



# Scaling SAF Production Through Innovative Feedstocks



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## Understanding SAF and Feedstock Innovation

What is SAF?

Sustainable Aviation Fuel is a renewable substitute for petroleum-based jet fuel with the potential to reduce greenhouse gas emissions by up to 80% over its lifecycle. It plays a critical

role in the aviation industry's mission to achieve net-zero emissions by 2050, as highlighted during industry-focused gatherings like the World Sustainable Aviation Fuel Forum and other prominent [aviation conference](#).

What are Feedstocks?

Feedstocks serve as the essential raw materials for producing sustainable aviation fuel (SAF). Traditionally, these materials include cooking oils, animal fats, and agricultural residues. However, limited availability and competition for these resources have driven interest in exploring alternative options. Let's uncover how municipal waste, algae, and carbon capture can revolutionize the SAF landscape.

## 1. Fueling Aviation with Municipal Waste

Believe it or not, the trash we throw away daily could help power commercial flights sustainably. Advanced waste-to-energy (WtE) technologies transform non-recyclable waste into SAF, reducing landfill use and harmful methane emissions.

Case Study

British Airways and Velocys partnered on the Altalto Project, a UK initiative turning household trash into jet fuel. Set to produce SAF soon, this project shows how waste can fuel sustainability.

Key Benefits

- Reduces landfill waste
- Cuts greenhouse gas emissions
- Creates renewable fuel from common materials

## 2. Algae-Based SAF—A Green Revolution

Algae, often dismissed as pond scum, is emerging as a valuable SAF feedstock. These fast-growing microorganisms thrive on non-arable land and capture CO<sub>2</sub>, making them ideal for sustainable fuel production.

How It Works

Algae is processed to extract lipids, which are refined into SAF. Unlike crops like corn or soy, algae doesn't compete with food supply chains.

Case Study

Boeing and the U.S. Navy tested algae-based biofuels in commercial and military aircraft. The results showed excellent performance, proving algae's potential for large-scale SAF production.

Key Benefits

- Produces a higher yield per acre compared to conventional crops

- Low impact on land and water resources
- Captures carbon naturally during growth

### 3. Carbon Capture and SAF Production

One of the most advanced technologies in SAF production uses carbon dioxide (CO<sub>2</sub>) captured from the air or industrial emissions. This CO<sub>2</sub> is combined with hydrogen from renewable energy to create synthetic fuels.

#### How It Works

Power-to-Liquid (PtL) technology uses renewable electricity to split water, producing green hydrogen. Combined with CO<sub>2</sub>, this hydrogen creates synthetic hydrocarbons used as SAF.

#### Case Study

INERATEC, featured at the upcoming World Sustainable Aviation Fuel Forum, has developed PtL technology to produce e-kerosene—a 100% synthetic SAF that blends seamlessly with aviation fuel.

#### Key Benefits

- Captures CO<sub>2</sub>, cutting emissions
- Scalable with renewable energy
- Supports circular economy principles

### Key Challenges to Scaling SAF with Innovative Feedstocks

While the potential of these feedstocks is immense, significant barriers to large-scale adoption remain. These challenges include high production costs, limited infrastructure, and regulatory complexities. Collaborative efforts involving governments, private enterprises, and research organizations are essential to mitigating these obstacles.

#### Statistics Worth Noting:

- The International Air Transport Association (IATA) estimates that 450 billion liters of SAF will be needed annually by 2050 to achieve net-zero aviation emissions.
- Currently, SAF accounts for less than 0.1% of global aviation fuel consumption—a gap illustrating the need for immediate action.

### Frequently Asked Questions About SAF

What is the main advantage of SAF compared to traditional jet fuel?

SAF can reduce lifecycle greenhouse gas emissions by up to 80%, significantly cutting the aviation industry's carbon footprint.

## Are innovative feedstocks like algae and waste scalable?

Yes, but scalability depends on technological advancements and the development of efficient infrastructure and supply chains.

## How is the aviation industry supporting SAF development?

Industry initiatives like the World Sustainable Aviation Fuel Forum provide platforms for collaboration among stakeholders, from policymakers to private enterprises. Subsidies and investment in [SAF development](#) and innovation are also becoming more common.

## World Sustainable Aviation Fuel Forum

The [World Sustainable Aviation Fuel Forum](#) is a key [aviation conference](#) dedicated to advancing sustainable aviation fuel (SAF) development and adoption. Bringing together policymakers, industry leaders, and experts, this forum provides a vital platform for collaboration and knowledge exchange. With a focus on accelerating the transition to SAF and achieving net-zero aviation emissions, the event fosters meaningful discussions and drives actionable solutions. Through insightful presentations, panel discussions, and networking opportunities, the World Sustainable Aviation Fuel Forum plays a pivotal role in shaping the trajectory of SAF development and leading the aviation industry towards a more sustainable future.