ICAO ENVIRONMENT

ACT-SAF #4 SERIES

Policies for SAF and cleaner energies

Produced and presented with support of the following partners:

ANAC Brazil
CAAS Singapore
DGAC France
FAA United States
MLIT Japan
European Commission
Khalifa University

1. Opening

Jane Hupe, Deputy Director, Environment

Objective

Provide participants with practical experiences from States that are developing a policy for SAF and promote the sharing of knowledge

Agenda

1. Opening
2. Introduction of partners
3. ACT-SAF updates
4. ICAO Policies on SAF
5. Singapore
6. United States of America
7. European Commission
8. Brazil
9. Japan
10. France
11. United Arab Emirates
12. Questions and answers
13. Closing remarks

ICAO ENVIRONMENT

ACT-SAF series #4 Partners (1/2)

ACT SAF

ANAC
AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

Ms. Marcela Anselmi

FEDERAL AVIATION ADMINISTRATION

Mr. Nathan Brown

Ms. Anna Oldani

CAAS
Civil Aviation Authority of Singapore

Mr. Daniel Ng

ACT-SAF series #4 Partners (2/2)

Ms. Mathilde Tannous

Ms. Ewa Oney

Mr. Satoru Togami

Mr. Alejandro Rios

Housekeeping

- Questions and Answers session after the presentations
  - Please write the questions on the chat – these will be taken first at the Q&A session
  - To take the floor, please raise your hand during the Q&A session

- All questions are perfectly valid questions

ACT-SAF updates

ACT-SAF platform provides the most recent information:

- List of Partners constantly updated
- ACT-SAF series material available online

ACT-SAF Series

Coordination with ACT-SAF partners identified that many States need conceptual training on SAF.

To address that, ICAO is developing the **ACT-SAF Series of training sessions**, to be held on a monthly basis. This will allow delivering comprehensive training to ACT-SAF Partners on an array of important SAF-related topics, ranging from sustainability, to policy, economics/financing certification and logistics.

The ACT-SAF Series will empower the ACT-SAF Partners with training material designed with the support of Supporting States and Organisations from the air transport, fuels and finance sectors, as well as academics and actors with niche expertise such as SAF reporting under CORSIA.

Want to participate on the ACT-SAF Series? Join ACT-SAF now (click here to access the ACT-SAF Terms and Conditions). Participation is open to all States and Organizations interested in further action on SAF.

ACT-SAF Series	Date	Topics	Contributor(s)	Abstract	Video and Presentation
#1	25 November 2022	An introduction to SAF	ICAO	• Introduction to ACT-SAF • Basics of SAF	Download Presentation
#2	25 January 2023	SAF sustainability and reporting under CORSIA	ISCC RSB Verifavia	• process for sustainability certification of SAF • Reporting and verificaiton of SAF Claims under CORSIA	Download Presentation
#3	23 February 2023	SAF technology and certification	Airbus US FAA Safran	• specifications for aviation turbine fuels • process for approval for new production pathways	Download Presentation
#4	23 March 2023	SAF policies	Brazil, European	• Practical experiences	

ICAO ACT-SAF Platform

Here you will find more information on our ACT-SAF Participants*

Latest news on ACT-SAF

Date	Latest news	Link
16/02/2023	ACI joins ACT-SAF	
12/01/2023	Cote d'Ivoire offers financial resources to ACT-SAF	
22/12/2022	Netherlands offers financial resources to ACT-SAF	
20/12/2022	France offers financial resources to ACT-SAF	
17/11/2022	ICAO launches the ACT-SAF Series of training events on SAF	
20/10/2022	Argentina signs the ACT-SAF Terms and Conditions	

https://www.icao.int/environmental-protection/Pages/act-saf.aspx

ACT-SAF updates

Key request - conceptual training on SAF

ACT-SAF Series (preliminary list of sessions)
✓ #1 Introduction to SAF
✓ #2 SAF sustainability and reporting under CORSIA
✓ #3 SAF production technology and certification
#4 SAF policies
#5 SAF market outlook (May)
#6 SAF economics and financing (June)
#7 SAF logistics (July)
#8 SAF Feasibility Assessment (September)

Today's Session

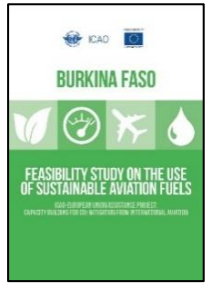
- Future sessions on specific aspects
- Subject to review – **feedback welcome**

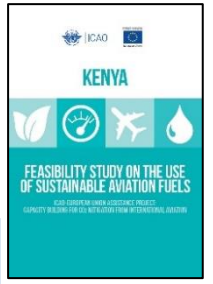
https://www.icao.int/environmental-protection/Pages/ACT-SAF-Series.aspx

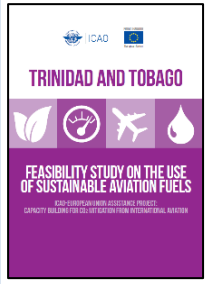
ACT-SAF updates – Feasibility Studies

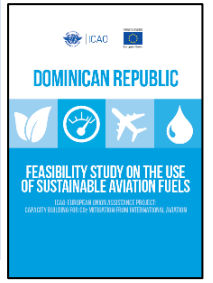
ACT SAF

1. Many feasibility studies will be developed in ACT-SAF
   - Three new feasibility studies under existing ICAO-EU project (Zimbabwe, Côte d'Ivoire and Cabo Verde), ICAO and World Bank project being structured, studies also being pursued by ACT-SAF partners
   - **Financial resources provided by ACT-SAF partners will allow MANY additional feasibility studies**
2. A template for SAF feasibility studies will be developed under ACT-SAF
   - Allow comparability between results, harmonized structure , facilitate outreach of results









ACT-SAF partners are invited to identify experts/consultants that could contribute to these two initiatives

Development of the ICAO template of feasibility studies	Development of ACT-SAF feasibility studies

Requirement: Expertise with development of clean energy studies *(not necessarily ACT-SAF focal point – any identified expert is welcome).*

Contact ICAO to participate on this effort (officeenv@icao.int)

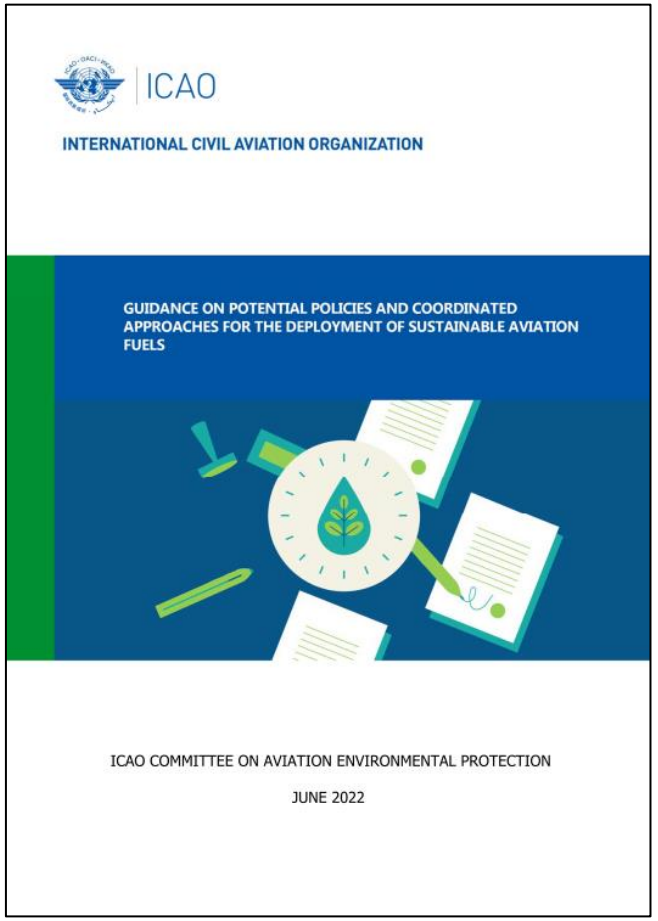
03. ICAO Policies on SAF, and related materials

ICAO Policies on SAF

ICAO has international policies applicable to SAF

CORSIA	2050 ICAO Vision for Sustainable Aviation Fuels	Long term Aspirational goal (LTAG)
• An aeroplane operator can **reduce its CORSIA offsetting requirements** through the use of CORSIA Eligible Fuels (CEF) • Includes international approaches for **sustainability and life cycle assessment** of fuels	Calls for a **significant proportion of SAF use by 2050,** and a **level-playing field with other sectors** **To be reviewed in CAAF/3 (2023)**	Largest aviation CO_2 emissions reductions to come from fuel-related measures LTAG agreement (A41-21) includes aspects related to policy planning, regulatory framework, implementation support, and financing

ICAO Guidance on Potential Policies and Coordinated Approaches for the deployment of SAF



- Developed by CAEP based on studies performed since 2016
- A support reference for ICAO States to develop SAF production
  - Insight on types of policy measures and their impacts
  - Examples of policies used or under preparation
  - Links to additional helpful resources
- Completes a toolbox of guidance material for ICAO States
- Can be used in combination with the ICAO SAF Rules of Thumb

Publically available on the ICAO website

Guidance document

https://www.icao.int/environmental-protection/Pages/saf_guidance_potential_policies.aspx

SAF rules of thumb

https://www.icao.int/environmental-protection/Pages/SAF_RULESOFTHUMB.aspx

SAF Policy options

Guidance provides details on 28 types of Policy Options, divided into 3 impact areas and 8 categories

Impact area: Stimulating Growth of SAF Supply

1 Government funding for RDD	2 - Targeted incentives and tax relief o expand SAF supply infrastructure	3 - Targeted incentives and tax relief to assist SAF facility operation	4 - Recognition and valorization of SAF environmental benefits
1.1 - Government R&D 1.2 - Government demonstration and deployment	2.1 - Capital grants ; 2.2 - Loan guarantee programs 2.3 - Eligibility of SAF projects for tax advantaged business status ; 2.4 - Accelerated depreciation/'bonus' depreciation 2.5 - Business Investment Tax Credit (ITC) for SAF investments 2.6 - Performance-based tax credit 2.7 – Bonds / Green Bonds	3.1 Blending incentives: Blender's Tax Credit 3.2 – Production incentives: Producer's Tax Credit 3.3 - Excise tax credit for SAF 3.4 - Support for feedstock supply establishment and production	4.1 – Recognize SAF benefits under carbon taxation 4.2 - Recognize SAF benefits under cap and-trade systems 4.3 - Recognize non-carbon SAF benefits: improvements to air quality 4.4 - Recognize non-carbon SAF benefits: reduction in contrails

Impact area: Creating Demand for SAF

5- Creation of SAF mandates	6 - Update existing policies to incorporate SAF	7 – Demonstrate government leadership
5.1 - Mandate renewable energy volume requirements in the fuel supply 5.2 - Mandate reduction in carbon intensity of the fuel supply	6.1: Incorporating SAF into existing national policies 6.2: Incorporating SAF into existing subnational, regional or local policies	7.1 Policy statement to establish direction 7.2: Government commitment to SAF use, carbon neutral air travel

Impact area: Enabling SAF Markets

8 - Market enabling activities
8.1 - Adopt clear and recognized sustainability standards and life cycle GHG emissions methods for certification of feedstock supply and fuel production 8.2 - Support development/recognition of systems for environmental attribute ownership and transfer 8.3 - Support SAF stakeholder initiatives

SAF estimates ("Rules of thumb")

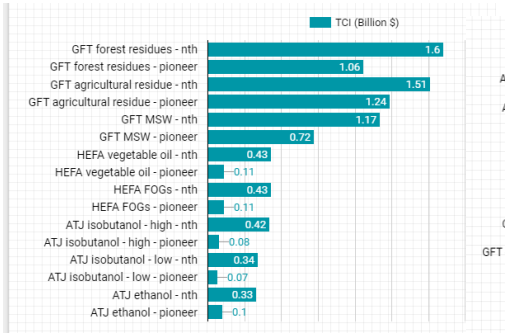
- **ICAO SAF Rules of Thumb -** order of magnitude estimations on SAF costs, investment needs and production potential. They can be used to inform policymakers and project developers. https://www.icao.int/environmental-protection/Pages/SAF_RULESOFTHUMB.aspx

  – Provides the impact of feedstock cost, fuel yield, facility scale, total capital investment (TCI) and minimum selling price (MSP) for both the ***n*th plant** and a **pioneer plant**.

