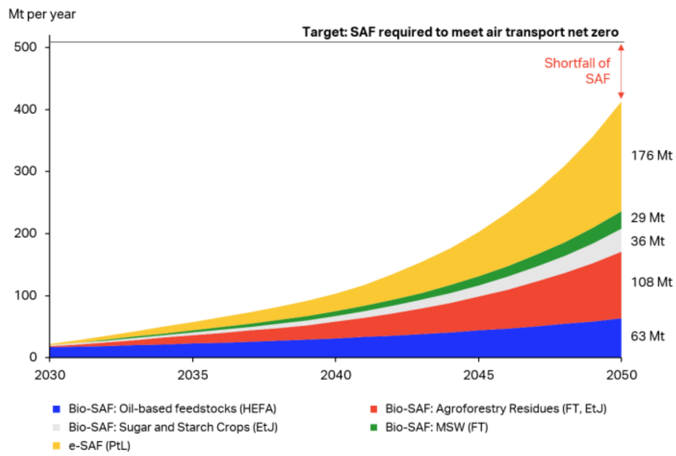
Key take-aways

Estimated global SAF production potential by 2050, core forecast



~400 Mt
of SAF production potential

- **Reaching 500 Mt** will require the full utilization of identified SAF biomass feedstocks
- Constrained by the pace of **technology rollout** – accelerated scaling-up is required
- **Bio-SAF** is a key part of the future SAF mix, but will need to also be complemented with **e-SAF**

3 Source: Worley Consulting, IATA Sustainability & Economics, 2025

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1) Our core Global SAF Forecast for 2050 highlights the need to **accelerate technology rollout** if we are to bridge the gap to 500 Mt.

Our core forecast reaches just over 400 Mt in 2050. Of this amount, bio-SAF accounts for 236 Mt of making it about 57% of the estimated SAF mix with the remaining 43% is eSAF.

2) In this forecast, only the HEFA pathway fully exploits the feedstocks that we have identified to be available to SAF production. For the remaining Bio-SAF options, they are able to utilize only part of the feedstocks that are considered to be available. To fully utilize these feedstocks, the technology rollout – i.e. the physical ability to build the production plants required to convert the feedstocks into SAF – needs to occur at a faster pace. Bio-SAF will be a core component of the future SAF mix, particularly in terms of establishing the industry, however eSAF will be required if 500 Mt of SAF production potential is to be reached in 2050.

3) If additional oil-based feedstocks can be secured for SAF production, there is scope to close the gap through increased HEFA production – this is the only

pathway to be limited by the feedstocks and not the speed in which production plants can be built.

How did we get there?

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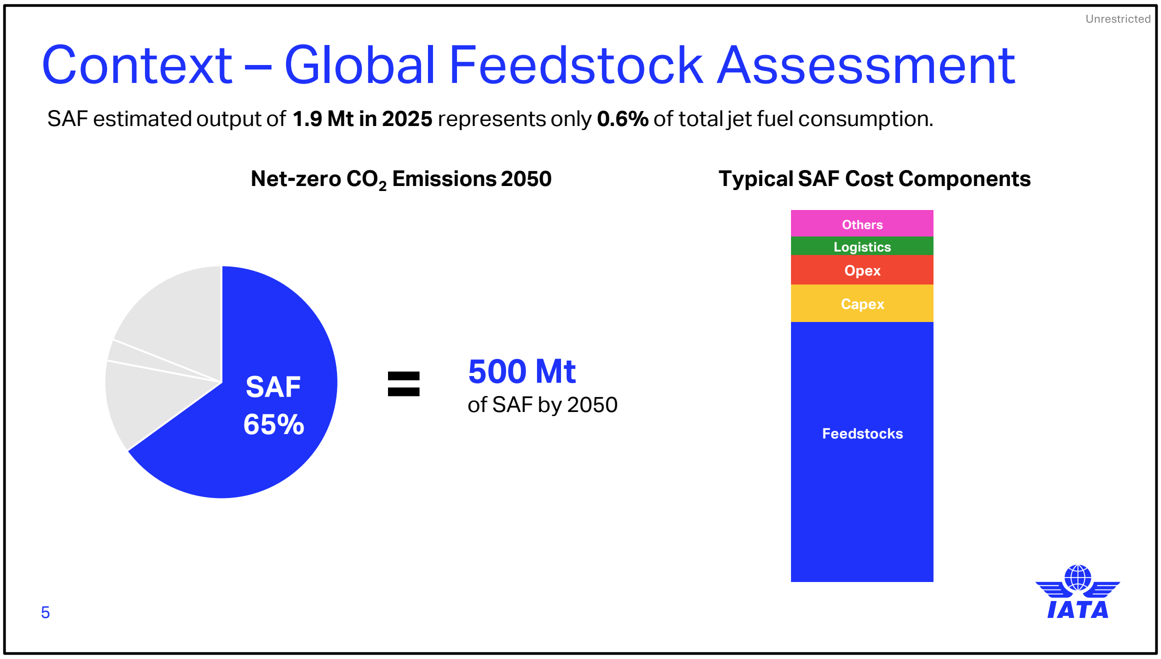
The outcome of study is based on scientific, robust and comprehensive **feedstock** data analysis, deeper dive into state of technologies their deployment rate and importantly associated **policy and regulatory environment.**

