

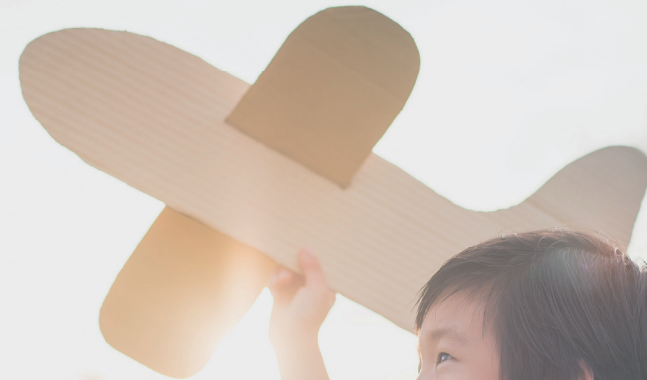
Clean the Earth with SAF



Environment  
×  
Aviation = **SAF**

SAF stands for Sustainable Aviation Fuel. SAF can be made from readily familiar materials.

Compared to conventional jet fuel, SAF can reduce carbon dioxide emissions by approximately 60% to 80%.



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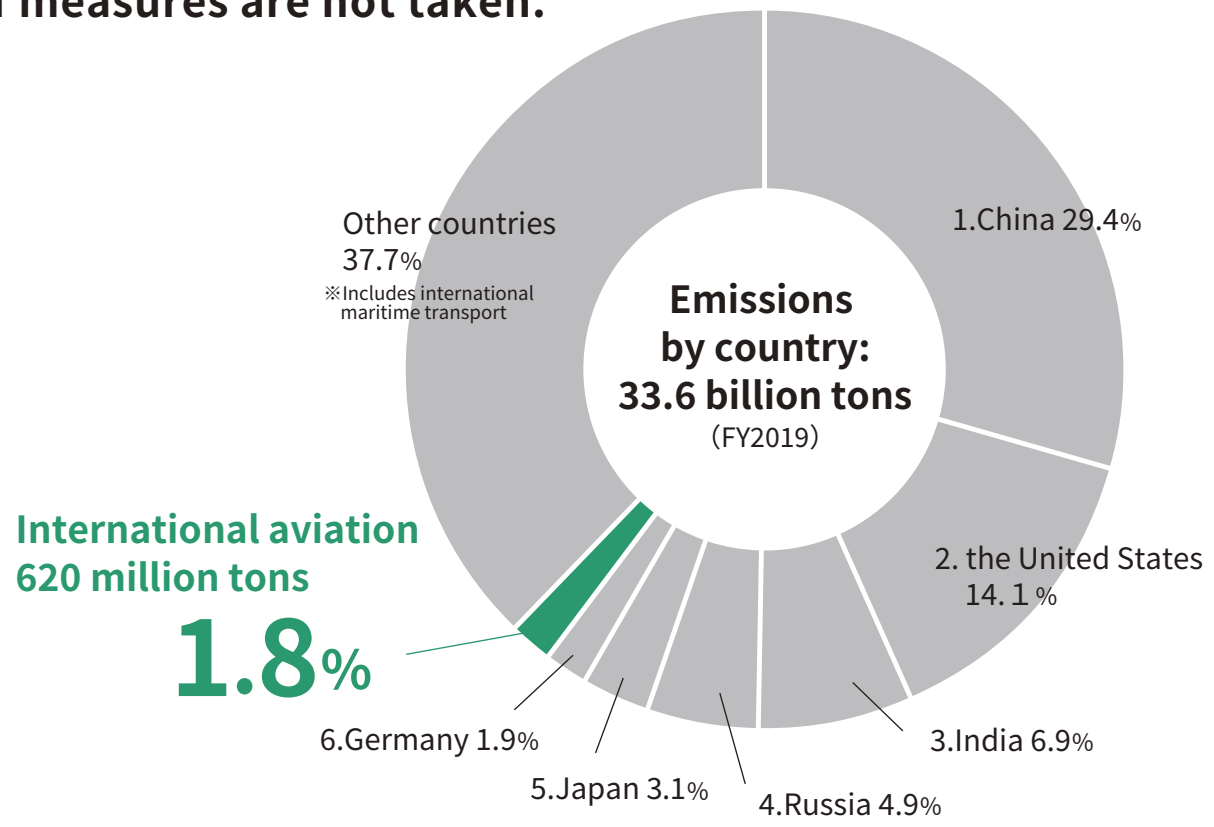
## Initiatives to promote the introduction of SAF in Japan