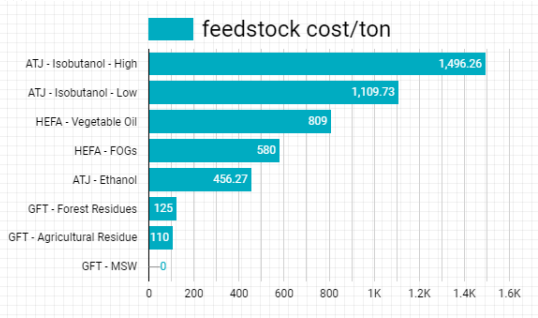
  – Provides **big-picture trends** for costs and processing technology/feedstock comparisons.

Processing Technology	Feedstock	Feedstock Cost ($/tonne)	Feedstock Cost ($/L)	TCI (million $)		MSP ($/L)	
				nth	pioneer	nth	pioneer
GFT	MSW	0	-	1170	724	0,7	1,8
GFT	Forest Residues	125	-	1636	1063	1,8	3,3
GFT	Agricultural Residues	110	-	1506	1238	2,1	3,8
ATJ	Ethanol	456	0.36	333	99	0,8	1,0
ATJ	Isobutanol - Low	1110	0.89	343	67	1,3	1,4
ATJ	Isobutanol - High	1496	1.20	424	75	1,8	1,9
HEFA*	FOGs	580	-	428	112	0,8	1,0
HEFA*	Vegetable Oil	809	-	431	108	1,1	1,2

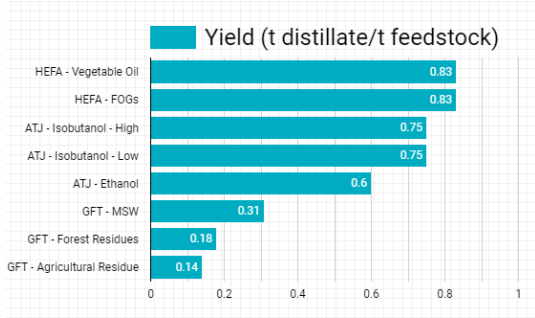
total capital investment (TCI)



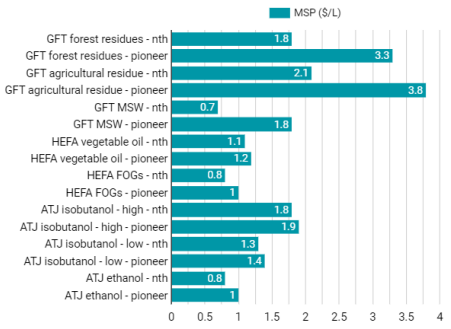
Feedstock costs



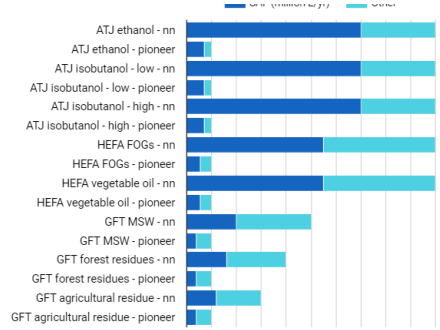
Feedstock Yield



Minimum Selling Price



Refinery capacity

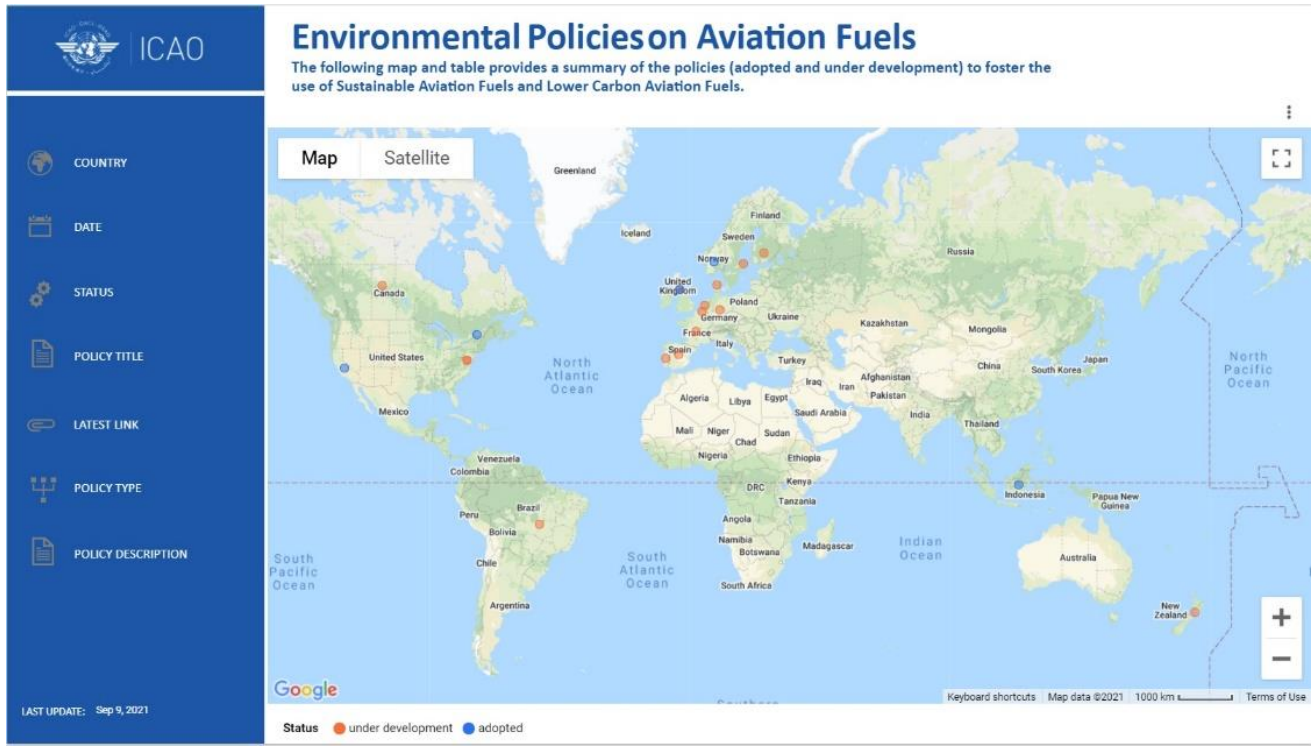


SAF Policies tracker

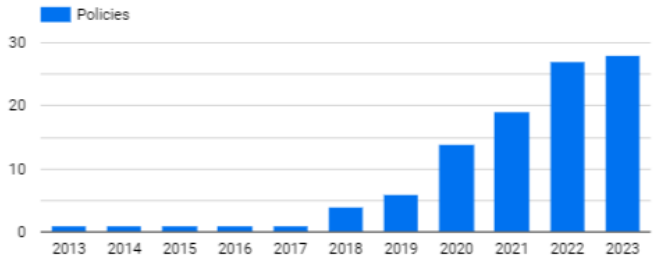
ACT SAF

26 policies adopted or under development

Tracker of Policies adopted or under development to foster SAF development



Date	State	Policy Title	Policy Description	Status	Source
13 févr. 2023	United States	Invest in Illinois Act	This legislation in Illinois provides a tax credit of $1.50 per gallon for SAF used by aircraft in the state. For the SAF to qualify for the credit, it must reduce carbon emissions by at least 50% throughout its life. The credit applies to all SAF used in Illinois, regardless of where it is produced. However, credits for SAF used before June 1, 2028, must come from renewable sources such as biomass, waste streams, renewable energy, or gaseous carbon oxides. The tax credit will be available until January 1, 2033.	adopted	https://www sustainable-
16 nov. 2022	India		SAF mandate blending under consideration	under development	https://www committed-t
18 oct. 2022	Japan		The Japanese government is seeking public comments on a draft policy to promote decarbonization in the aviation industry. The policy, in part, would require flights to be carbon neutral by 2050 and require airlines to use sustainable aviation fuel (SAF).	under development	https://biom s-draft-policy
3 oct. 2022	China	China Civil Aviation Green Development Policy and Action	Target of 50k tons of SAF use by 2025 SAF performance testing, airworthiness certification, exploration of new paths for its development.	adopted	http://www.c 15425.html
16 août 2022	United States	Inflation Reduction Act (SAF blenders tax credit)	The bill provides a $1.25 per-gallon credit for each gallon of SAF sold as part of a qualified fuel mixture, including that it has a demonstrated lifecycle greenhouse gas (GHG) reduction of at least 50 percent compared to conventional jet fuel. The credit, available for two years beginning January 1, increases up to $1.75 per gallon on a sliding scale based on the percentage of lifecycle GHG emissions reduced beyond 50 percent. Beginning in 2025, SAF would be eligible for credits up to $1.75 per gallon under a new Clean Fuel Production Credit (CFPC). That credit is set to expire at the end of 2027.	adopted	https://www aviation/202
19 juil. 2022	United Kingdom	Jet Zero Strategy	Increasing support for sustainable aviation fuels (SAF), by creating secure and growing UK SAF demand through a SAF mandate that will require at least 10% of jet fuel to be made from sustainable sources by 2030 and kickstarting a domestic	adopted	https://www sets-out-stra free-flying



04. Singapore

Developing a Sustainable Air Hub in Singapore

- Singapore is working with industry partners to develop a Sustainable Air Hub Blueprint with concrete targets and pathways

Blueprint to be published in 2H 2023

Sustainable Air Hub Blueprint

Objective: Establish targets and pathways to achieve a Sustainable Singapore Air Hub

International Advisory Panel (IAP) to advise on strategies

Airport

Airline

Air Traffic Management (ATM)

Enablers

International Advisory Panel on Sustainable Air Hub (IAP)

- In Feb 2022, Civil Aviation Authority of Singapore (CAAS) set up the IAP to support the development of the Singapore Sustainable Air Hub Blueprint
  - 20 industry, technology, and knowledge leaders from Singapore and around the world

Chair

Professor Chong Tow Chong
President,
Singapore University of Technology and Design

Aviation Authority

Mr Han Kok Juan
Director-General,
Civil Aviation Authority of Singapore

International Organisations

Mr Luis Felipe de Oliveira
Director-General,
Airports Council International

Mr Simon Hocquard
Director-General,
Civil Air Navigation Services Organization

Mr Willie Walsh
Director-General,
International Air Transport Association

Knowledge Partners

Professor Peter Jackson
Director,
Aviation Studies Institute

Professor Lam Khin Yong
Co-Chair,
Air Traffic Management Research Institute

Mr Jeffrey Chua
Chairman,
Boston Consulting Group Singapore

Mr Kaushik Das
Senior Partner and Managing Partner for Southeast Asia,
McKinsey & Company

Mr Pedro Gómez
Head of Shaping the Future of Mobility,
Member of Executive Committee,
World Economic Forum

ICAO ENVIRONMENT

International Advisory Panel on Sustainable Air Hub (IAP)

ACT SAF

Technology Partners

Mr Thorsten Lange
Executive Vice President for Renewable Aviation,
Neste

Dr Steve Howard
Chief Sustainability Officer,
Temasek

Industry Partners

Dr Sabine Klauke
Chief Technical Officer,
Airbus

Mr Lee Seow Hiang
Chief Executive Officer,
Changi Airport Group

Dr Naveed Hussain
IAP Member from February – April 2022
Vice President and Chief Engineer,
Boeing Defense, Space and Security,
The Boeing Company

Dr Todd Citron
IAP Member from April 2022
Chief Technology Officer,
The Boeing Company

Ms Grazia Vittadini
Chief Technology and Strategy Officer,
Rolls-Royce

Mr Kerry Mok
President and Chief Executive Officer,
SATS

Ms Aw Kah Peng
Chairperson,
Shell Companies in Singapore

Mr Goh Choon Phong
Chief Executive Officer,
Singapore Airlines

Mr Philippe Keryer
Executive Vice President for Strategy, Research, and Technology,
Thales