- Combining the assessment how the numbers got together
- 2030 as a baseline for the assessment for 2050
- Breakdown of different technologies (Slide 18)



As we also heard in the morning sessions that Airlines Net Zero Commitment and IATA's roadmap are the guiding tools in terms of net zero enablers and their role.

Looking at the gap between SAF production today and the required amount by 2050, a significant gap (~250x) needs to be bridged in the next two decades. This transition requires significant investment in innovation, new technologies, their scale-up, and the streamlining of the feedstock supply chain to **produce SAF in a cost-effective manner**, facilitating faster adoption by airlines.

The availability and role of sustainable feedstocks is vital, given their share in the total cost of SAF production. Furthermore, by using diverse feedstocks, we can also lower production costs as different materials may be more cost-effective.

Feedstocks

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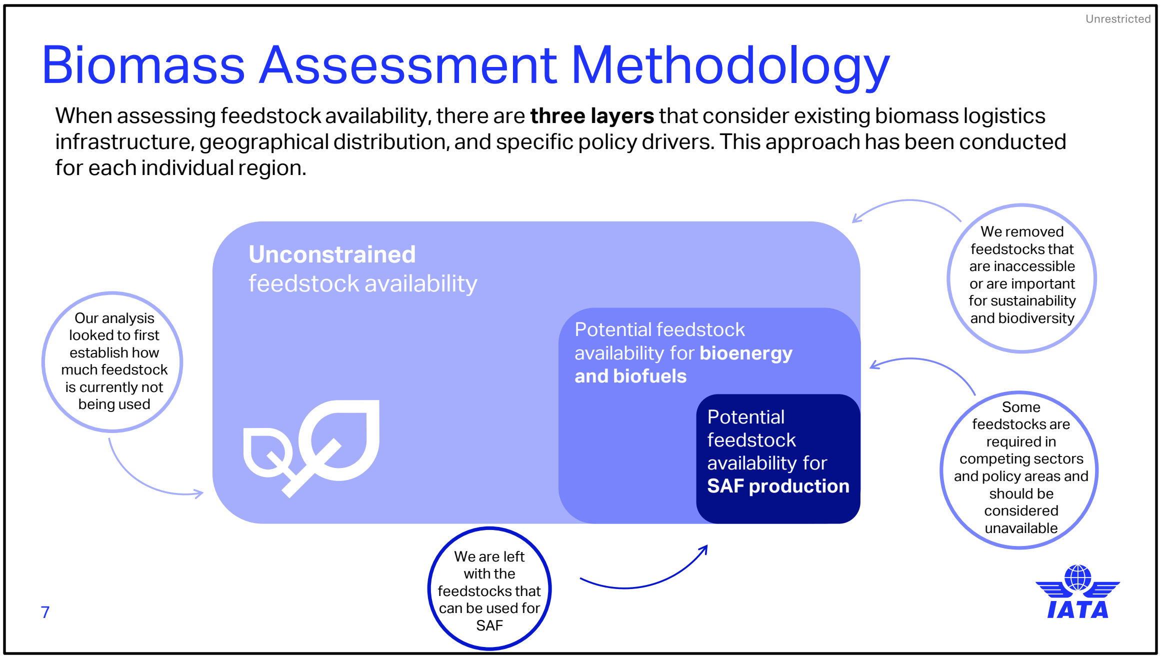


Assessing the global feedstock potential is complicated by the **lack of harmonized data.** In our assessment, we adopted a **bottom-up approach to ensure global consistency** using **standardized metrics,** scientific assumptions essentially a 3 layered model.

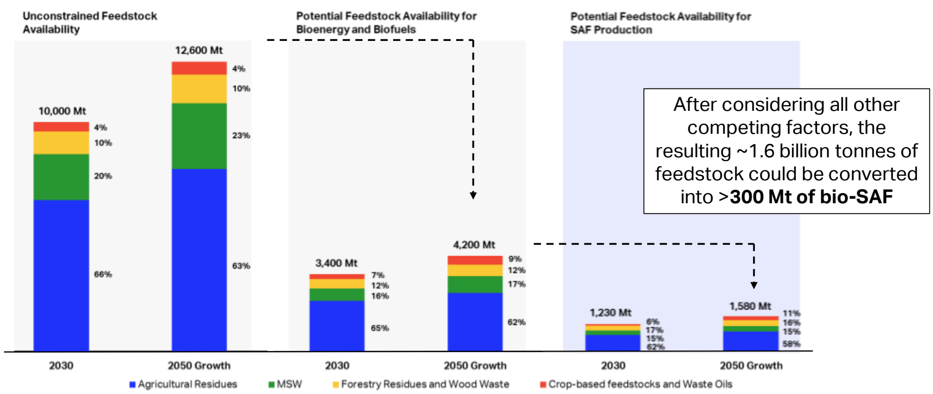
Unconstrained Feedstock Availability: The total amount of the resource that is available and generated across sectors at regional or hotspot levels, regardless of current use or competing demands.