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# CO2 emissions in the international aviation sector

**CO2 emissions in the international aviation sector account for approximately 1.8% of the world total. Due to increasing global demand for aviation, this number is expected to continue to grow if measures are not taken.**



	Emissions (100 million tons of CO <sub>2</sub> )	Percentage
1. China	98.8	29.4%
2. the United States	47.4	14.1%
3. India	23.1	6.9%
4. Russia	16.4	4.9%
5. Japan	10.6	3.1%
International maritime transport	6.8	2.0%
6. Germany	6.4	1.9%
<b>International aviation</b>	<b>6.2</b>	<b>1.8%</b>
7. South Korea	5.9	1.7%
8. Iran	5.8	1.7%
9. Indonesia	5.8	1.7%
10. Canada	5.7	1.7%
Others	97.2	28.9%
<b>Total</b>	<b>336.2</b>	<b>100.0%</b>

Source: Created from "Green House Gas emissions from fuel combustion" (2021) by IEA



# Goals for the international aviation sector

## 2021-2035

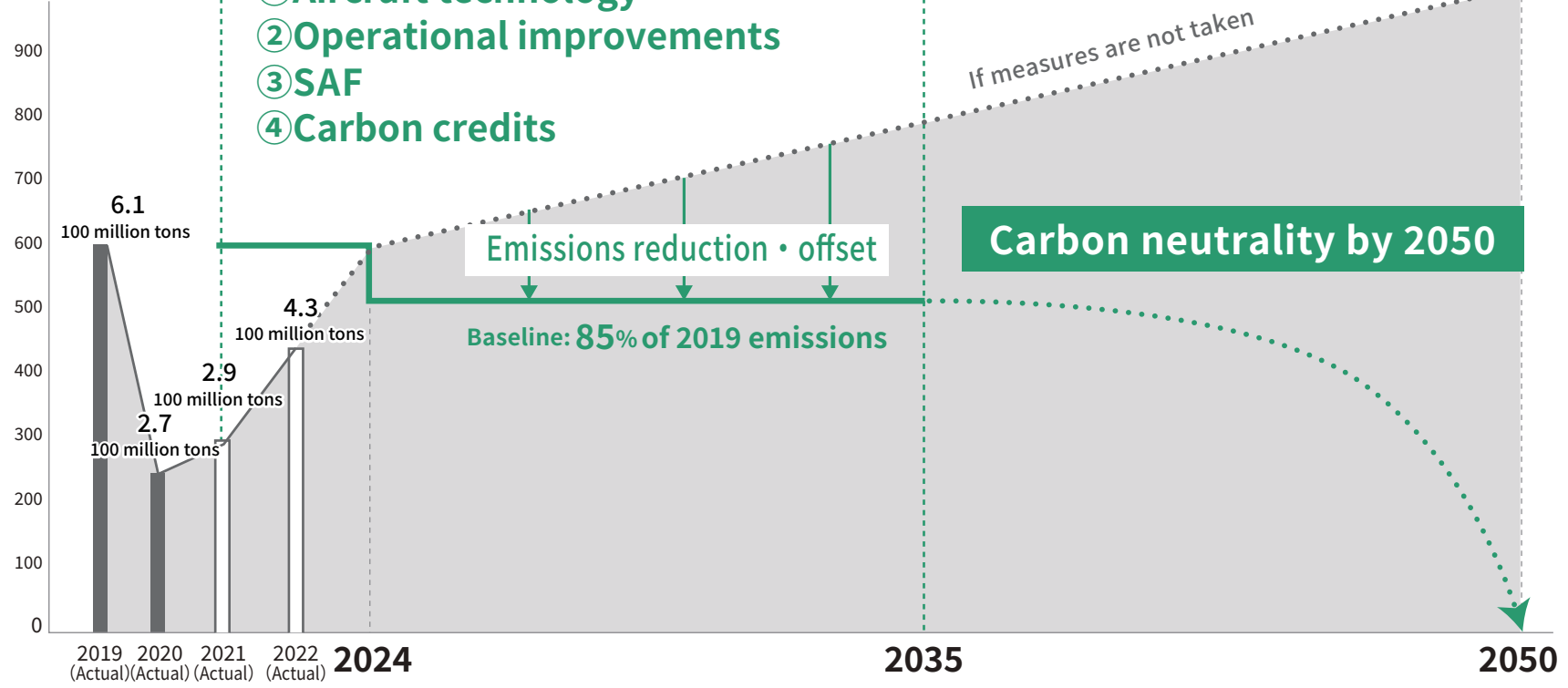
The goal

### Achieving carbon neutral growth from 2020

Measures (CORSIA)

- ① Aircraft technology
- ② Operational improvements
- ③ SAF
- ④ Carbon credits

CO<sub>2</sub> emissions from all international aviation (million tons)