Recommendations of the IAP

- Report with 15 recommended initiatives was published in Sep 2022

Recommendations of the International Advisory Panel on Sustainable Air Hub

Airport

a. Airfield solar deployment
b. Renewable electricity
c. Building energy efficiency
d. Clean energy airside vehicles
e. System optimisation with digital twin project
f. Resource circularity through on-site waste-to-energy facility

Airline

a. Roadmap to create long-term secured SAF supply ecosystem
b. Corporate Buyers' Club
c. Structural offtake mechanism for SAF
d. Aviation vertical offerings in carbon markets, support ecosystem for and encourage uptake of aviation carbon offsets
e. Technical centre for capability-building in aircraft technology

ATM

Short-term (2022-2026)

a. Advanced demand-capacity balancing
b. Performance-based navigation
c. Gate-to-gate trajectory optimisation

Medium-term (2027-2032)

d. Trajectory-Based Operations and Free Route Airspace in collaboration with stakeholders and partner ANSPs

Enablers

a. Policy and regulation
b. Industry development
c. Infrastructure planning and provision
d. Workforce transformation

Singapore's SAF Plans and Initiatives

- Singapore is exploring 5 initiatives to improve sustainability of airlines operating to, from and through Singapore
- Necessary to take multi-pronged ecosystem approach to make SAF viable

First Steps: Singapore SAF Pilot

- CAAS partnered with Singapore Airlines (SIA), Temasek, CAG, ExxonMobil and Neste to conduct SAF pilot at Changi Airport:
  - First step to validate Changi's supply chain readiness for SAF
  - Understand demand for SAF credits by customers
- SAF was first uplifted onto SIA flight on 7 Jul 2022, via Changi Airport's fuel hydrant system
- Started sale of SAF credits in Jul 2022
  - Allow corporate and individual travelers to reduce carbon footprint

CAAS Civil Aviation Authority of Singapore

TEMASEK

SINGAPORE AIRLINES

CHANGI airport singapore

ExxonMobil

NESTE

SAF Supply Initiatives

- Changi Airport needs to develop a long-term secured supply of SAF to boost the availability and affordability of SAF, to support increased adoption by its airlines
- We are developing a roadmap to create a long-term SAF supply in Singapore and the region
  - Build up SAF supply chain, validate regional feedstock to align with global standards and encouraging investments in new SAF pathways
- Singapore is participating in a Southeast Asia (SEA) feedstock study led by Boeing and Roundtable on Sustainable Biomaterials (RSB), alongside other key stakeholders from the aviation, energy, agricultural and financial sectors
  - Identify sustainable SAF feedstock potential in ASEAN countries, key sustainability risks, and opportunities for each feedstock and country
  - Cross-sectoral stakeholder group from across ASEAN involved
  - Study will take into account ICAO's standards and guidance material on CORSIA Eligible Fuels
  - Estimated to take around 15 months, with results in first quarter of 2024

SAF Offtake Mechanism at Changi Airport

- Long-term demand certainty is required to incentivise SAF suppliers to expand SAF production capacity; scope to strengthen demand signals for SAF in Singapore
- Need to implement a structural mechanism that encourages sustained SAF adoption amongst airlines
- Embarking on a study to design a structural SAF offtake mechanism at Changi Airport, to catalyse a self-sustaining ecosystem and flow of funds
  - Consider the unique context and characteristics of Singapore's air hub, its airlines and passengers
  - Assess various models and shortlist the preferred option(s) for Singapore, such as mandates, incentives or hybrid mechanisms
  - Design mechanism and assess impact on traffic growth, traffic mix and financial impact to key stakeholders
- Study will commence in first quarter of 2023 and will take about four months to complete

Corporate Buyers' Club for SAF

- Studying the feasibility and design of a corporate buyers' club to encourage early adopters to take collective action, to aggregate SAF demand and provide stronger demand signals for SAF production and scale-up
  - Tap on business travelers and air cargo users and encourage them to become first movers
  - Potential of collaborating with regional partners to expand the buyers' club to the broader ASEAN region
- As the buyers' club would be the first of its kind in Singapore, need careful assessment of its commercial viability and operating model
- Plan to commence study in second quarter of 2023, which will take around 3 months

Supporting Mechanisms

- Beyond in-sector measures, carbon offsets are necessary to achieve net-zero
- Work with key players in Singapore's emerging carbon services hub to build the market for aviation carbon offsets
  - Includes products and platform innovations for aviation carbon offsets
  - Develop support ecosystem to improve the reliability, traceability and accountability of offsets

- To complement our plans, we are also pursuing international partnerships
  - Established partnerships with the US, Australia, New Zealand and Japan
  - Exploring concept of possible "green lanes", which would include defining and exploring their viability with major international partners and shaping specific requirements, such as the use of SAF

05. United States of America

Policymaking in the United States to Support Sustainable Aviation Fuels

Nate Brown
Federal Aviation Administration
Office of Environment and Energy

23 March 2023

U.S. Aviation Climate Action Plan

State Action Plan submission to International Civil Aviation Organization (ICAO)

- On November 9, 2021, Secretary of Transportation Pete Buttigieg announced the *United States Aviation Climate Action Plan*, which describes a whole-of-government approach to put the aviation sector on a path toward achieving net-zero emissions by 2050.

- The plan builds on individual and sector-wide commitments announced by the U.S. aviation industry, and highlights specific actions and policy measures to foster innovation and drive change across the entire U.S. aviation sector.

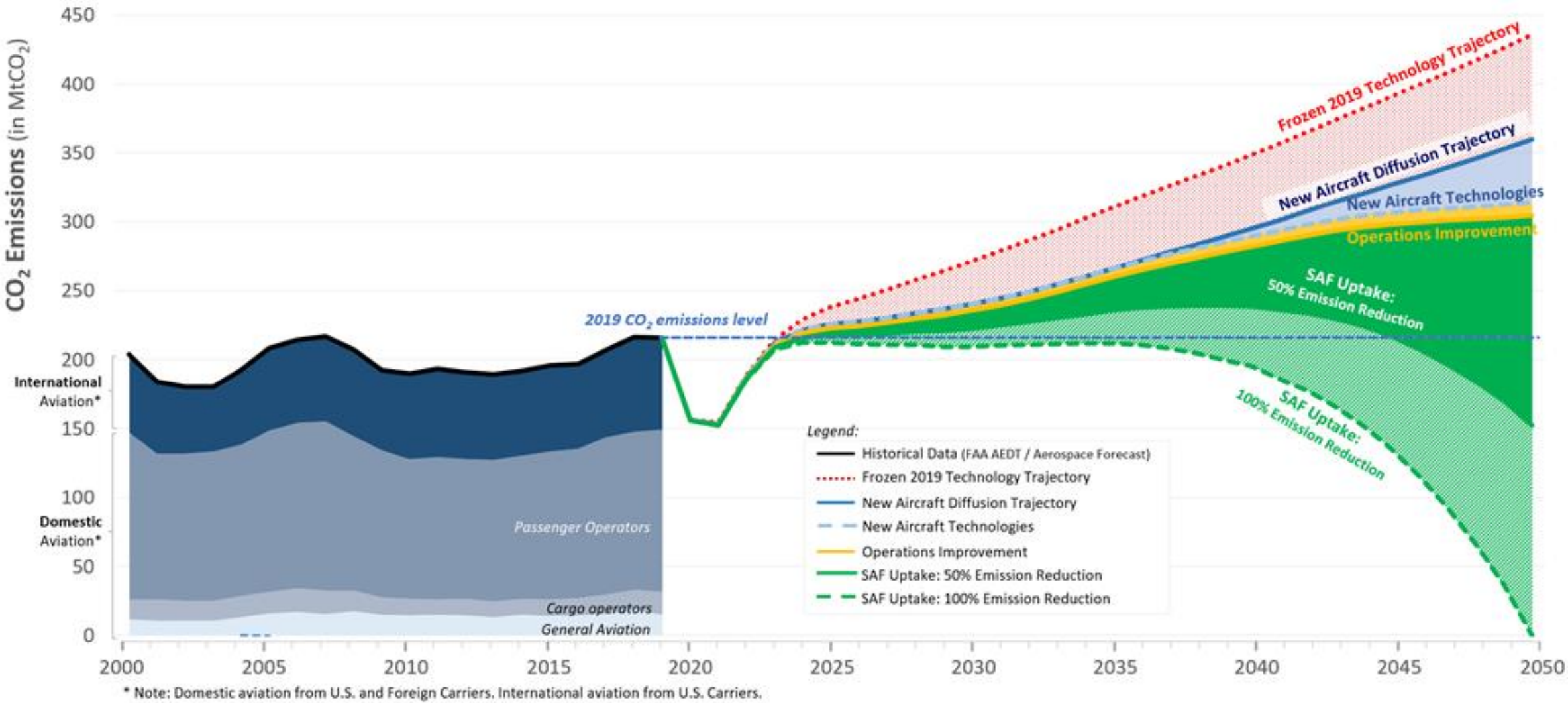
- Climate Action Plan Press Release:

https://www.faa.gov/newsroom/us-releases-first-ever-comprehensive-aviation-climate-action-plan-achieve-net-zero

- Climate Action Plan Document:

https://www.faa.gov/sites/faa.gov/files/2021-11/Aviation_Climate_Action_Plan.pdf

U.S. Aviation CO2 Trajectory

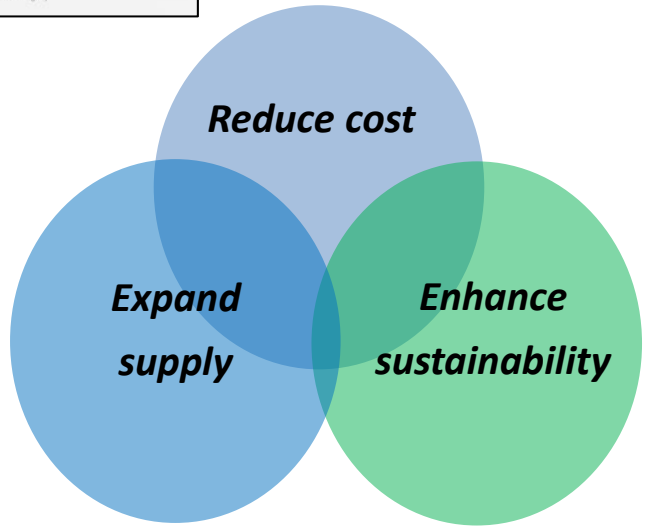


* Note: Domestic aviation from U.S. and Foreign Carriers. International aviation from U.S. Carriers.

U.S. SAF Grand Challenge

- Agreement by the Departments of Transportation, Energy and Agriculture
- Achieve 3 billion gallons of domestic SAF production in 2030 and put U.S. on trajectory to 35 billion gallons per year by 2050
- At least a 50% reduction in life cycle greenhouse gas emissions, as compared to conventional jet fuel
- Multi-agency roadmap to focus federal actions to support industry scale-up

Sustainable Aviation Fuel Grand Challenge



Roadmap Structure

- Feedstock Innovation
- Conversion Technology Innovation
- Building Supply Chains
- Policy and Valuation Analysis
- Enabling End Use
- Communicating Progress and Building Support

- 26 Workstreams
- 139 Activities
- 2030 & 2030-2050 impact timeframes

Sustainable Aviation Fuel Grand Challenge

SAF Grand Challenge Website

Sustainable Aviation Fuel Grand Challenge

Sustainable Aviation Fuel Grand Challenge

Inaugurated on Sept. 9, 2021, the Sustainable Aviation Fuel Grand Challenge is the result of the U.S. Department of Energy (DOE), the U.S. Department of Transportation (DOT), the U.S. Department of Agriculture (USDA), and other federal government agencies working together to develop a comprehensive strategy for scaling up new technologies to produce sustainable aviation fuels (SAF) on a commercial scale.

The SAF Grand Challenge will guide federal actions to support industry to reduce the cost, enhance the sustainability, and expand the production and use of SAF to:

- Produce 3 billion gallons per year of domestic SAF production that achieve a minimum of a 50% reduction in life cycle greenhouse gas emissions compared to conventional fuel by 2030.
- Meet a goal of supplying 100% of projected domestic aviation jet fuel use, or 35 billion gallons of annual production, by 2050.

