

21 AUG, 2023

# FLYING TOWARDS A GREENER SKY



The Edge, Malaysia

**ESG**  
ENVIRONMENTAL . SOCIAL . GOVERNANCE

THE EDGE MALAYSIA | AUGUST 21, 2023

**08**  
VIEWS |  
**How to not practise sustainability**

**10**  
FINANCE |  
**SMEs must not be left out of the transition**

**11**  
ESG 101 |  
**Back to basics**

**FLYING TOWARDS A GREENER SKY**

Sustainable aviation fuel is touted as the solution to make the aviation sector, which currently contributes 2% of global energy-related carbon emissions, more environment friendly. Can Malaysia take advantage of this trend to become an SAF hub for the region? **PG6**

**UOB**



21 AUG, 2023

FLYING TOWARDS A GREENER SKY



The Edge, Malaysia

COVER STORY

# FLYING TOWARDS A GREENER SKY

BY RAVINYAA RAVIMALAR

**E**nvironment conscious travellers may feel guilty whenever they board a plane, once they are aware that the aviation sector accounts for 2% of global energy-related carbon dioxide emissions, according to the International Energy Agency in 2022.

The growth in emissions from this sector exceeded that of rail, road and shipping, and is bound to increase as travellers return in full force post-pandemic.

But the introduction and mainstreaming of sustainable aviation fuel (SAF) may change the trajectory of emissions for the sector and partially alleviate the guilt of travellers.

SAF is a type of biofuel that uses waste and renewable materials as feedstock. Unlike conventional jet fuel that is made of fossil fuels and releases significant carbon emissions and contributes to climate change, SAF offers a potential lifeline for the planet and a tangible pathway towards a more sustainable aviation industry.

Industry players are buying this vision, and global demand for SAF is soaring. According to S&P Global Commodity Insights, an annual supply of 17.5 billion gallons equivalent of SAF is needed for countries to meet their SAF 2050 blending targets. The majority of countries with such targets are European Union member states. Norway, Sweden and France, for instance, have SAF blending mandates in place.

In June, Malaysia Airlines operated its first passenger flight using SAF by Finnish energy company Neste Pte Ltd on flight MH603 from Kuala Lumpur to Singapore, which was refuelled at the Kuala Lumpur International Airport.

The Boeing 737-800 aircraft was fuelled by a blend of conventional jet fuel and Neste's SAF, which is produced from 100% renewable waste and residue raw materials, according to reports.

Neste, which is currently the world's largest SAF producer, supplied the SAF in collaboration with Petco Trading (UK) Ltd, which is Petrolim Nasional Bhd's (Petronas) marketing and trading arm based in Europe, while product handling and refuelling was carried out by Petronas Dagangan Bhd (PDB).

**AN OPPORTUNITY FOR MALAYSIA TO TAP**

Clearly, there is a demand for SAF. This also underscores an opportunity for countries like Malaysia that are rich in agriculture and organic waste, which can be used as feedstock for SAF. S&P Global estimates that SAF supply volumes stood at just over 200 million gallons in 2022, which means a 17.3% growth is needed by 2050.



Currently, in Malaysia, demand for SAF is still low due to the price [which] is three to five times higher than conventional jet fuel.

See, MAG



Around 449 billion litres of SAF is needed annually by 2050. SAF in the coming decades will need to grow far more than the existing global production capacity.

Jauhainen, Neste



Malaysia is one of the largest producers of oil palm. With the waste we have here, we can be the feedstock supplier for biofuels.

Vinesh, FatHopes



market to switch to SAF if competitors are not required to do the same. Without demand certainty, it is also difficult to progress necessary investments in SAF production capacity.

"However, the demand and supply of SAF will gradually increase after 2025 due to increasing demand from consumers, international regulatory requirements and country mandates," says See.

According to the World Economic Forum Sustainable Aviation Fuel Certificate Emissions Accounting and Reporting Guidelines in 2022, the cost of SAF is currently around two to five times higher than conventional jet fuel, and its usage constitutes less than 0.1% of total jet fuel demand.

It might take a while for investments in SAF to take off. But in view of the blending mandates for SAF, economies of scale could be achieved eventually.