If measures are not taken

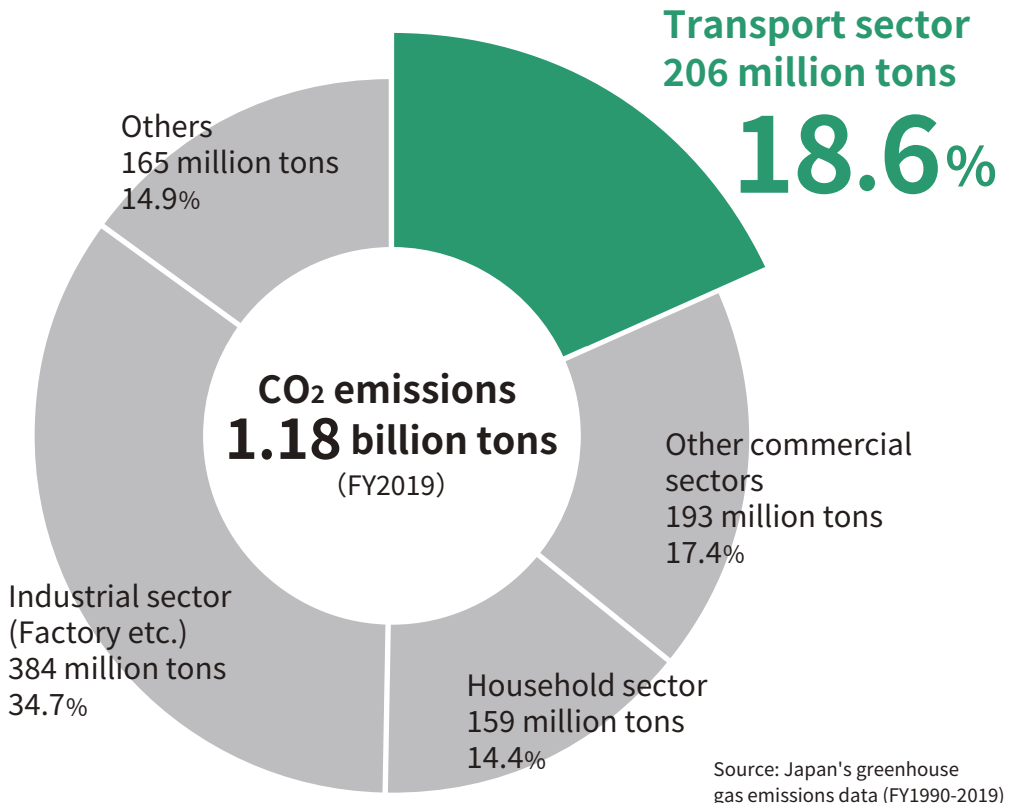
Carbon neutrality by 2050

Emissions reduction • offset

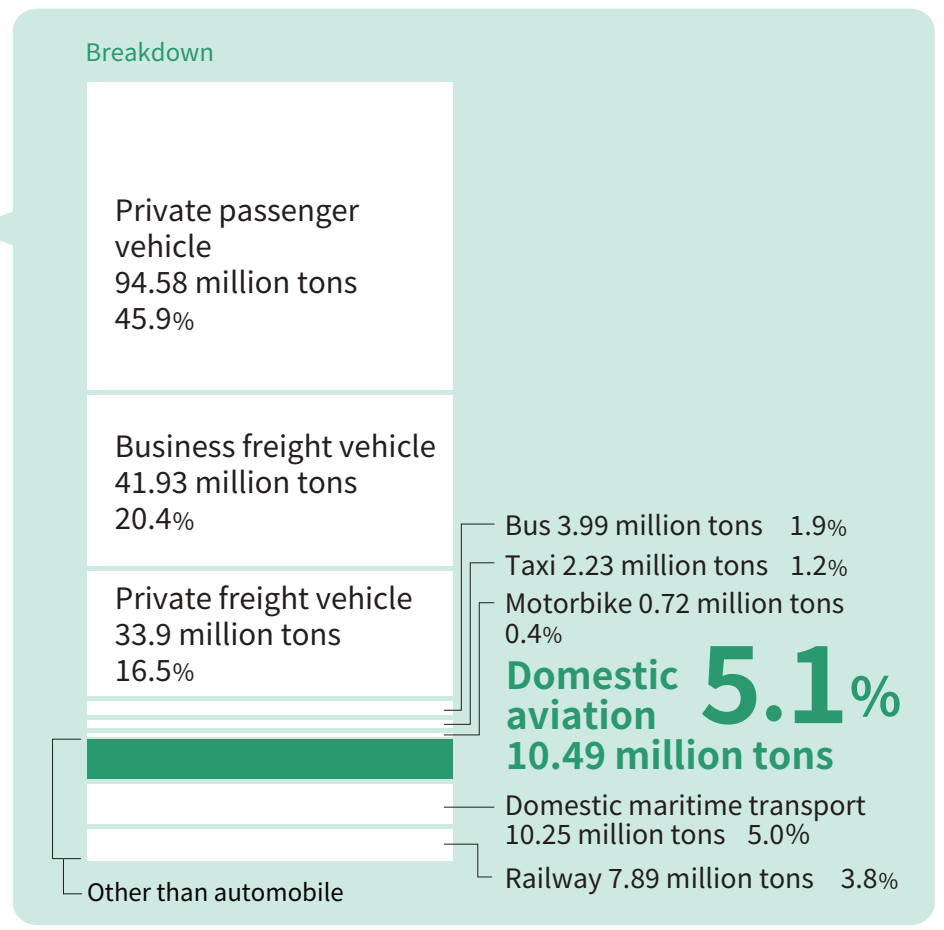
Baseline: 85% of 2019 emissions

# CO2 emissions in the domestic aviation sector

The transport sector accounts for **18.6%** of CO2 emissions in Japan. Domestic aviation accounts for **5.1%** of this transport sector.



Source: Japan's greenhouse gas emissions data (FY1990-2019)