SAF Grand Challenge Roadmap

To achieve the SAF Grand Challenge 2030 and 2050 goals, the interagency team worked with other government agencies; stakeholders from national labs, universities, non-governmental organizations; and the aviation, agricultural, and energy industries to develop the *SAF Grand Challenge Roadmap: Flight Plan for Sustainable Aviation Fuel*.

SAF Grand Challenge Roadmap

To achieve the SAF Grand Challenge 2030 and 2050 goals, the interagency team worked with other government agencies; stakeholders from national labs, universities, non-governmental organizations; and the aviation, agricultural, and energy industries to develop the *SAF Grand Challenge Roadmap: Flight Plan for Sustainable Aviation Fuel*.

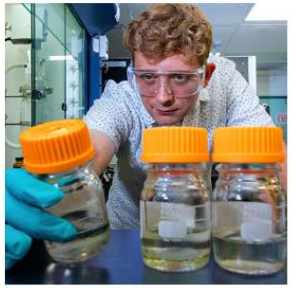
SAF Grand Challenge Partners

Successful implementation of the SAF Grand Challenge will require close collaboration of agencies across the federal government—particularly DOE, USDA, DOT and its

https://biomassboard.gov/sustainable-aviation-fuel-grand-challenge

The SAF Grand Challenge Roadmap overview figure depicts how the six action areas address barriers across the entire supply chain from innovations in feedstock supply through end use. Within each of the six action areas are workstreams that define critical topics to be addressed.

Feedstock Innovation



Conversion Technology Innovation

Building Supply Chains

Policy and Valuation Analysis

Enabling End Use

Communicating Progress and Building Support

Inflation Reduction Act (IRA) - Production support through 2027

IRA Tax Credits

SAF Tax Credit §13203 - 2023-2024

- Achieves 50% lifecycle GHG reduction
- $1.25 with additional up to $1.75 for additional lifecycle emissions reduction

Production Credit §13704 - 2025-2027

- Lifecycle GHG <50kg CO2e/MMBTU (Jet Baseline = 94kg CO2e/MMBTU)
- Enhanced value for SAF up to $1.75 for 100% reduction

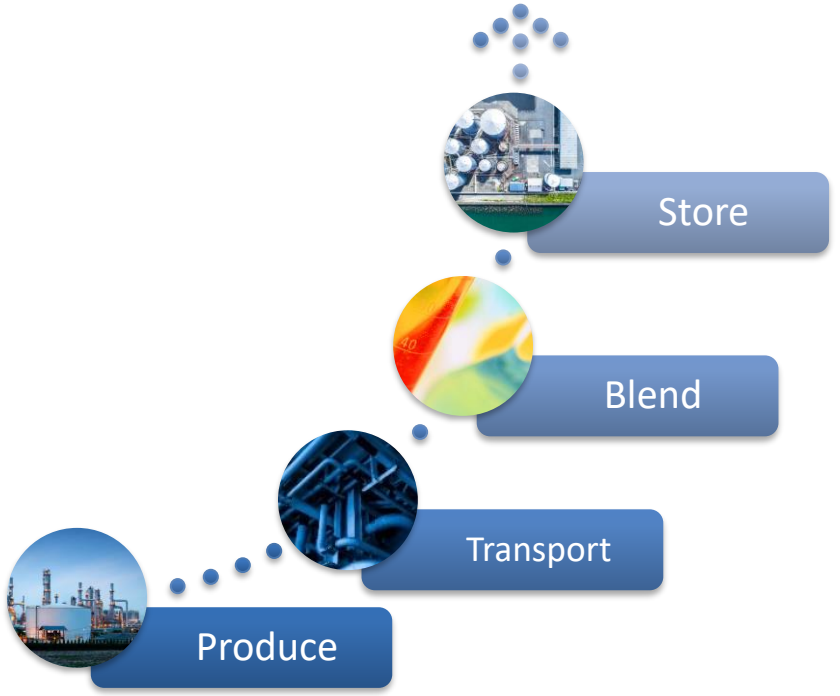
Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress

IRA SAF and Clean Technology Grant Program

Support projects to rapidly scale-up domestic SAF production

IRA FAST Grant Program

§40007
$245 million competitive grant program
Specifies consideration criteria and eligible entities
FAST Meeting – Dec. 14, 2022



[Text - H.R.5376 - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress]

The Path to Success on SAF

- Create an environment where producers choose to produce and sell SAF
  - Legislative action to reduce cost and risk
- A coordinated approach to federal agency actions that derisks technology, supply chains, and markets, and reduces barriers
  - Actions that support near-term production
  - Ongoing innovation to support future production
  - Data collection and analysis to support markets for SAF through strong policies and focus on sustainability
- Industry action to build and purchase SAF supply

Inflation Reduction Act

Sustainable Aviation Fuel Grand Challenge

SAF Grand Challenge Roadmap

Industry commitments

Thank You

Nate Brown
Office of Environment & Energy
Federal Aviation Administration
Nathan.Brown@faa.gov

06. European Commission

EU SAF policy: context

- European Green Deal: the EU aim to be **climate neutral in 2050**.
- Intermediate target: reduce emissions by at least **55% by 2030**.
- Action across all sectors of the economy, including air transport:
    - Aviation hard to decarbonise
    - High potential of SAF
    - SAF low uptake (less than 0,1%)
        - ➢ **ReFuelEU Aviation**

EU SAF policy: ReFuelEU Aviation initiative

- **Regulation:**
  - European Commission proposal in 2021
  - On-going legislative process in the European Parliament and Council
  - Adoption expected in 2023
- **Supporting measures**
- **International partnerships**

ReFuelEU Aviation legislative proposal

Objectives

Foster **ramp-up of SAF production** and its availability to aircraft operators to decarbonise aviation.

Guarantee **a level playing field** in aviation through a harmonised European approach for a gradual supply and uptake of SAF in flights departing from EU airports.

ReFuelEU Aviation legislative proposal

Design*

Ramp-up: binding minium SAF shares in aviation fuel supplied in the EU:

Total shares in the fuel mix (in %)	2025	2030	2035	2040	2045	2050
Sustainable Aviation Fuels (SAF) target	2	5	20	32	38	63
Synthetic aviation fuels *sub-target*	-	0.7	5	8	11	28

Eligible SAF:

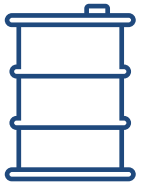
Sustainability framework of the Renewable Energy Directive

- Sustainable biofuels produced from waste and residues
- Synthetic aviation fuels produced from renewable sources

* Subject to possible changes as a result of the legislative process.

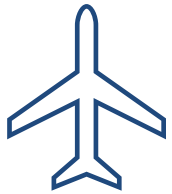
ReFuelEU Aviation legislative proposal

Obligations



Aviation fuel suppliers

to supply minimum SAF shares at EU airports



Aircraft operators

(above *de minimis* threshold)

departing from EU airports

to uplift fuel at EU airports without tankering practices

EU airports

(excluding small and outermost regions' airports)

to guarantee access to refueling infrastructure

ReFuelEU Aviation supporting measures

- **Financing:**
  - EU financial programmes: Horizon Europe, Innovation Fund, InvestEU
  - Revised state aid guidelines
  - EU taxonomy to faciliate access to finance
  - SAF Allowances under EU ETS to reduce the price gap between fossil and SAF (up to €2 bn)
  - Strengthen price signal: proposals for a revision of EU Emissions Trading System (carbon price) and Energy Taxation Directive (removal of jet tax exemption)
- SAF **Clearing House** to bring new SAF pathways to the market
- Renewable and Low-Carbon Fuels Value Chain **Industrial Alliance**
- **Net Zero Industry Act** to strengthen EU net-zero technology products manufacturing ecosystem

International Partnerships for SAF

- **EU support to the LTAG** for international aviation of net-zero carbon emissions by 2050 adopted at the 41st ICAO Assembly.
- EU fully committed to support SAF production around the world.
- **SAF capacity building** projects**:**
  - EU capacity building projects on sustainable aviation, including on SAF (budget of €21 million since 2014).
  - Upcoming projects of €4 million under ACT-SAF:
    - implemented with ICAO and EASA
    - feasibility studies and policy development support to foster SAF.

Thank you!

European Commission

07. Brazil

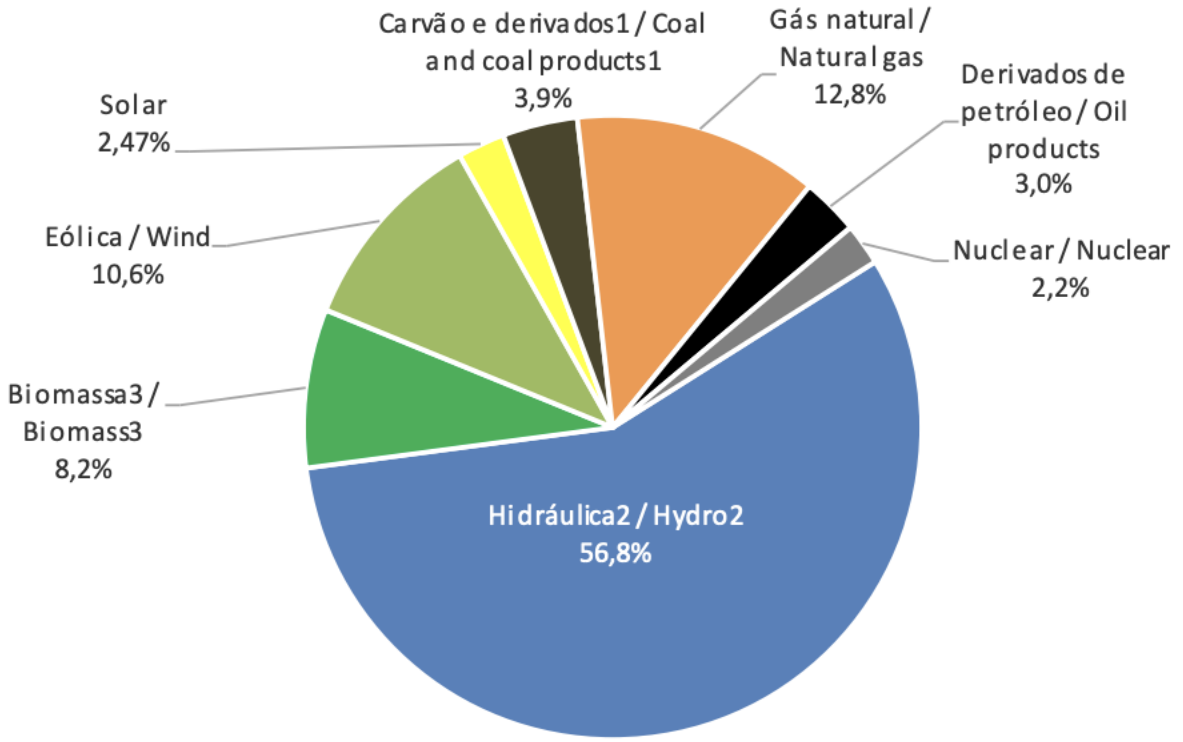
Brief Background

- Brazil has a long and rich tradition of biofuel production.
  - The first governmental program to foster production dates to the 1970's.
- Today, blending ethanol and biodiesel in fossil fuel is mandatory for ground transportation.
  - 27% blending for gasoline and 10-12% for diesel, respectively.
- Brazil is one of the largest biofuel producers in the world and is widely recognized as a model for sustainable and efficient biofuel production.