Feedstock Available for Bioenergy and biofuels: This was estimated by subtracting biomass allocated to other essential sectors (non-bioenergy competing uses) from the unconstrained.

Feedstock Availability for SAF: We arrived at this number based on regional analysis that considered competing biofuels/bioenergy markets, logistics infrastructure constrains, policy drivers etc.

Biomass Assessment - Results

Starting with the unconstrained feedstock availability, we can establish how much of the global biomass feedstocks can be used for SAF production in 2030 and 2050



Source: Worley Consulting, IATA Sustainability & Economics, 2025

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Using 3 layered approach we clearly establised that despite a large proportion of biomass already allocated to sustainable practices and other bioenergy sectors, **substantial volumes remain available to support SAF production.**

You also note the growth in feedstocks between 2030 through 2050, where underlying assumption are support by established infrastructure and a shifting demand toward SAF production.

The outcome firmly highlighted abundance of agri- forest residues; which where we need novel technologies; missing today from the scene. Collectively all of these feedstocks have a potential to yield >300 mt of bio SAF.

We must highlight that approach factored existing constraints and operational realities, thereby mitigating the risk of overestimating availability.

Technology

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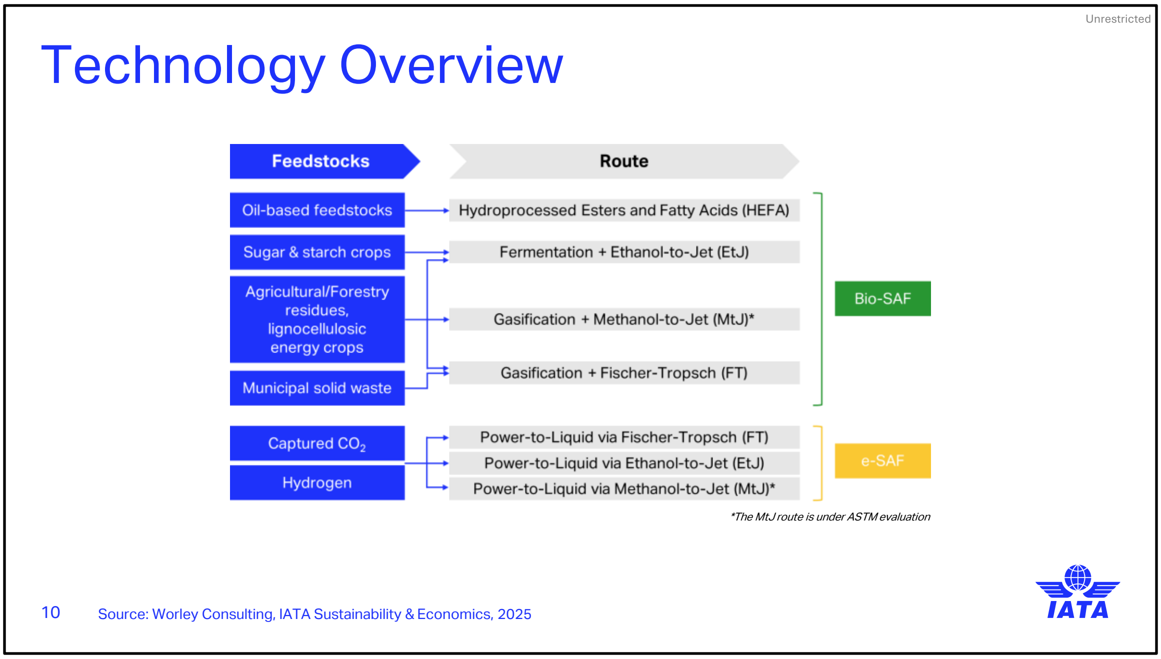
The technology assessment involves examining all potential SAF production routes and evaluating their technical details and commercial suitability.

To better understand the technologies and key challenges we adopted a stepwise approach.



A complex slides but with strong reminder that both **bio and e-SAF are required** to meet 2050 goals an new production routes require further technological development before they can be deployed at scale.

In our technology evaluation, which is the heart of this study, we again followed a 3 Step approach to evaluate 40+ routes where;

1st Analyzed and compiled all existing and possible routes to SAF.