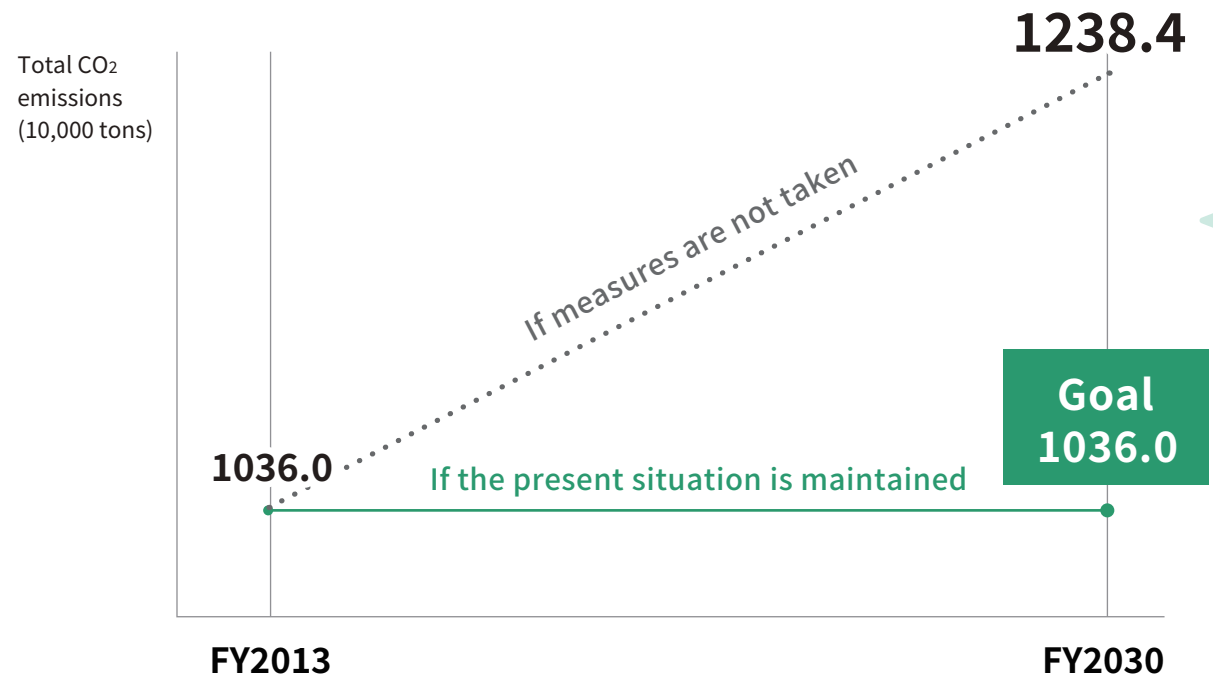


# Goals for the domestic aviation sector

## Goal for FY2030: Limiting or reducing the total CO<sub>2</sub> emissions in FY2013.

CO<sub>2</sub> emissions per unit transport volume (kg-CO<sub>2</sub>/ton-kilometer):  
Intensity: 1.3977 (FY2013) → Intensity: 1.1693 (FY2030)

CO<sub>2</sub> emissions = intensity x transport volume



Compared to the case without any measures, the difference is **-2.024 million tons.**

# Institutional framework

Promote decarbonization in the aviation sector  
Institutional framework for promoting aviation decarbonization



# Points of the Basic Policy for Promoting Aviation Decarbonization (1 December 2022 the Notification of Ministry of Land, Infrastructure, Transport and Tourism)

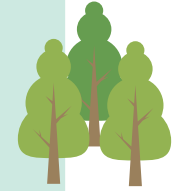
## 1 Significance and goals of promoting aviation decarbonization

### 2030

- International aviation** Limit on total emissions increase after 2020
- Domestic aviation** Reduce CO<sub>2</sub> emissions per unit transport volume by 16% compared to FY2013
- Airports** Reduce greenhouse gas emissions at each airport by more than 46% compared to FY 2013  
Furthermore, we aim to achieve carbon neutrality throughout the airport

### 2050

- International aviation**
  - Domestic aviation**
  - Airports** Promote the use of new technologies and increase credit creation and utilization
- Carbon neutral



## 2 Basic policies on measures to be implemented by the government

- Promote SAF introduction**
- Improve flight operations through more sophisticated air traffic control, etc.**
- Introduce new environmental technologies into aircraft**
