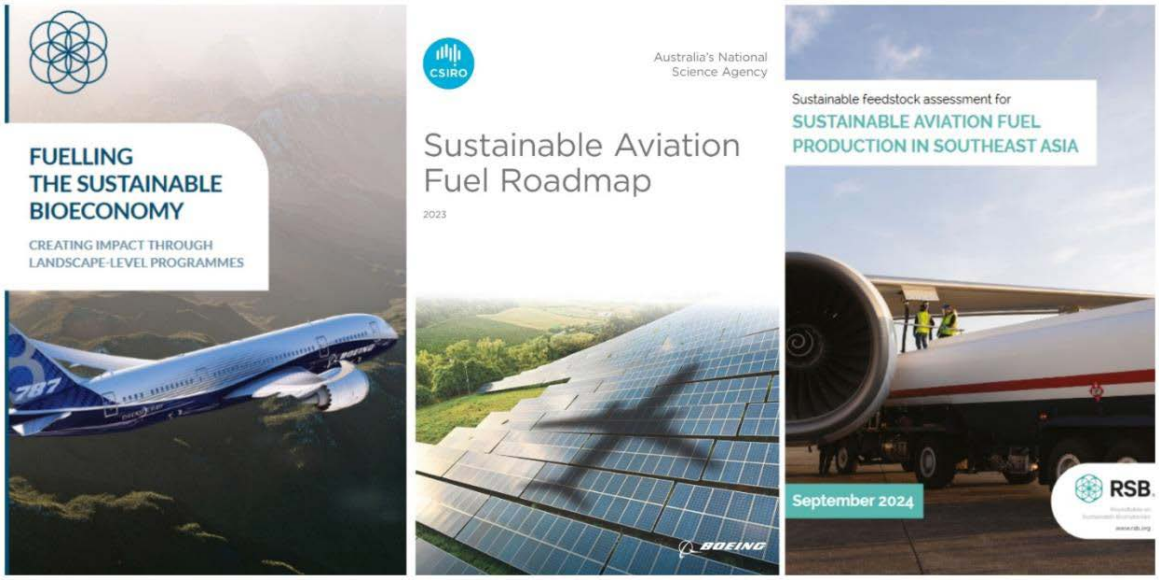
Ramping up roadmaps under ICAO's ACT-SAF initiative: experience from Boeing and partners

By Boeing



Boeing and partners are developing country-specific roadmaps that lay the foundation for scaling SAF

The International Civil Aviation Organization (ICAO) has been at the forefront of aviation decarbonization including its adoption of a long-term aspirational goal for international aviation to achieve net-zero emissions goal by 2050, as well as its aspiration to reduce carbon emissions by 5% for international aviation by 2030 using sustainable aviation fuels (SAF), Lower Carbon Aviation Fuel (LCAF) and other aviation cleaner energies.

Boeing supports ICAO's efforts and in 2023 the company joined the ICAO Assistance, Capacity-building and Training for Sustainable Aviation Fuels (ACT-SAF) initiative. ACT-SAF creates opportunities for countries to develop their full potential in SAF development and deployment.

In support of ICAO's initiative, Boeing has helped develop region-specific roadmaps and SAF feedstock analyses together with local partners to help scale SAF production locally to drive regional energy resilience and help meet demand globally. These roadmaps help to identify which feedstocks are the most cost-effective and politically and technically achievable in any country.

Boeing supported studies span the UK, Ireland, India, UAE, Australia & New Zealand, Brazil, South Africa, Ethiopia, Japan and a recently launched SAF feedstock assessment for Southeast Asia.

"These roadmaps inform three things," said Brian Moran, Chief Sustainability Officer at Boeing. "They inform policy, including incentives and other measures, such as revenue certainty mechanisms that de-risk investment in SAF facilities for producers. They inform technology, and which feedstock and production pathways are the most promising to scale up. And thirdly, they inform financing and opportunity for investors."

In the charts below, further fidelity on country and regional paths towards net zero is provided by the Boeing Cascade Climate Impact Model, a digital tool that quantifies the potential of commercial aviation's strategies to reduce carbon emissions.

Key takeaways from a few Boeing-sponsored SAF roadmaps:

Japan

- A SAF feedstock study in Japan[1], undertaken by strategic consultancy firm ICF and led by Boeing, Mitsubishi Heavy Industries and SMBC Aviation Capital, identified potential for Japan to produce up to 441 million gallons (1.67 billion liters) of SAF by 2030.
- Promising feedstocks include woody biomass, municipal solid waste and renewable electricity.
- Scaling up local production of SAF could allow Japan to nearly meet its 2030 goal of using 10% SAF for international flights.