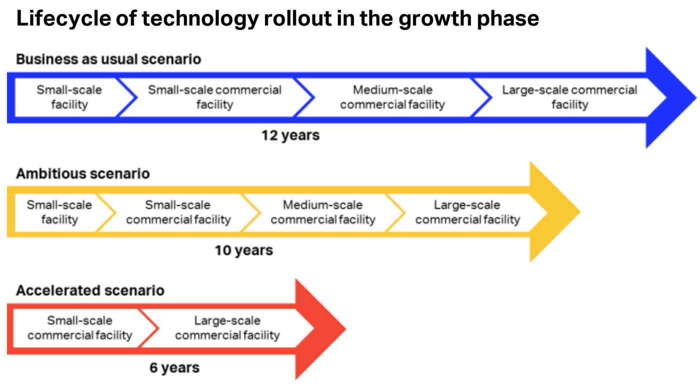
2nd Assessed their commercial suitability to arrive at a consolidated list.

3rd Each route was scored against key criteria such as TRL, ease of feedstock pre-treatment, carbon yield of SAF, CAPEX and efficiency of the process.

This was an important step for examining all potential SAF production routes and select the key routes and served as base for scenario development of SAF production volumes globally.

Technology Rollout

- **Growth Phase**: between the first pilot facility and the first large-scale commercial facility.
- **Ramp-up Phase**: assumed to follow a simple compound annual growth rate (CAGR).



11 Source: Worley Consulting, IATA Sustainability & Economics, 2025

Transitioning technologies from pilot scale to commercial production requires coordinated efforts to progress through project phases, securing financing, offtake agreements, feedstock supply, and electricity interconnections.

The technology rollout depends heavily on the initial growth phase between the first pilot facility and the first large scale commercial facility. Supported by real-world experience, various scenarios were modelled to estimate the likely growth rate of SAF technologies. Ramp up phase we considered traditional biofuels industry and renewable solar industry and

We did not factored accelerated scenario …..

Regional Blueprints

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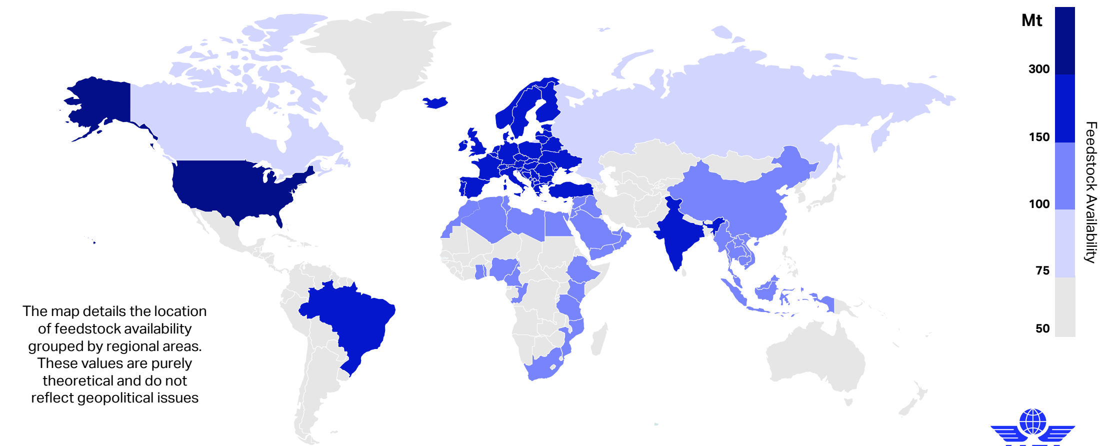
Biomass feedstock hotspots for SAF in 2050

Across the global landscape, the likes of **the United States, Brazil, Europe, India, PR China, Indonesia, and Malaysia emerge as important areas,** that offer the highest bio-resources potential for SAF.