- Promote energy saving of airport facilities and vehicles**
- Promote conversion of airports into renewable energy hubs, etc.**
- Promote understanding of initiatives to decarbonize aviation among aircraft and airport users, etc.**

## 3 Basic matters regarding measures to be taken by related parties

- Airlines**  
Promote active use of SAF, consider flight operation improvement measures, introduce fuel-efficient aircraft and equipments with new environmental technologies, promote understanding of initiatives for aircraft and airport users, etc.
- Airport managers, airport-related businesses, etc.**  
Energy of airport facilities and vehicles, conversion of airports into renewable energy hubs, etc., utilize the Airport Decarbonization Promotion Council, collaborate with local communities, promote understanding of initiatives among aircraft and airport users, etc.
- Other related parties**  
Businesses involved in SAF feedstock procurement / Fuel producers and suppliers / New technology development businesses, universities and research institutes / Businesses with energy saving and renewable energy technologies, etc. / Local governments near airports / Aircraft and airport users





# Certification status of the Decarbonization Promotion Plans

## ANA Group

Certification date: 24 January 2024

ALL NIPPON AIRWAYS CO., LTD. /  
Air Japan Co., Ltd. / ANA WINGS CO., LTD /  
Peach Aviation Limited

## JAL Group

Certification date: 24 January 2024

Japan Airlines Co., Ltd. / J-Air Co., Ltd. / JAPAN AIR COMMUTER CO.,LTD. /  
Hokkaido Air System Co., LTD. / Japan Transocean Air Co., Ltd. /  
RYUKYU AIR COMMUTER CO.,LTD. / ZIPAIR Tokyo / SPRING JAPAN Co., Ltd.

