

Joint Report

Achieving a Carbon Neutral Future in Aviation by 2050



2030 Ambition Statement

On September 22, 2021, ANA Holdings, Inc. and Japan Airlines Co., Ltd. joined the World Economic Forum's Clean Skies for Tomorrow Coalition, an initiative which promotes the use of sustainable aviation fuels (SAF). The companies also co-signed the 2030 Ambition Statement, which aims to increase the use of SAF in the global aviation industry to 10% of total volume by 2030.

We recognize that addressing the climate challenge requires a concerted, global effort by all sectors, including the airline industry. For aviation demand to recover after the global pandemic and play a role in supporting economic growth while putting the industry on a path to achieve net zero CO₂ emissions in 2050, it is necessary to greatly accelerate the development, production, distribution, and use of SAF through cooperation among the industries involved in aviation transportation.

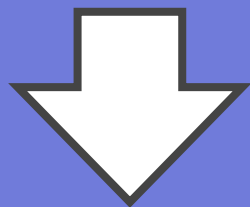
[2030 Ambition Statement](#): 2030 Ambition Statement: Companies that have signed this statement include global airline groups, airports, fuel suppliers and other industry stakeholders, while ANA Holdings and Japan Airlines are the only Japanese companies (as of October 2021).

What is Sustainable Aviation Fuel?

- ✈ Throughout its lifecycle, sustainable aviation fuel (SAF) reduces CO₂ emissions by approximately 80% compared to conventional fuels, from its production (using raw materials such as biomass, cooking oil waste and exhaust gases), to its combustion. In addition, SAF is also compatible with existing fueling infrastructure without modification.
- ✈ SAF is an essential alternative fuel for achieving net zero CO₂ emissions in the aviation industry, a recognized challenge to this sector, but the current global production level of SAF is only 0.03% compared to demand, and mass production is urgently needed to make widespread use more viable.
- ✈ To achieve global adoption of SAF by 2050, we need to accelerate the development, production, and use of SAF through cooperation among all industries involved in air transportation. Achieving SAF use of at least 10% by 2030 is a key milestone in the path to full adoption by 2050.