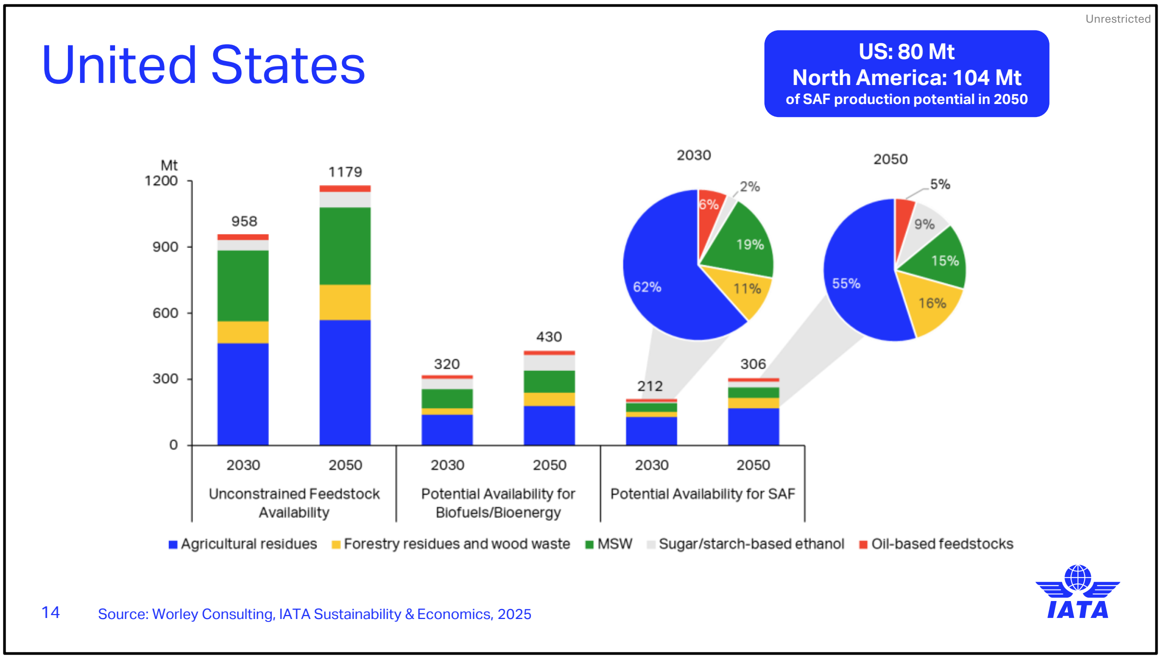
13 Source: Worley Consulting, IATA Sustainability & Economics, 2025

1) The world is diverse, with differing environments and ecosystems. This is reflected in terms of the global landscape for feedstocks - there is significant regional variation, with different feedstock species and amounts available, each requiring differing approaches to their successful utilization for SAF production.

2) North America has the largest volumes of feedstocks, in particular the United States. South America is also important, with Brazil also containing the lions share of the available resources within the region.

3) India, China and South-East Asia also all have significant potential feedstock availability, although as a result of their feedstocks and strengths, they will likely all take different approaches in terms of the technology required to convert them into SAF differ.

4) Even regions like sub-Saharan Africa and the middle east and northern Africa have their role to play in SAF production. Significant but fragmented feedstocks and a lack of infrastructure are a couple of examples of the issues that first need to be overcome.



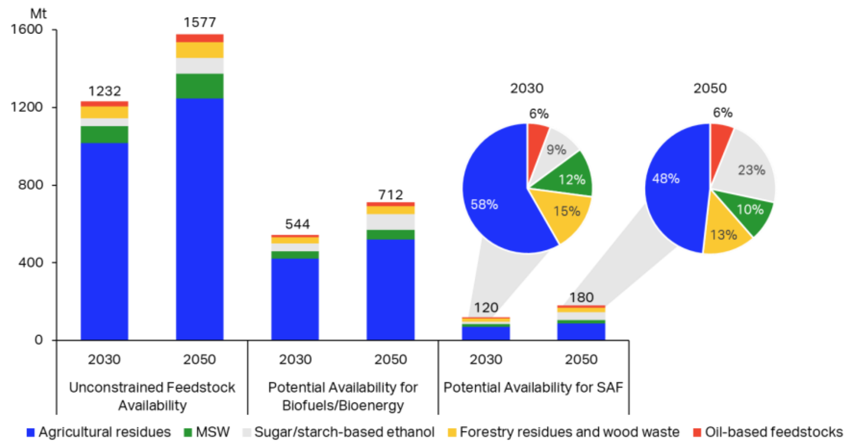
1) The US has a resource rich country, with an array of different biomass feedstocks that could be utilized for SAF production.

2) There are strong financial incentives for scaling SAF supply in the US market. The current policy landscape has prompted some uncertainty for the sector in the short term.

3) The country has extensive experience in the biofuels sector, particularly in bioethanol and biodiesel for road transport. As a result, the are a major producer and consumer of bioenergy. Biomass will dominate the US mix, with bioSAF expected to contribute over 65%