### 1 Use of SAF

- Replace more than 10% of fuel consumption with SAF
- Estimated SAF use in FY2030: Approximately one million KL

※Assuming internationally competitive prices.  
Varies depending on transport volume.

#### Other initiatives

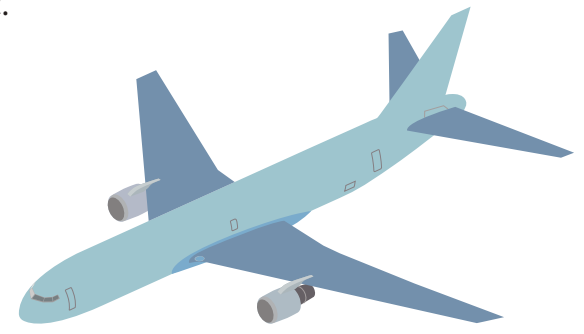
- ACT FOR SKY, cooperation by public-private councils, etc.
- Issuance of green bonds
- Ensuring safety through compliance with Civil Aeronautics Act, etc.

### 2 Improve flight operations

- Select optimal route / speed
- Reduce payload weight
- Early accelerated ascension
- One side engine stop during taxiing, etc.

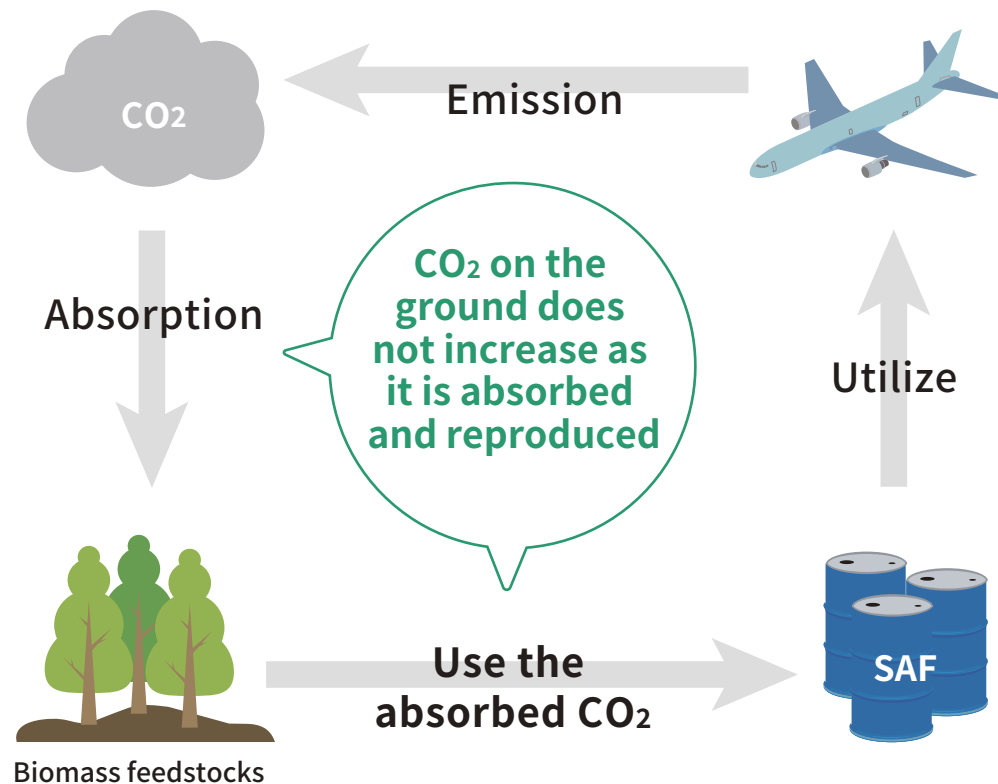
### 3 Introduce new environmental technologies into aircraft

- Introduce fuel-efficient aircraft
- Initiatives related to the study toward introduction of electrification of aircraft and hydrogen aircraft, etc.
- Contribute to public-private consultations for international standardization of new environmental technologies, etc.