Brief Background

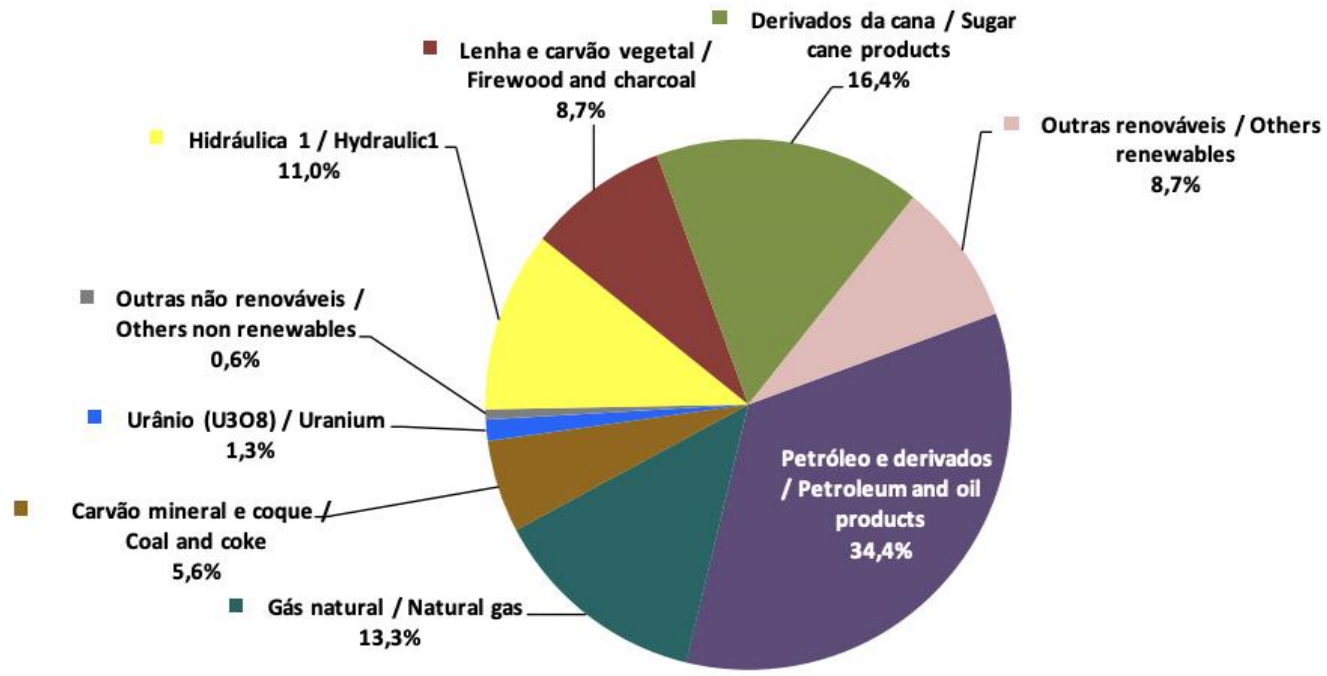
- **Electricity supply: + 80% non-fossil**

Chart 1.1.b – Total Electricity Supply by Source



- **Total energy supply: + 46% non-fossil**

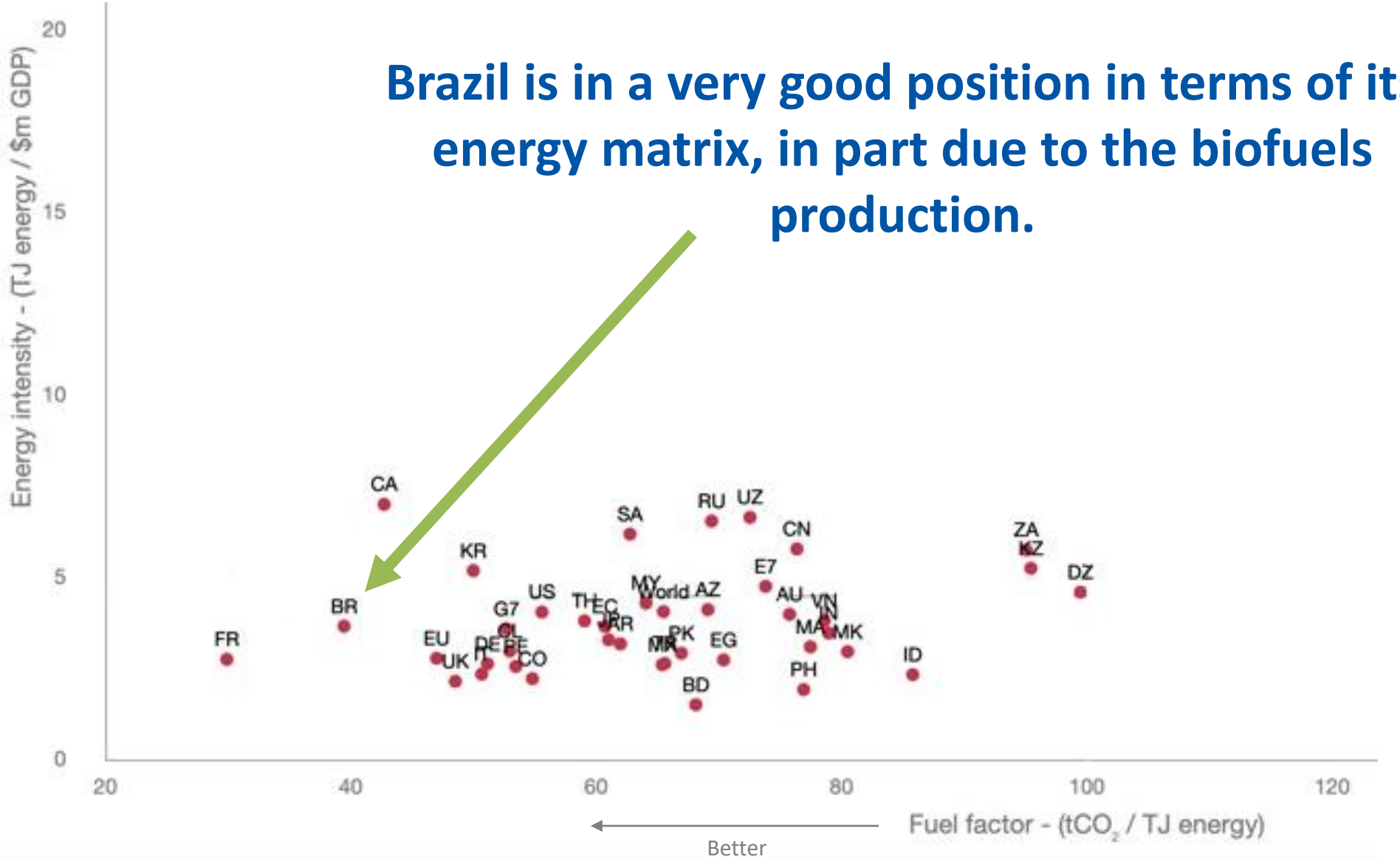
Chart 1.3.b – Total Energy Supply



1. Inclui importação de eletricidade oriunda de fonte hidráulica. 1 kWh = 860 kcal (equivalente térmico teórico - primeiro princípio da termodinâmica). Ver Anexo VI.6 - Tratamento das informações. / *Includes electricity imports originated from hidraulic sources. 1 kWh = 860 kcal (physical equivalent - First Principle of Thermodynamics). Look Appendix VI.6.*

Brief Background

Brazil is in a very good position in terms of its energy matrix, in part due to the biofuels production.



Preparations and discussion

How do we make use of this tradition and of the great potential of Brazil to foster the production of SAF?

Preparations and discussion

- April, 2021 – The Ministry of Mines and Energy instituted the Technical Committee – Fuel for the Future:
  - Multidisciplinary Committee – integrated clean energy policy in Brazil (SAF, maritime and ground transportation)
  - Subcommittees for thematic areas.

Preparations and discussion

IBAMA

ANAC
AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL

anp
Agência Nacional do Petróleo, Gás Natural e Biocombustíveis

PÁTRIA AMADA BRASIL
GOVERNO FEDERAL

INMETRO

COP21 · CMP11
PARIS 2015
UN CLIMATE CHANGE CONFERENCE

CNPE

CORSIA

RenovaBio

2

MINISTÉRIO DE MINAS E ENERGIA

PÁTRIA AMADA BRASIL
GOVERNO FEDERAL

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ProQR
CLIMATE NEUTRAL ALTERNATIVE FUELS

1

GOL

ALTA

JURCAIB
Junta De Representantes Das Companhias Aéreas Internacionais De Brasil

IATA

ABEAR
Associação Brasileira das Empresas Aéreas

Apresentação única das entidades

3

Azul

RBQAV

UFRN

UFG
UNIVERSIDADE FEDERAL DE GOIÁS

UFPB

UFRJ

ASSOCIAÇÃO BRASILEIRA DE AVIAÇÃO GERAL
Abag

3

BOEING

LATAM

UFMG
UNIVERSIDADE FEDERAL DE MINAS GERAIS

4

APROBIO
Associação dos Produtores de Biocombustíveis do Brasil

BR
PETROBRAS

EMBRAER

Plataforma de Bioquerosene e Renováveis da Zona da Mata

3

raízen

Ubrabio
União Brasileira do Biodiesel e Bioquerosene

SAE BRASIL
A CASA DO CONHECIMENTO DA MOBILIDADE BRASILEIRA

5

BNDES

ECB GROUP BRASIL

BSBIOS
ENERGIA RENOVÁVEL

RSB

ICAO

anp

3

Clean Skies for Tomorrow

WORLD ECONOMIC FORUM

ANEAA
ASSOCIAÇÃO NACIONAL DAS EMPRESAS ADMINISTRADORAS DE AEROPORTOS

MINISTÉRIO DA AGRICULTURA, PECUÁRIA E ABASTECIMENTO

PÁTRIA AMADA BRASIL
GOVERNO FEDERAL

5

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CLIMATE NEUTRAL ALTERNATIVE FUELS

S&P Global
Platts

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INSTITUTO BRASILEIRO DE PETRÓLEO E GÁS

UNIGEL

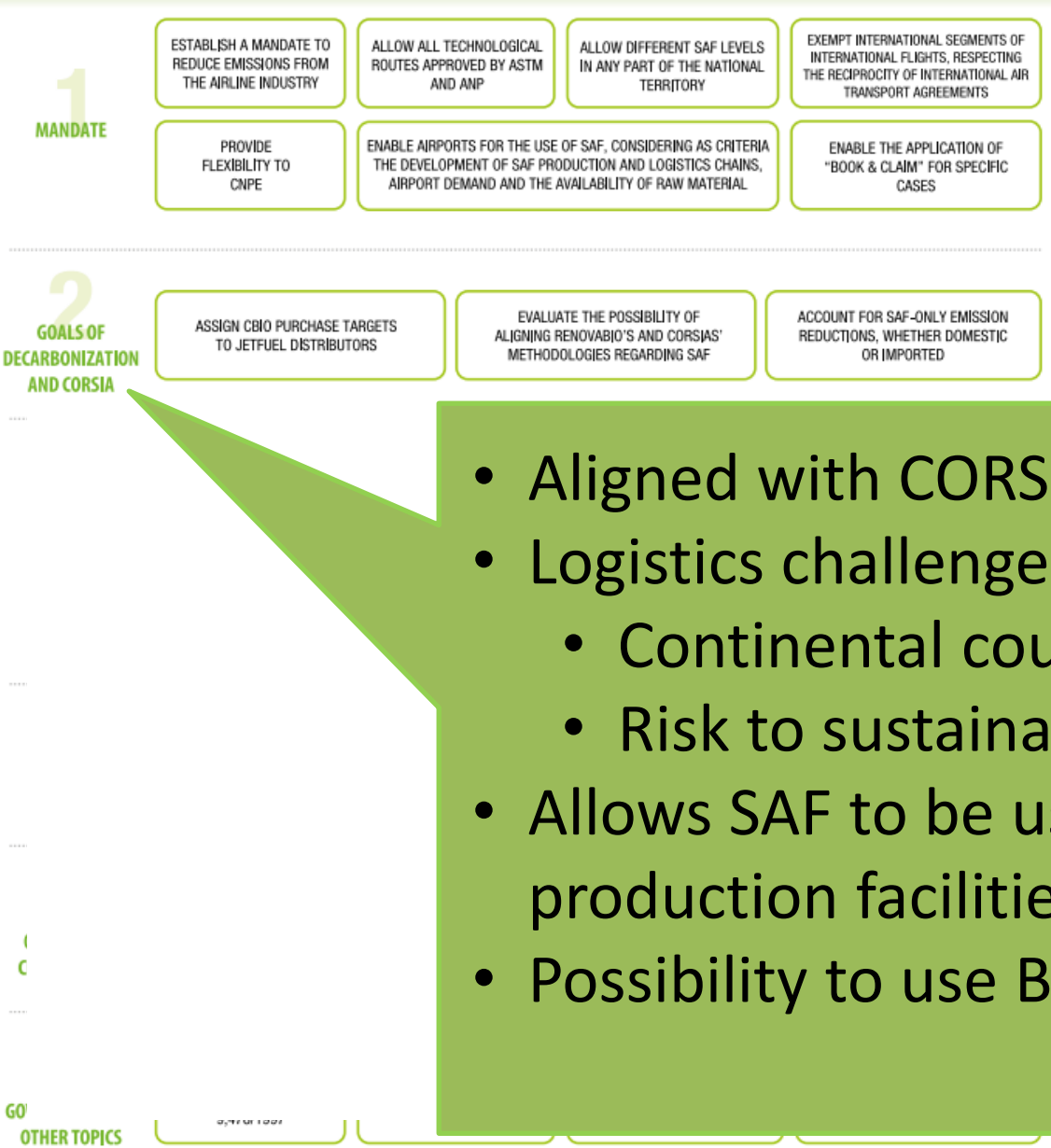
Preparations and discussion

- 6 months of intensive work: public consultation, workshops and wide discussion with stakeholders.
- The final conclusion was drafted by the Ministry of Mines and Energy with the support of ANAC in matters related to SAF.