Southeast Asia

- RSB's report on Southeast Asia[2] noted the region boasts significant potential to produce SAF due to its abundant bio-based feedstock resources such as agricultural residues, sugars, municipal waste and some energy crops.
- The region's bio-based feedstock capacity could produce 34.2 billion gallons (129.4 billion liters) of SAF annually by 2050, or about 12% of global SAF demand.
- 75% of the potential SAF feedstock can be sourced from post-consumer and agricultural waste.
- Making up 37% of total feedstock contribution, the most voluminous feedstocks are rice husks and straw.

Australia

- CSIRO's report on Australia[3] illustrates that through a combination of feedstocks and technologies, local feedstocks can meet a large and growing portion of Australia's jet fuel demand. Australia will have enough feedstocks to produce 60% of local jet fuel demand, growing to 90% by 2050, according to the forecast.
- In November 2024, Boeing and CSIRO published an update called the SAF State of Play[4]. The study found several projects are progressing towards SAF blending and production, including Boeing's investment into Wagner Sustainable Fuels[5] to build Australia's first blending facilities.
- Federal and State government action is driving policy development and de-risking investment, while Australia's finance sector is increasingly engaged in developing innovative funding approaches to scale SAF.

Brazil

- A RSB report on Brazil[6] determined huge potential in sugarcane bagasse and wood residues, particularly in the south-eastern part of the country.
- The main findings suggest the potential for SAF production from the mapped residues in Brazil is up to 2.4 billion gallons (9.08 billion liters), which is around 125% of the current fossil kerosene (Jet A) consumption in Brazil.

"Scaling SAF sustainably is not one size fits all, so these roadmaps are incredibly important to guide these investments," said Moran. "They unlock learnings as to where we should put precious resources while guiding governments on national priorities they can help advance."

1 https://www.icf.com/insights/aviation/saf-ecosystem-in-japan
2 https://rsb.org/wp-content/uploads/2024/09/rsb-sustainable-feedstock-assessment-saf-in-southeast-asia.pdf
3 https://www.csiro.au/safroadmap
4 https://www.boeing.com.au/content/dam/boeing/en-au/pdf/boeing-and-csiro-saf-state-of-play-report-2024.pdf
5 https://www.boeing.com.au/news/2024/boeing-invests-in-australian-sustainable-aviation-fuel-productio
6 https://rsb.org/programmes/projects/fuelling-the-sustainable-bioeconomy/