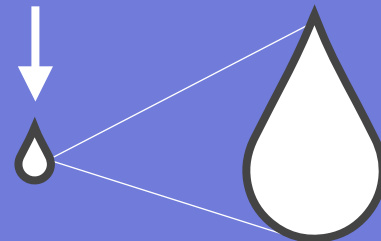
CO₂ Reduction with SAF

80%



Demand/Supply Gap in SAF

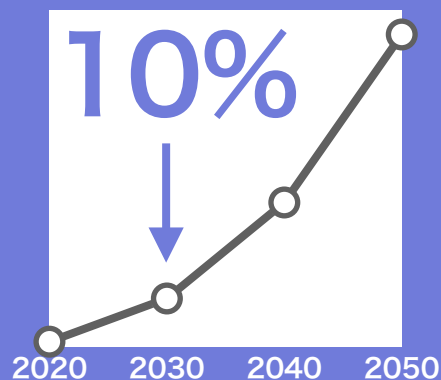
0.03%



Need for Cooperation among Sectors



Milestone for SAF Promotion

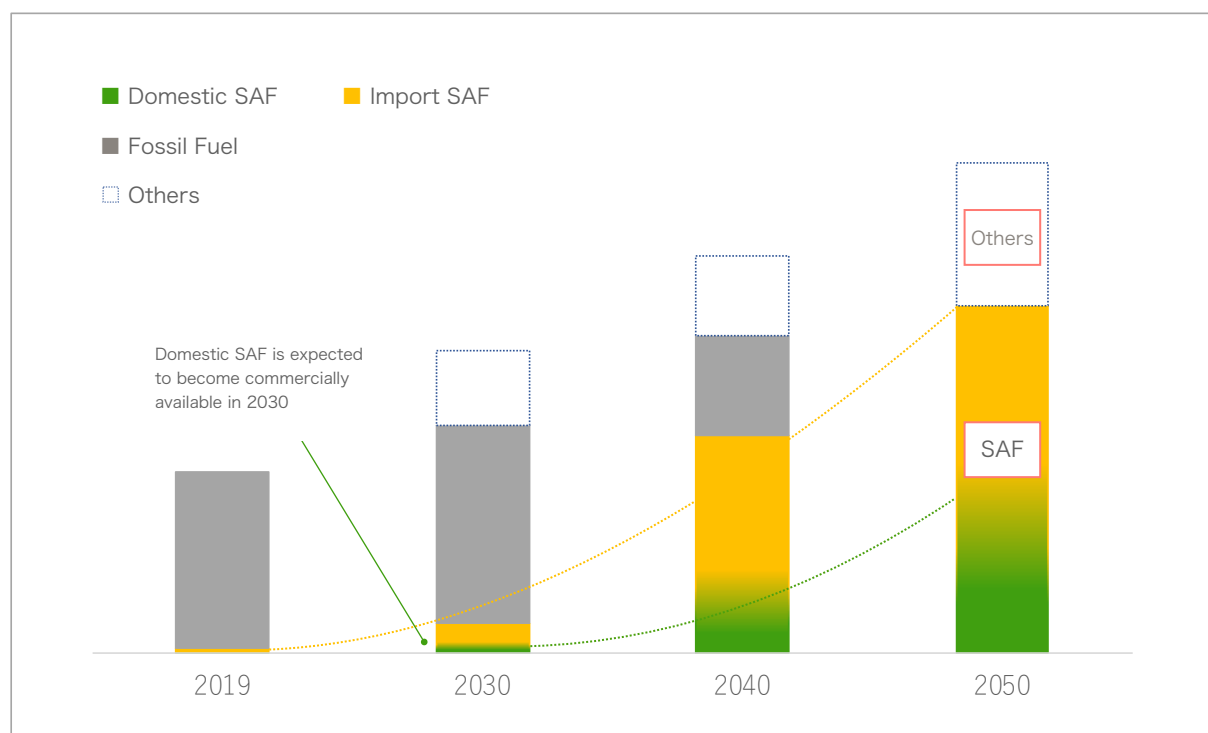


SAFs are essential for medium and large aircraft

To achieve net zero CO₂ emissions from aircraft operations by 2050, both companies are working to reduce the amount of fuel used by upgrading to more fuel-efficient aircraft while also exploring new operation methods. Aircraft manufacturers have also started to develop electric and hydrogen aircraft, and both airlines are active participants in government projects working to accelerate the introduction of these new technologies. However because liquid jet fuel is still required for medium and large aircraft the mass production and widespread use of liquid jet fuel with low environmental impact (such as SAF) is essential to achieve net zero CO₂ emissions from aircraft by 2050.

In 2050, the maximum amount of SAF required in Japan will be roughly 23 million KL

The two airlines have estimated that the maximum amount of SAF required for Japan to achieve net zero CO₂ emissions by 2050 would be approximately 23 million KL. This estimate is based on the growth rate forecast of the air transportation business by international organizations as well as the amount of SAF required for domestic and international flights by Japanese airlines and for foreign airlines operating out of Japanese airports in 2050.

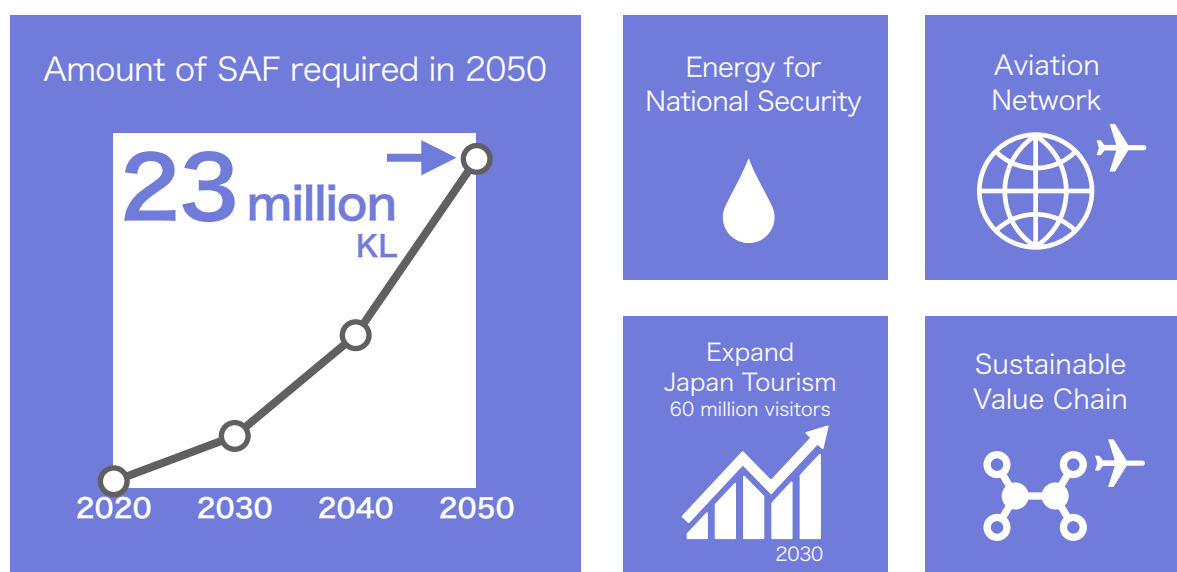


*1 Base calculations for the estimates:

- 1) The total amount of fuel required in Japan is estimated based on the air transportation demand forecast for 2050 by ATAG waypoint 2050 2nd edition.
- 2) The CO₂ emission reduction level of 71% in 2050 using SAF is calculated based on the ATAG waypoint 2050 2nd edition Scenario 2 / F3.
- 3) The CO₂ reduction rate in the life cycle of SAF in 2050 is estimated to be 90%. Assuming 100% reduction rate, this would amount to about 21 million KL.

In Japan, there has been strong government support for the development and production of SAF, notably including the use of Japan's Green Innovation Fund. However, domestic SAF production has not yet become commercialized. Currently, it is necessary to make use of existing supply chains that are dependent on imported SAFs, which are more costly.

After domestic SAF is expected to become commercially available in 2030, it will be important to implement policies that increase self-sufficiency from an energy security policy perspective, instead of simply relying on imports from Europe, the United States and China. If Japan's airports can achieve a stable supply of domestically produced SAF at internationally competitive prices, the international airports in Japan will become more competitive which will lead to the establishment of a stable international aviation network based in Japan. Both airlines are committed to contributing to the government's goal of expanding tourism to welcome 60 million visitors to Japan by 2030 and to providing a sustainable value chain for Japanese industry as a whole., The airlines share a sense of urgency with the key stakeholders involved in air transportation and will work diligently to resolve various issues related to the procurement of raw materials, manufacturing, quality control, distribution and use of domestic SAF.



^{*2} Prospects for the Mass Production of SAF in Japan

The “Green Growth Strategy through Achieving Carbon Neutrality in 2050” outlines Japan’s policies to establish a low-cost and stable SAF production and supply system at domestic airports in 2030.

^{*3} Provision of a Sustainable Value Chain

This refers to the reduction of greenhouse gas emissions from employee business travel by air, air transportation and delivery of raw materials and products, as classified by the Scope 3 standards issued by the GHG Protocol in 2011, by upgrading to fuel-efficient aircraft, new operation methods and using SAF.

Greening Japan's industry and leaving a legacy for the next generation

On August 9, 2021, the Intergovernmental Panel on Climate Change (IPCC) reported that human activities have caused the atmosphere, oceans, and land to warm due to emissions of CO₂ and other greenhouse gases, and that the future rise in global temperature must be limited to 1.5°C in the future.

Air transport has long connected the world, helping to facilitate personal connection, cultural exchange and international trade. Achieving a stable supply of SAF (which directly contributes to CO₂ reduction) and the establishment of internationally competitive prices are effective solutions to achieving net zero CO₂ emissions from aircraft operations.

If Japan can act as a role model by achieving viable local production and local consumption of SAF, its impact will be felt across Asia and it will contribute to reduced

CO₂ emissions from the air transportation value chain throughout the Asian region. When emissions are lowered to target levels it will lead to the greening of the entire industrial structure, creating a virtuous cycle between the economy and the environment that is supported by imports and exports. To achieve this goal, Japanese airlines need and call for government support for infrastructure investment in the development, mass production and spread of SAF technology, as well as the cooperation of all industrial sectors involved in air transportation.

Compared to the United States and Europe – which are leading the way in the production and commercialization of SAF – the technological development, mass production and diffusion of SAFs in Asia is still in its developing stages.

ANA and JAL have decided to take prompt and concrete actions to ensure sustainable air transportation and a prosperous planet for future generations. As an important component of the social infrastructure that connects Japan to the rest of the world, we will work with the government and other related parties to promote SAF and we will also cooperate in promoting other environmental measures.

Greening the entire industrial structure



*⁴ SAF market in the Asian region: approximately 22 trillion yen

Based on ATAG waypoint 2050 2nd edition scenario 2 / F3, the global supply of SAF in 2050 is assumed to be 445Mt (555 billion liters), with aviation demand in Asia accounting for approximately 40%. The unit price of SAF is estimated at 100 yen per liter, and this is based on the assumption that the unit price will be 100 yen per liter by 2030, as indicated in the “Green Growth Strategy through Achieving Carbon Neutrality in 2050,” and that mass production will be further advanced by 2050 and economies of scale will come into effect.