Brazil

60 Mt
SAF production potential in 2050



Source: Worley Consulting, IATA Sustainability & Economics, 2025

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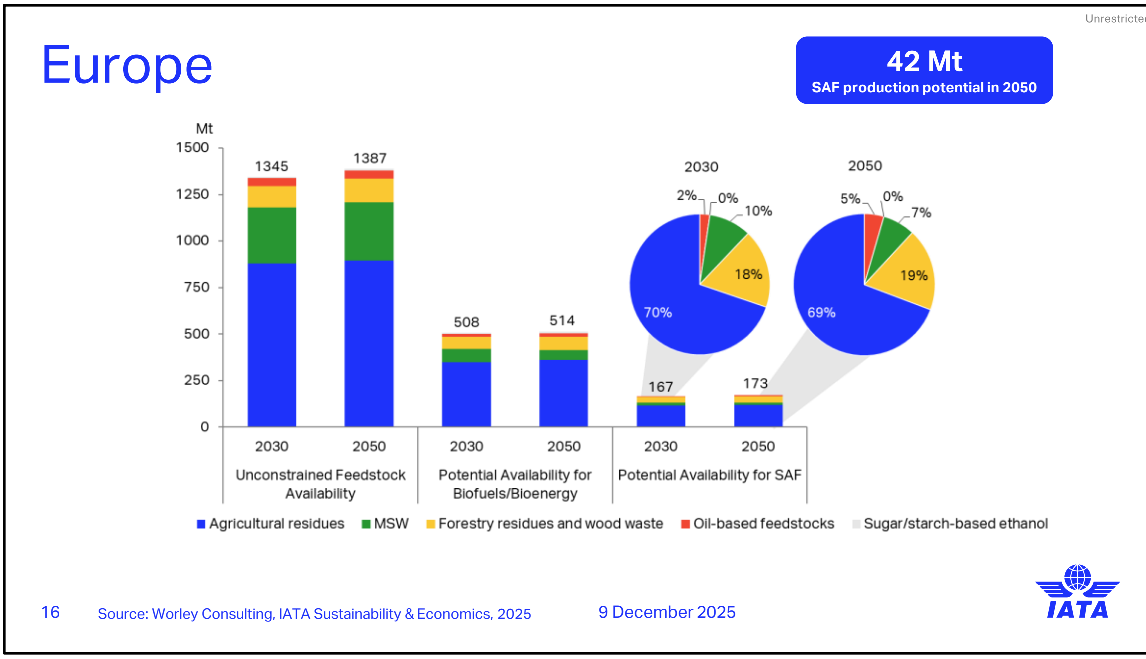
1) Brazil has a significant biomass resource availability and is estimated to hold about 75% of the total amounts in the South and Central America region.

2) The country is a major producer and consumer of bioenergy and biofuels - it is the world's second largest ethanol producer and has a strong refiring base. This leaves Brazil well-positioned to scale up SAF production, likely to focus mainly on the ethanol to jet pathway, using either first-generation or advanced ethanol (from agroforestry residues). Brazil is likely to leverage its sugarcane and corn ethanol industries to scale SAF production.

3) Brazil has potential to become a major SAF producer, with a particular focus on bioSAF and the EtJ pathway (this is due to its large feedstock base, mature supply chains and extensive operational experience. 70% of the region's SAF is estimated to be from biomass.



1) Europe has well-established biofuel and bioenergy sectors, particularly in terms of biodiesel and bioethanol produced and used for road transport. Crops are currently allowed for use in road transport but the amount is capped. Crops are not allowed for use under ReFuelEU, with the main main policy framework for biofuels focused on wastes and residues. This position has softened following the addition of novel biomass feedstocks such as cover crops to the eligible list.

2) The regional focus is still likely to be on utilizing wastes streams such as agricultural and forestry residues and waste oils. Waste oils are however limited – Europe will likely look to full expand its domestic waste oil potential, there will likely remain a need for imports.

3) In terms of eSAF feedstocks, Europe faces strict sustainability criteria which will have cost and competitiveness implications. It is advanced in terms of enacting SAF policy, however there is uncertainty on how successful it will be in its current design. Of the 42 Mt of SAF production potential in Europe, around 50% of it is expected to be bio-SAF and 50% eSAF.

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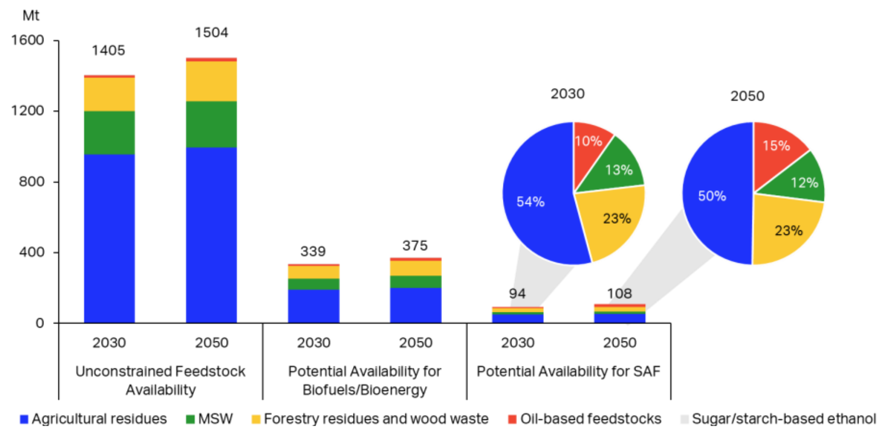
PR China

66 Mt
SAF production potential in 2050



17 Source: Worley Consulting, IATA Sustainability & Economics, 2025 9 December 2025

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1) China has significant potential to supply feedstocks for SAF, including waste oils agroforestry residues, MSW and potentially non-food energy crops. Biomass and renewable energy resources are already integral to China’s energy sector, and the country is expected to become one of the leading producers of SAF worldwide.