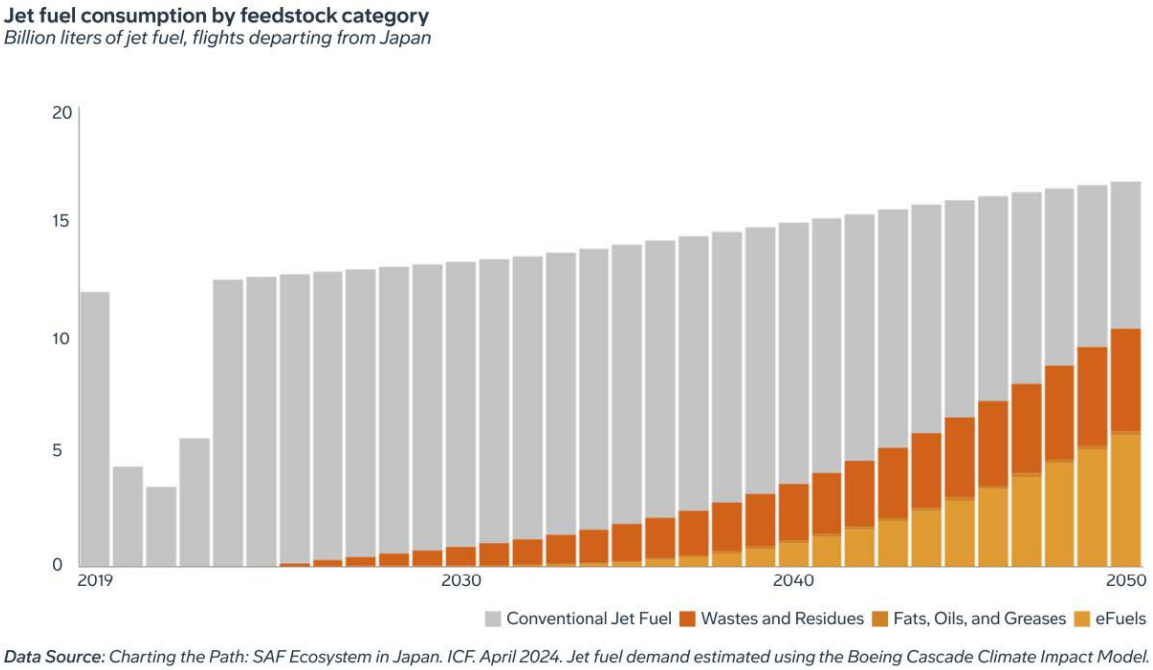


FIGURE 1: Boeing's Cascade digital tool examines the possible pathways to produce SAF in Japan and reduce the country's carbon emissions from aviation. (Boeing graphic)

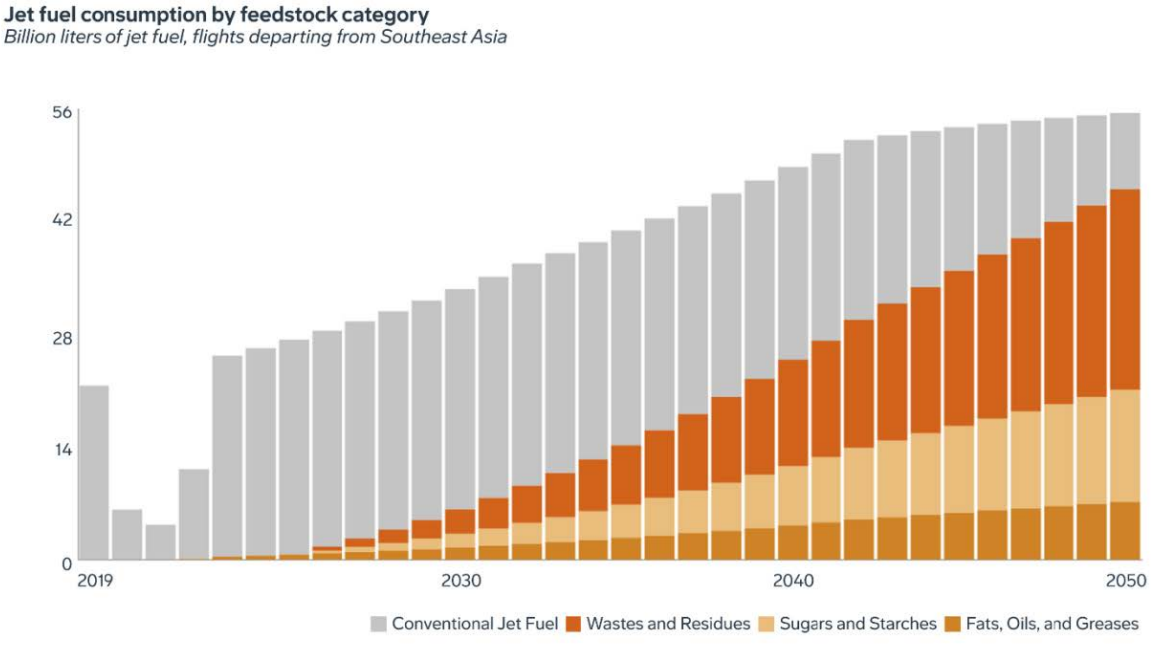
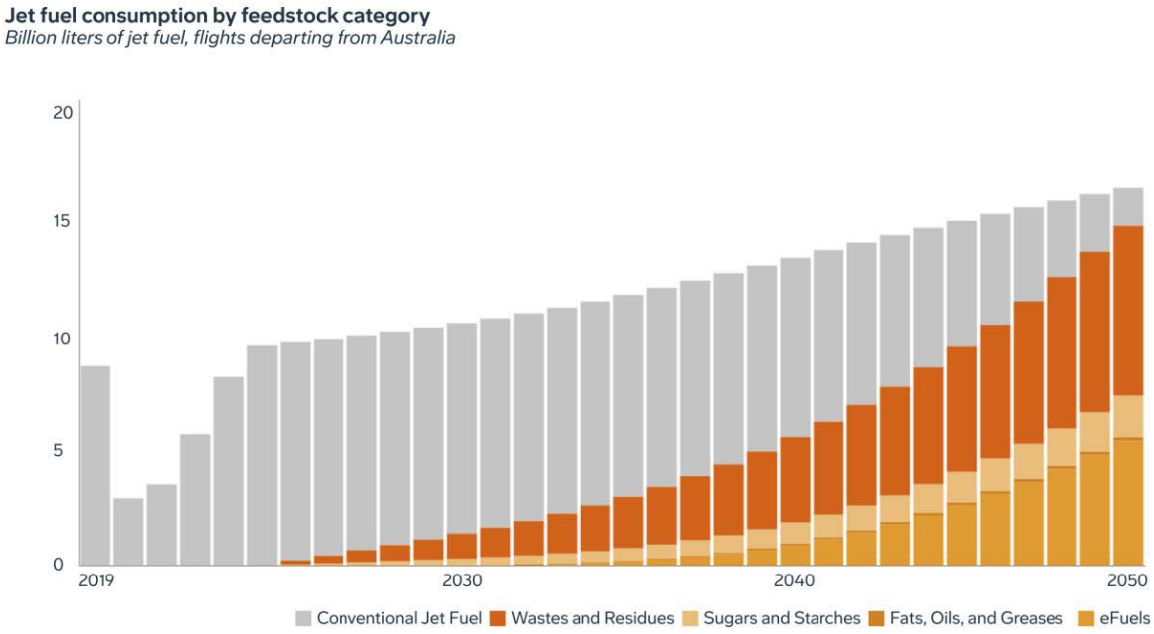
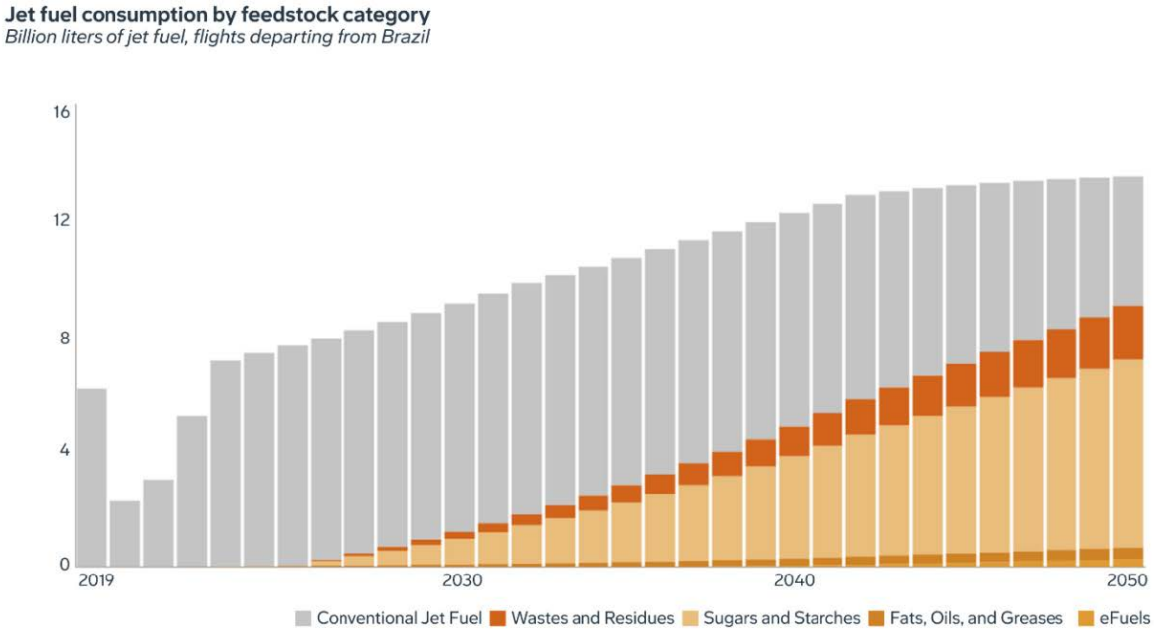


FIGURE 2: A chart from Cascade illustrates the pivotal role agricultural waste and residues could play in locally developed SAF in Southeast Asia. (Boeing graphic)



Data Source: Sustainable Aviation Fuel Opportunities for Australia. CSIRO. 2023. Jet fuel demand estimated using the Boeing Cascade Climate Impact Model.

FIGURE 3: A chart from Cascade outlines the opportunities to develop SAF from local feedstocks in Australia, which could produce 60% of local jet fuel demand today, growing to 90% by 2050, according to a CSIRO report. (Boeing graphic)



Data Source: Feedstock Availability for Sustainable Aviation Fuels in Brazil: Challenges and Opportunities. Roundtable on Sustainable Biomaterials (RSB). 2021. Jet fuel demand estimated using the Boeing Cascade Climate Impact Model.

FIGURE 4: A chart from Cascade outlines the various paths for local SAF production in Brazil, including the potential of sugarcane bagasse and wood residues. (Boeing graphic)