## What is SAF?

**Sustainable Aviation Fuel, so-called "SAF".**  
**Compared to conventional jet fuel CO<sub>2</sub> emissions are reduced by approximately 60% to 80%.**



**There are 21 types of feedstocks registered with ICAO\*.**  
**There are 69 combinations of feedstocks, places of origin, and production methods.**

※A specialized agency of the United Nations responsible for establishing international standards and legal frameworks, etc. for international civil aviation

e.g.,) Municipal solid waste, waste cooking oil, tallow, sugarcane, corn oil, etc.



waste cooking oil



sugarcane

## SAF standards

- Safety standards**  
**To be used as jet fuel, it must meet **ASTM**<sup>※1</sup> standards,<sup>※2</sup> etc.**

※1 Standards developed and published by ASTM International, the world's largest standards organization. Developed standards for 130 fields such as energy and environment.

※2 Fuel must be specified by the aircraft manufacturer.

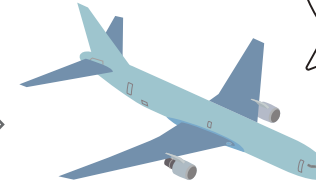
- Environmental standards**  
**By being registered and certified as a **CORSIA**<sup>※</sup> eligible fuel, **CO<sub>2</sub> reduction benefit is recognized.****

※A system that stipulates offsetting mechanisms (use of SAF and credits), etc. in order to achieve ICAO goals. Adopted at the 2016 ICAO General Assembly.



**ASTM  
standards,  
etc.<sup>※2</sup>**

**CORSIA  
eligible fuel  
registration**



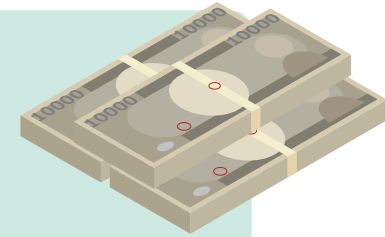
Available as  
an effective  
SAF!



## SAF Challenges

1

### High production cost



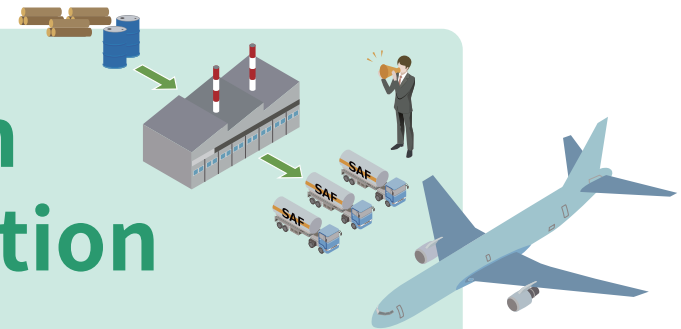
2

### Secure sufficient feedstocks



3

### Supply expansion and stable utilization



# SAF Public-Private Council

## Public-private Council to promote SAF introduction

### Members

#### Airlines

All Nippon Airways / Japan Airlines /  
The Scheduled Airlines Association of Japan /  
the Board of Airline Representatives (Observer)



#### Oil wholesalers, etc.

ENEOS Corporation / Idemitsu Kosan Co.,Ltd. /  
COSMO ENERGY HOLDINGS CO., LTD. /  
Fuji Oil Company, Ltd. / Taiyo Oil Company, Limited /  
JGC HOLDINGS CORPORATION / Petroleum Association of Japan



#### Trading companies

Mitsubishi Corporation / MITSUI & CO., LTD. /  
ITOCHU Corporation / Sojitz Corporation



#### Airport companies, etc.

NARITA INTERNATIONAL AIRPORT CORPORATION / Central Japan  
International Airport Co.,Ltd. / NEW KANSAI INTERNATIONAL AIRPORT  
COMPANY,LTD / SAN-AI OBBLI CO., LTD. / Kansai Airports / “Zenkoku  
Kuko Kyuyu Jigyō” Kyokai