2) China’s vast population and advanced collection infrastructure position it as the world’s largest market for UCO. Collection rates and availability are expected to rise, a factor driven by mature waste oil trade and the high demand from Europe.

3) Additionally, China has the world’s largest renewable energy production capacity. Their approach to renewable energy expansion, coupled with significant CO_2 availability and an established domestic manufacturing supply chain, makes the region ideally positioned to implement eSAF production at scale. As a result, eSAF is expected to account for about 60% of the Chinese SAF production potential.

East Asia & Pacific

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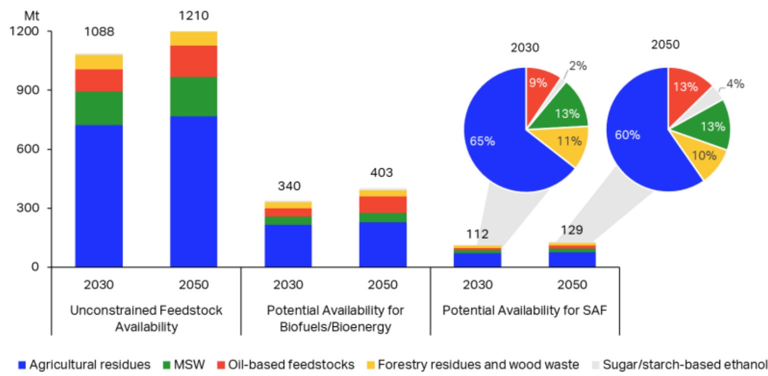
50 Mt
SAF production potential in 2050



18 Source: Worley Consulting, IATA Sustainability & Economics, 2025 9 December 2025

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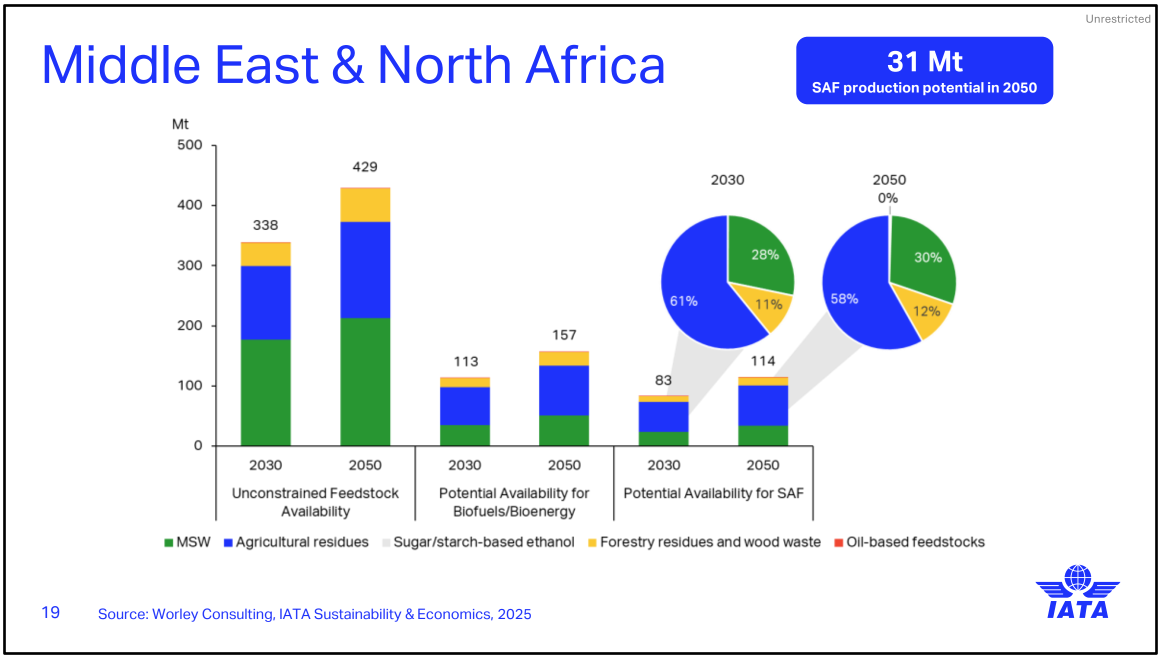
1) The region is diverse in its feedstock availability, with some nations having a lots of potential biomass for SAF while others have very little. As a result, ASEAN countries are expected to have the greatest potential in the region.