Public Policy for SAF

- No blending mandate or tax incentives – limited budget
- Alternative: a mandate of CO_2 emissions reduction (in %) by the use of SAF
  - Applied to airlines (thus not on SAF distribution).
  - Fosters competition for the use of the best technology available and the most efficient SAF

Public Policy for SAF



- Aligned with CORSIA requirements
- Logistics challenge:
  - Continental country
  - Risk to sustainability (distribution)
- Allows SAF to be used in the main hubs near the production facilities
- Possibility to use Book & Claim systems

Public Policy for SAF

1 MANDATE

- ESTABLISH A MANDATE TO REDUCE EMISSIONS FROM THE AIRLINE INDUSTRY
- ALLOW ALL TECHNOLOGICAL ROUTES APPROVED BY ASTM AND ANP
- ALLOW DIFFERENT SAF LEVELS IN ANY PART OF THE NATIONAL TERRITORY
- EXEMPT INTERNATIONAL SEGMENTS OF INTERNATIONAL FLIGHTS, RESPECTING THE RECIPROCITY OF INTERNATIONAL AIR TRANSPORT AGREEMENTS
- PROVIDE FLEXIBILITY TO CNPE
- ENABLE AIRPORTS FOR THE USE OF SAF, CONSIDERING AS CRITERIA THE DEVELOPMENT OF SAF PRODUCTION AND LOGISTICS CHAINS, AIRPORT DEMAND AND THE AVAILABILITY OF RAW MATERIAL
- ENABLE THE APPLICATION OF "BOOK & CLAIM" FOR SPECIFIC CASES

2 GOALS OF DECARBONIZATION AND CORSIA

- ASSIGN CBIO PURCHASE TARGETS TO JETFUEL DISTRIBUTORS
- EVALUATE THE POSSIBILITY OF ALIGNING RENOVABIO'S AND CORSIAS' METHODOLOGIES REGARDING SAF
- ACCOUNT FOR SAF-ONLY EMISSION REDUCTIONS, WHETHER DOMESTIC OR IMPORTED

3 PROJECT FINANCING AND RD&I

- REGULATE ARTICLE 3, I OF LAW N. 14,248/2021 (FEDERAL INCENTIVE)
- STRUCTURE SAF FINANCING LINES THROUGH BNDES
- EXTEND SAF INCENTIVES TO GREEN DIESEL IN ORDER TO DEVELOP BIOREFINERIES
- ESTABLISH GOVERNMENT GUIDELINES FOR PROJECT AND RD&I FUNDING
- ASSESS THE STRUCTURING OF A GUARANTEE FUND WITH THE PARTICIPATION OF THE NATIONAL TREASURY FOR INVESTMENT PROJECTS IN SAF

- Clearer objectives for the financing of SAF production by the National Development Bank (BNDES)
- Guidelines for the funding of R&D

Public Policy for SAF

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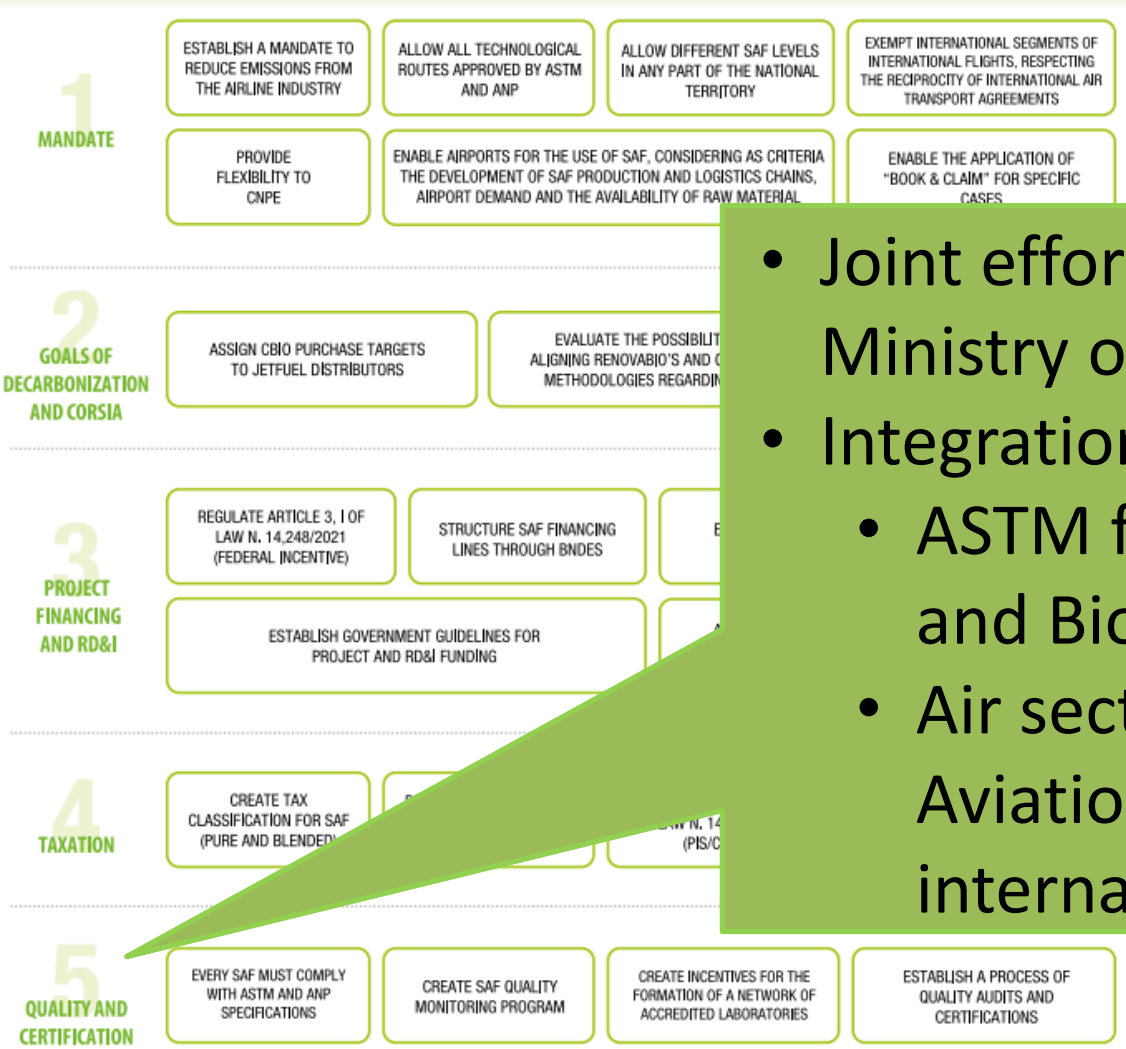
4 TAXATION

- CREATE TAX CLASSIFICATION FOR SAF (PURE AND BLENDED)
- DEFINE RULES FOR "ICMS" REGARDING SAF (PURE AND *BLENDED*)
- REGULATE ARTICLE 3, II OF LAW N. 14,248/2021
- EVALUATE THE FEASIBILITY OF ENCOURAGING THE USE OF RAW

- Discussion of tax incentives for renewable fuels at the federal level.

Public Policy for SAF



- Joint effort of several public institutions, led by the Ministry of Mines and Energy
- Integration (examples)
  - ASTM fuel certification by the National Oil, Gas and Biofuels Agency (ANP)
  - Air sector regulation by the National Civil Aviation Agency (ANAC), including the international standards defined by ICAO

Public Policy for SAF

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- REGULATE ARTICLE 3, II OF LAW N. 14,248/2021 (PIS/COFINS)
- EVALUATE THE FEASIBILITY OF ENCOURAGING THE USE OF RAW MATERIAL FROM FAMILY FARMING

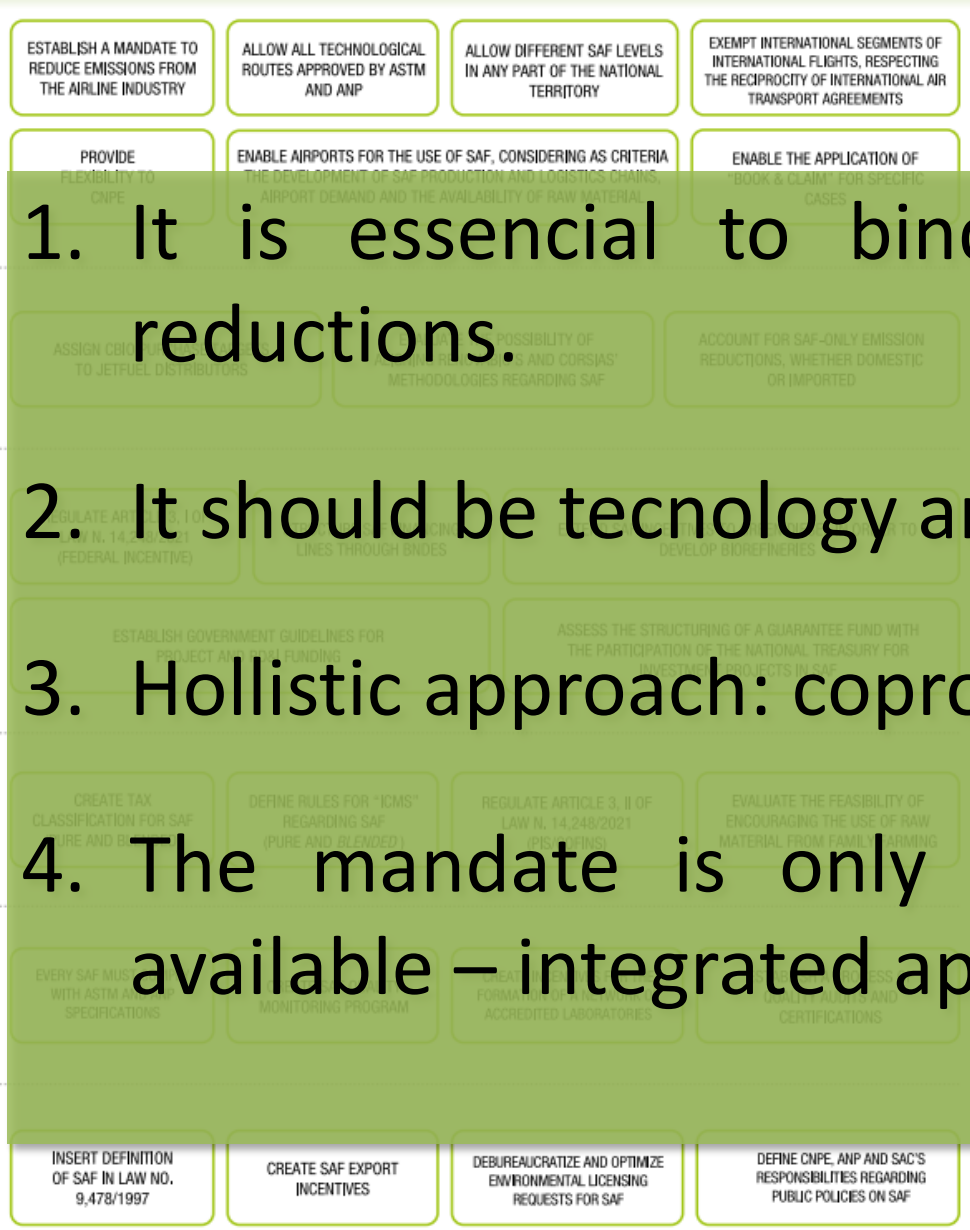
5 QUALITY AND CERTIFICATION

- EVERY SAF MUST COMPLY WITH ASTM AND ANP SPECIFICATIONS
- CREATE SAF QUALITY MONITORING PROGRAM
- CREATE INCENTIVES FOR THE FORMATION OF A NETWORK OF ACCREDITED LABORATORIES
- ESTABLISH A PROCESS OF QUALITY AUDITS AND CERTIFICATIONS