#### Joint coordinator

JCAB, Ministry of Land,  
Infrastructure, Transport  
and Tourism



Agency for Natural  
Resources and Energy



New Energy and Industrial Technology  
Development Organization (Observer)



Ministry of Agriculture,  
Forestry and Fisheries



Ministry of the Environment





## Regulations and support

# Establish a system to ensure a stable supply of internationally competitive SAF.



### Regulations

#### Suppliers

Establish SAF supply target amount based on the “Sophisticated Methods of Energy Supply Structures” (planned)

#### Airlines

Set SAF utilization target amount in the basic policy for promoting aviation decarbonization  
**2030 fuel consumption: 10% replacement**



### Support

SAF production • supply chain development support  
**Total amount for 5 years: about 340 billion yen**

Strategic areas domestic production promotion tax system  
**Up to 40% corporate tax deduction (10 years)**  
**Tax deduction amount 30 yen/liter**



# Support for registration and certification of CORSIA eligible Fuel

We are working on **registration and certification of domestic SAF** and are developing the knowledge gained into **guidelines**.

## Initiative

### 1 Support for Pilot Project Participants

Continue to support the expansion of registering new SAF feedstocks.

#### Pilot project operators

Idemitsu Kosan / ENEOS / JGC Holdings • Cosmo Oil / Green Power Development Corporation of Japan / Biomaterial in Tokyo • Sanyu / Revo International / Nippon Paper Industries • GEI • Sumitomo Corporation / Sekisui BR

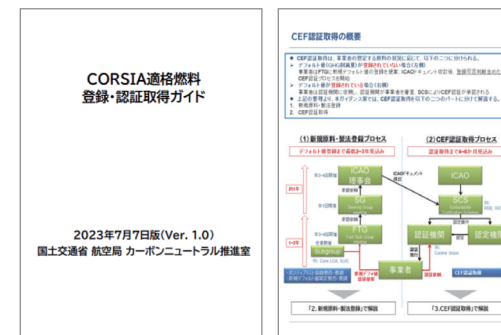


## Initiative

### 2 CORSIA Eligible Fuel registration and certification guidelines

Published in FY2023.

To be revised continuously according to the progress of the initiative.



Scan here for details on the guidelines (Note: QR code destination is in Japanese)



## Visualization of CO<sub>2</sub> emissions reduction by SAF

**Corporate Scope 3 CO<sub>2</sub> emissions reduction.**  
**Create standards and build momentum for carbon insets.**

A system that enables airline users to track how much they have contributed to CO<sub>2</sub> emissions reduction through the use of SAF.



### Initiative

## 1 How to calculate CO<sub>2</sub> emissions and reductions

We will investigate methods of calculating CO<sub>2</sub> emissions and allocating them between cargo and passengers in other countries and industries and consider a system that can visualize the use of SAF.

### Initiative

## 2 Fraud prevention, third party authentication systems

Examine the requirements for a third-party authentication system to establish a system that prevents fraudulent activities such as double counting.

# Public relations activities to increase awareness of SAF

## 1 “Carbon Neutral Sky” Symposium



Held from FY2022.  
We aim to raise awareness of SAF through lectures and panel discussions.



## 2 Disseminate information via the web “Sora Kabo☆ Portal”



Civil Aviation Bureau's web portal on aviation decarbonization.



## 3 Disseminate information through video “Sora Kabo☆ Channel”



Civil Aviation Bureau's YouTube channel on aviation decarbonization.



## 4 Disseminate information through various events and media

### Main events

February 2024 Tokyo Big Sight  
Lectures at the 18th Renewable Energy World Exhibition & Forum

January 2024  
Lectures at Web Forum

### Broadcast on major TV/web, etc.

November 2023  
Asahi Shimbun: Podcast “What is SAF”  
(introducing domestic and international initiatives)

March 2023  
TV Tokyo: TV Tokyo BIZ “Initiatives to promote the introduction of SAF” (TV appearance)

February 2023  
NHK: Close-up Gendai  
“Flying in the sky with tempura oil!? Chase! The battle for the “Dream fuel” , etc.