"Asia-Pacific is the world's largest aviation market, playing a major and crucial role in the aviation industry's transformation towards the goal of net zero by 2050. A requirement of around 449 billion litres (360 million tonnes) of SAF is needed annually by 2050.

SAF in the coming decades will need to grow far more than the existing global production capacity," says Sami Jauhainen, acting executive vice-president and vice-president APAC for renewable aviation at Neste.

"In Asia, Japan is targeting 10% SAF use by 2030, and it is considering a blending mandate as a tool to achieve that. As for Singapore, the government aims to publish its blueprint for driving aviation decarbonisation in

Singapore is ahead of the game. In May, Neste opened its Singapore refinery, which can produce up to one million tonnes of SAF. It established an integrated SAF supply chain to the Singapore Changi Airport as well, which makes its products available to regional and international airlines.

Malaysia is also hoping to get a piece of the pie. Malaysia Aviation Group (MAG) inked a memorandum of understanding with PDB in May to make SAF production available in Malaysia on a commercial scale.

Part one of the recently released National Energy Transition Roadmap (NETR) states that a biofuel refinery will be developed in Pengerang, Johor, as a catalyst for creating hubs to produce bio-based products including SAF, hydrotreated vegetable oil, advanced sustainable fuel and biochemicals, championed by Petronas.

But the widespread adoption of SAF faces a chicken-and-egg situation, wherein both SAF producers and consumers are hesitant or financially unable to shoulder the initial costs required to scale up global production.

"Currently, in Malaysia, demand for SAF is still low due to the price. [The price of] SAF is three to five times higher than conventional jet fuel," says Philip See, group chief sustainability officer at MAG.

It is not easy for airlines operating in a competitive





21 AUG, 2023

# FLYING TOWARDS A GREENER SKY



The Edge, Malaysia

### SAF LIFE CYCLE

**Feedstock growth** (sustainable non-food crops, inedible byproducts, algae) use CO<sub>2</sub> to grow

**OR**

**Repurpose waste streams** (landfill, municipal waste, crop waste, forestry waste, food waste) avoid large amounts of methane gas or incineration

**Transport to Processing**

**Sorting and pre-processing** (municipal waste sorting includes removing recyclables)

**Refining to sustainable aviation fuel**

**Transport to storage**

**Storage and blending** (of SAF and fossil jet fuel)

**Transport and logistics**

**Delivery at airport**

**Flight**

CO<sub>2</sub> is shown as an input and output throughout the cycle.

### WHAT IS SAF?

Currently, a large share of aircraft operates on jet fuel, which is a refined kerosene-based, clear or straw-coloured liquid used to power turbine engines such as turboprop and jet engines. Jet A1 is typically the most used jet fuel worldwide that is suitable for international travel through varying climates.

Sustainable aviation fuel (SAF), meanwhile, is derived from non-conventional or non-fossil-fuel sources, which could be from biological or non-biological sources, according to the International Air Transport Association (IATA). The feedstock includes cooking oil, plant oils, municipal waste, waste gases and agricultural residues.

Philip See, group chief sustainability officer at Malaysia Aviation Group (MAG), believes that SAF has the potential to achieve performance and technical specifications equivalent to those of conventional kerosene-based jet fuel.

"SAF is formulated to serve as a seamless replacement for jet fuel, thereby enabling its utilisation in current aircraft engines without necessitating any alterations or adjustments to the existing infrastructure," he says.

According to a report by KPMG, various alternatives such as hydrogen or batteries have been explored as feasible alternatives to kerosene-based jet fuel. However, adopting these alternatives would necessitate a complete overhaul of aircraft design and refuelling infrastructure, making widespread implementation likely to occur only after 2050.

Meanwhile, SAF is readily accessible and can be utilised without requiring the development of new aircraft or engines.

The carbon footprint of SAF is also lower if the feedstock is sustainably produced. According to IATA, after performing an overall carbon dioxide life cycle emissions calculation, it found that SAF can reduce emissions by up to 80% in some cases. If the SAF is produced from municipal waste, the environmental gains will also come from reduction of methane, which is produced when waste is left to decompose in landfills.

This is why SAF is a key strategy for MAG's decarbonisation journey. The company aims to achieve net zero carbon emissions by 2050 by implementing a fuel efficiency programme that can improve operational efficiency and reduce fuel consumption. It is also working with various industry partners to ensure the supply of SAF across its network and to make SAF the cleaner and more viable energy option for its flights in the future.