2) Currently, the regional focus is on maximizing HEFA SAF production, leveraging well-established oil-based feedstock supply chains and making the most of their existing resources. Indonesia and Malaysia have significant palm oil production – any expansion of this would likely be limited by sustainability and land-use considerations however the wastes and residues from the process, such as POME and PFAD, are options for SAF production.

3) Ensuring practices align with accepted sustainability criteria will be important for certain feedstocks to be accepted. HEFA will likely play an important role in the region, with BioSAF expected to account for 65% of total SAF mix.



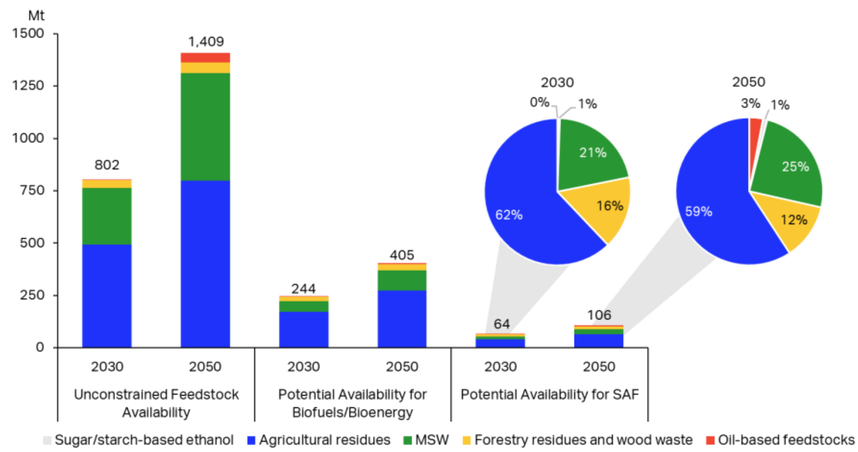
1) The MENA region is not renown for its agricultural lands and is typified by deserts and arid lands. Although improving this has been a focus of land policy, difficulties in achieving large amounts of crop growth mean that bioresources for SAF will be likely be based on wastes such as MSW.

2) MENA can leverage significant amounts of MSW as a scalable feedstock for SAF. Improvements to waste management practices are ongoing, however further work will be required in terms of establishing advanced collection facilities and the subsequent infrastructure if MSW is to realize its potential and become a critical feedstock in the region.

3) There is also significant potential for renewable energy, particularly solar. To date there are several green hydrogen projects announced in the region which, if successful, could prove to be the foundations for significant eSAF production, especially if reliable sources of carbon can be secured. As a result, it isexpected that nearly 60% of the regional SAF mix will be eSAF.

Sub-Saharan Africa

7 Mt
SAF production potential in 2050



20 Source: Worley Consulting, IATA Sustainability & Economics, 2025

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1) Sub- Saharan Africa has vast agricultural resources but does face challenges around land degradation, soil infertility and food insecurity. Unlocking this potential will require strategic agricultural improvements, infrastructure development and the overcoming of regulatory challenges, specifically policy fragmentation.

2) Agricultural residues are likely to have the greatest potential as feedstocks for SAF within the region, however there will have to be a significant investment into infrastructure if the regions potential is to be realized.

3) If renewables are to be used in the region, sizable investment into both power and CO2 infrastructure would be necessary to overcome existing energy grid issues. As a result, the region is expected to produce just a modest amount of SAF by 2050, with as much as 75% of this being bio-based.

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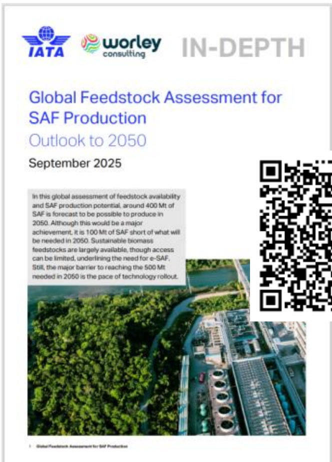

- **Sufficient sustainable feedstocks** exist; we need accelerated deployment of new technologies for Net Zero CO_2 2050.
- There is **an increasing risk** that we fall short of our net zero targets without this **accelerated deployment**.
- Governments and industry stakeholders must **work together to convert SAF feedstock into actual SAF production.**
- Rallying **regional leadership** is one of the key drivers for SAF production and unlocking new economic opportunities.

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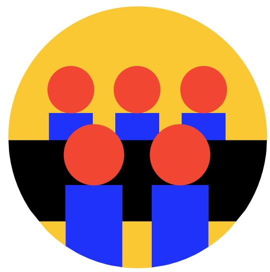
Bridging the gap between where we are now and needed to be in 2050 is possible but would require both securing greater access to sustainable biomass feedstocks and an urgent and accelerated scaling up of novel SAF technologies



Questions?