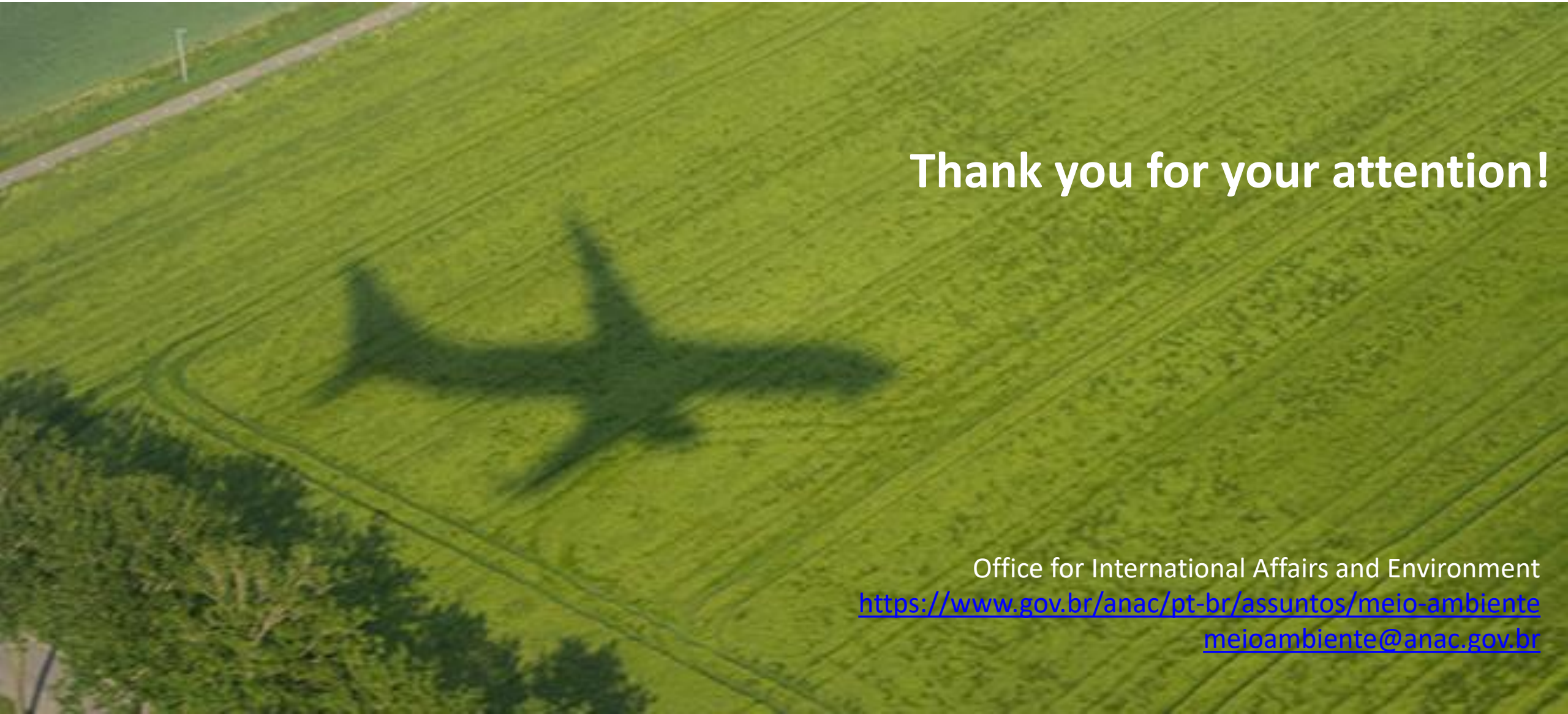
6 GOVERNANCE AND OTHER TOPICS

- INSERT DEFINITION OF SAF IN LAW NO. 9,478/1997
- CREATE SAF EXPORT INCENTIVES
- DEBUREAUCRATIZE AND OPTIMIZE ENVIRONMENTAL LICENSING REQUESTS FOR SAF
- DEFINE CNPE, ANP AND SAC'S RESPONSIBILITIES REGARDING PUBLIC POLICIES ON SAF

Final remarks



1. It is essencial to bind the public policy to emission reductions.
2. It should be tecnology and feedstock agnostic.
3. Hollistic approach: coproducts for ground transportation.
4. The mandate is only one of the public policy's tools available – integrated approach.



Thank you for your attention!

Office for International Affairs and Environment
https://www.gov.br/anac/pt-br/assuntos/meio-ambiente
meioambiente@anac.gov.br

08. Japan

Aviation Sustainability Initiatives in Japan

23rd March 2023

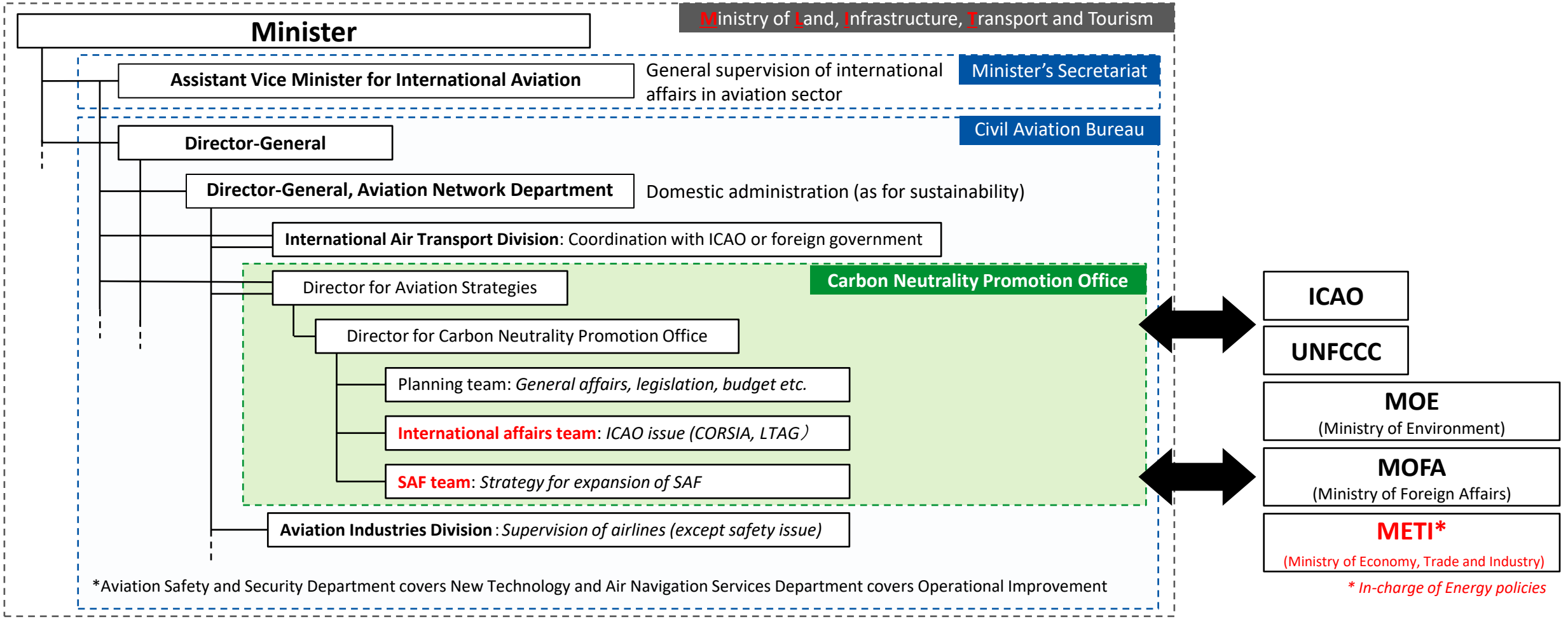
Carbon neutrality promotion office,
Japan Civil Aviation Bureau, MLIT

Today's contents

- ✓ **Governance structure for SAF policy making in Japan**
- ✓ **Two key initiatives in Japan**
  - SAF Roadmap and Utilization target in 2030
  - Amendment of the Civil Aeronautics Act
- ✓ **Activities in Private sector**
- ✓ **Future vision**

Governance Structure

- JCAB established the Carbon Neutrality Promotion Office in April, 2022, to reinforce organizational structure dealing with aviation sustainability issues.
- The Assistant Vice Minister is unitarily in charge of international affairs in aviation sector including sustainability issues in ICAO and UNFCCC.



Public-Private Councils

- In Mar21, JCAB established **"Study Group on CO2 Reduction in the Aircraft Operation Sector"** which consists of air-carriers, academic experts etc.
- The study group **established roadmaps for promotion of decarbonisation in aviation operation sector**.

> ***<Target> Replacing 10% of the fuel consumption by Japanese airlines with SAF in 2030***

- Accelerating actions in the roadmaps, JCAB has established **public-private councils**.

Private-Public Councils for promotion of SAF deployment

Purpose

- ✓ Coordination of demand (airlines) and supply (oil companies) to facilitate the development and production of domestic SAF
- ✓ Construction of future supply chain including imported SAF

Key actions

- ✓ Coordinating of **demand and supply of SAF**
- ✓ Demonstration of **imported neat SAF refueling in Japan**
- ✓ Assistance of **ICAO CEF certification**

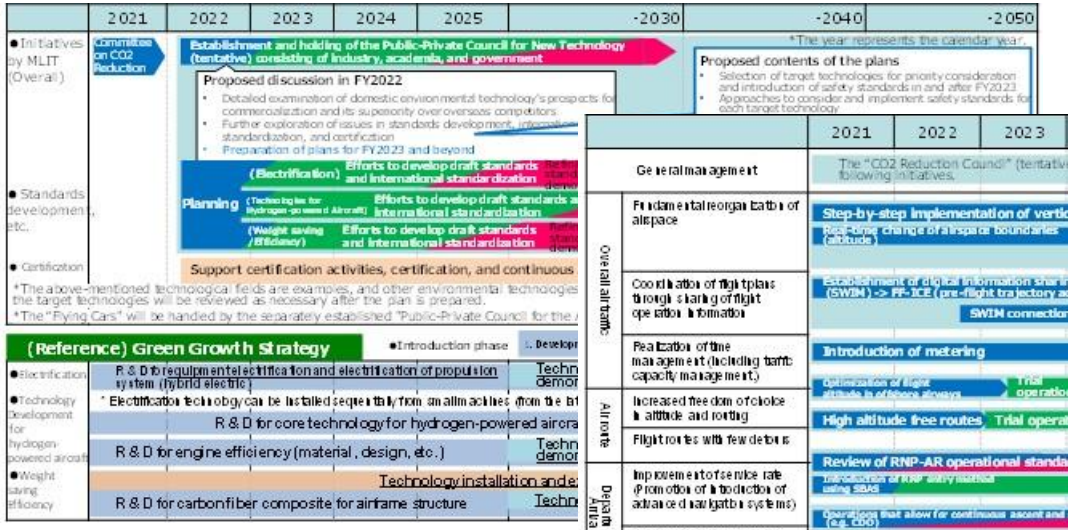
Member

- ✓ Private sector: Air-carriers, Airport company, Oil company, etc.
- ✓ Public sector: MAFF, METI, MLIT, MOE, NEDO(observer)