MAG conducted 17 domestic and international passenger flights using SAF across the group's companies in 2022, reducing emissions by 66%, according to its sustainability report.

### CONTRIBUTION TO ACHIEVING NET ZERO

- 3% Infrastructure and operational efficiencies
- 19% Offsets and carbon capture
- 13% New technology, electric and hydrogen
- 65% Sustainable aviation fuel (SAF)

### AIRLINES AND LOGISTICS COMPANIES USING SAF

- Malaysia Airlines
- Firefly
- MASwings
- Air France-KLM
- Lufthansa
- Delta Airlines
- American Airlines
- Alaska Airlines
- British Airways
- Finnair
- Japan Airlines
- Qatar Airways
- Cargo carriers such as Deutsche Post-DHL, Amazon Prime Air and United Parcel Service (UPS)

It is crucial to raise awareness of SAF through capacity building for internal and external stakeholders, See stresses.

MAG actively engages with governments and international organisations to advocate for policies and incentives that support SAF adoption. The company also urges collaboration for supply chain development with fuel producers, suppliers and governments to develop the necessary infrastructure and feedstock supply to support SAF production and distribution.

### WHAT CAN MALAYSIA DO?

Malaysia has been attempting to put its organic waste from the agriculture industry to good use through various policies, whether for electricity generation or product manufacturing. Could the boom in SAF be another avenue?

"We realise that there are many other companies around the world that have invested heavily in building SAF plants, but most don't have access to feedstock. Malaysia, however, is one of the largest producers of oil palm. With the waste we have here, we can be the feedstock supplier for biofuels," says Vinesh Sinha, CEO and founder of FatHopes Energy Sdn Bhd. The company has been promoting the local biofuel industry since 2013.

It primarily focuses on the collection and purification of used cooking oil (UCO) from houses and fast-food chains like McDonald's. The UCO is then processed at FatHopes' depots across Southeast Asia and subsequently exported to European countries, where it is utilised as an ingredient to produce renewable diesel.

Vinesh believes that Malaysia should focus on strengthening the infrastructure for the collection of feedstock for biofuels production. UCO, in his view, is a viable and sustainable feedstock for SAF.

"There are a few potential [types of feedstock for biofuels] on the cusp of commercialisation. For instance, algae is the most popular biofuel feedstock that is spoken about widely. But it has issues. First, algae do have a relatively high oil content. However, the extraction of oil from algae is fossil fuel reliant. It uses a chemical called hexene, which is expensive," he continues.

"It's extremely flammable and dangerous as a resultant flame is invisible to the naked eye. And hexene is produced only in the oil and gas industry. For the biofuel industry to rely on algae, you need the algae industry to rely on the fossil fuel industry, which defeats the purpose of being sustainable."

Vinesh adds: "Other than the burgeoning agriculture and livestock waste, I still firmly believe post-consumer waste, which is UCO, can be aggregated at industrial scale for biofuels production."

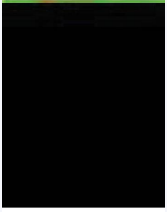
Regardless, for Malaysia to become a hub that can provide, store and produce SAF, government policies

An oil collector from FatHopes transferring UCO from a tank to the company's depot (far left); and Malaysia Airlines planes being refuelled with SAF at Kuala Lumpur International Airport

2023, potentially also including proposals on policy frameworks to support SAF use," he says.

Neste expects global SAF demand to reach 15 million tonnes by 2030, primarily due to policy frameworks such as blending mandates. Voluntary demand from airlines and corporations with air travel and freight activities could play an important role.

Nevertheless, "while it has the potential to flourish, airlines in Asia-Pacific are still lagging behind their European and North American peers in terms of SAF usage, and most governments in the region have yet to put in place firm policies to actively support the use of SAF", says Jauhiaiainen.



21 AUG, 2023

## FLYING TOWARDS A GREENER SKY

The Edge, Malaysia



Page 4 of 4

### SUMMARIES

Sustainable aviation fuel is touted as the solution to make the aviation sector, which currently contributes 2% of global energy-related carbon emissions, more environment friendly.