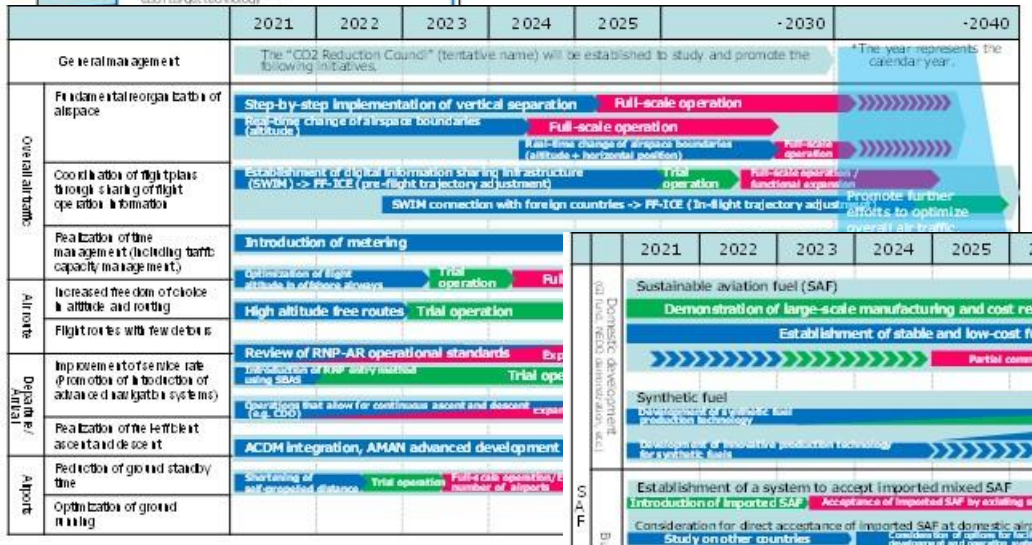
Vice-minister of MLIT, Mr. Nakayama at the 1st council

SAF Roadmap and Utilization target in 2030

- The roadmaps for promoting decarbonization in aircraft operation sector were established in 2021 and are shared among public/private parties in Japan.
- **Two quantitative targets** for decarbonization were established within roadmaps.
  - **SAF**: *Replacing 10% of the fuel consumption by Japanese airlines with SAF in 2030*
  - **Operational improvement:** *Reducing CO2 emissions by about 10% through future efforts of improvement of flight operations by renovating air navigation services*

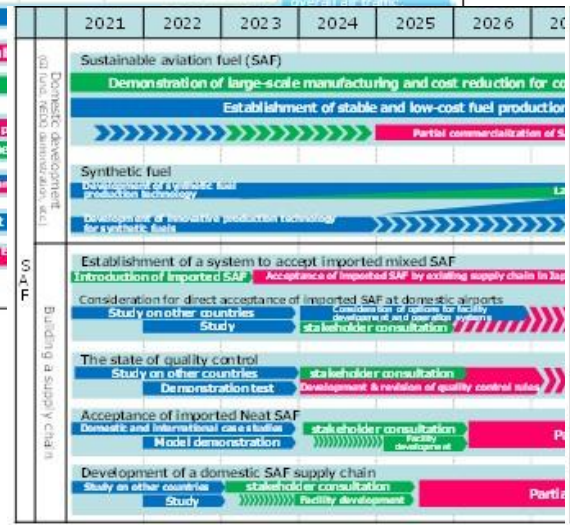


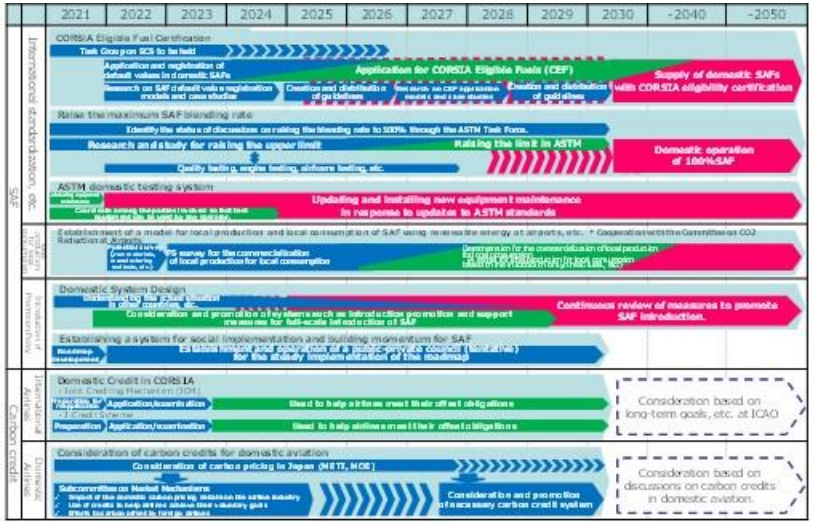
New Technologies



Improvement of Flight Operation

Introduction of SAF





Amendment of the Civil Aeronautics Act

- The MLIT introduces an institutional decarbonization framework to share actions based on the roadmaps and to allow each operator and airport to take action voluntarily and systematically and to increase their accountability.

➡ **Amendment of the Civil Aeronautics Act/Airport Act :**

The Promotion of decarbonisation is stipulated in the provision for the purpose of the acts.

[Framework]

Basic policy for promotion of decarbonisation in aviation sector established by government

MLIT

Application ⇅ Approval

Application ⇅ Approval

Plan for promotion of decarbonisation in air transport established by air-carriers

Aeroplane operator

Plan for promotion of decarbonisation in airport established by airport administrators

Airport administrator

Air-carriers may request consultation

Council for promotion of decabonisation in airport

Airport administrator may organize council

[Key actions] Contents listed in Roadmaps

Reflecting

Aircraft operation field

- New technologies
- Improvement of flight operation
- Promotion of the introduction of SAF

Airport field

- Reduction of airport facility and GSE
- Introduction of renewable energy
- Reduction of aircraft on the ground and airport access etc.

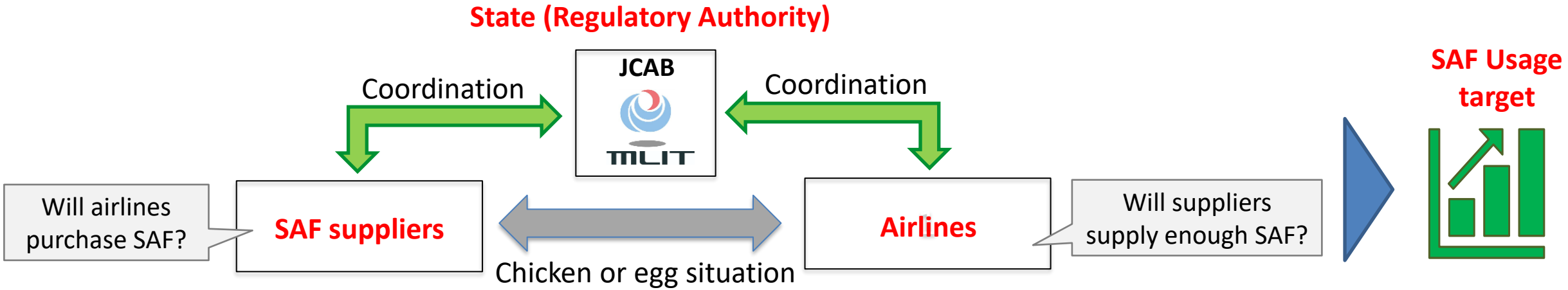
Solar power generation facilities in Kansai Airport

*Photo: Kansai Airports

Lessons learned

Difficulties in relationship between fuel suppliers and airlines

JCAB has been involved in a chicken or egg situation between the supply side (SAF suppliers) and the demand side (AOs);



Considering this situation, JCAB decided to set a concrete target volume for the use of SAF, in order to facilitate the production of domestic SAF.

The above experience has shown us that a civil aviation authority (CAA) could play the role of regulator, but it could also be a coordinator.

Private Initiative for SAF
- Act for Sky -

■ Establishment of “Act For Sky”

On 2 March 2022, a voluntary organisation, "ACT FOR SKY", was launched with JGC HD, Revo INTL’, ANA and JAL as lead companies, with the aim of promoting and expanding domestic SAF.

◆ What is Act For Sky

CONCEPT

ACT FOR SKY is an all-Japan initiative aiming to achieve carbon-neutral skies through the promotion and expansion of sustainable aviation fuel (SAF). We will create a movement that crosses the boundaries of the companies directly involved in domestic SAF and the companies and organisations required to build the supply chain, in order to realise the commercialisation, diffusion and expansion of domestic SAF.

◆ Member companies: 24 (as of February 2023)

JGC, REVO INTERNATIONAL, JAPAN AIRLINES, ANA, IHI Realize your dreams, idemitsu, ITOCHU, ENEOS, odakyu, COSMO, Act for Sky, 太陽石油, TOYO ENGINEERING, NISSIN GROUP, Marubeni, MITSUI&CO., 三菱重工, 大栄環境グループ, DAIWA ROYAL HOTEL, TOSHIBA, J-POWER 電源開発株式会社, ニチレイ, BOEING, KANSAI AIRPORTS, Green Earth Institute

Source: ACT FOR SKY website (https://actforsky.jp/)

Future Vision

- JCAB believes that it is important to have a bilateral or multilateral relationship with certain states in order to increase the use of SAF among them.

- In this sense, we are exploring possible relationships around the world to realize our vision with some policy coordination.

- JCAB welcomes any states or organizations on board, to make this world a better place in light of the NCLB principle.

09. France

- ACT-SAF series – #4 training on “SAF policies”
  - March 2023

- Focus on French endeavor for SAF
  - Mathilde Tannous – French Civil Aviation Authority / Air Transport Directorate

1- Framework for climate action in France

In 2017, France set itself the ambitious objective of **achieving carbon neutrality by 2050.**

This objective is at the heart of France's roadmap for carrying out its climate change mitigation policy: the **National Low-Carbon Strategy**, the second edition of which (SNBC-2) was adopted in April 2020.

The **European Green Deal** (décember 2019) set into legislation **the target of meeting climate neutrality in 2050**.
To achieve this, the European Union has :

- set itself an enhanced global binding target at horizon **2030** : a **net reduction of GHG emissions in the EU of at least 55% compared to 1990**
- Released the **"Fit for 55" package** in which several types of "measures" are mobilized to accelerate the decarbonization of the aviation sector, such as the development of SAF

Revision of our climate strategy with the adoption of the new **French Energy and Climate Strategy** (SFEC) for mid-2024 : a roadmap to achieve carbon neutrality by 2050 & to ensure our adaptation to climate change impacts

- The **first climate energy programming law (LPEC) must be adopted before July 1st, 2023**.
- SNBC-3 will be in the twelve months following the adoption of LPEC (mid-2024).

Work to develop the SFEC is based on **enhanced consultation** with the general public, sector experts, economic players and local authorities.
The **conclusions** of the roadmap **prepared by the aviation sector** have been presented (February 2023).

2- Focus on French endeavour for SAF

- **Co-construction of a national strategy :**

- Started in 2017 with a **Green Growth Commitment** focusing on SAF production in France signed
- between the **State** and five major French industrial groups **: Airbus, Air France, Safran, Suez and Total**

- **Roadmap for the deployment of SAF in France published in January 2020**
  - **2%** in 2025 ● **5%** in 2030 ● **50%** in 2050
  - 5 essential principles : safety / sustainability / economic viability / competitive supply chains / consistency with supranational initiatives

**(estimation based on 2019 traffic level)*

	2025	2030
Roadmap objectives	2%	5%
Quantity of kerosen uplifted in France (Mt)*	8,2	8,8
Quantity of blended SAF (Mt)	0,16	0,43

2- Focus on French endeavour for SAF

- **Mid-2020** launched **a Call for Expression of Interest** to assess stakeholders' interest and needs

- **July 2021: calls for proposal** to support the development
- of a French SAF production sector :
  - **200 million € for pilot/demonstrator construction or engineering studies**
  - Closed in September 2022 – 5 winning projects to date

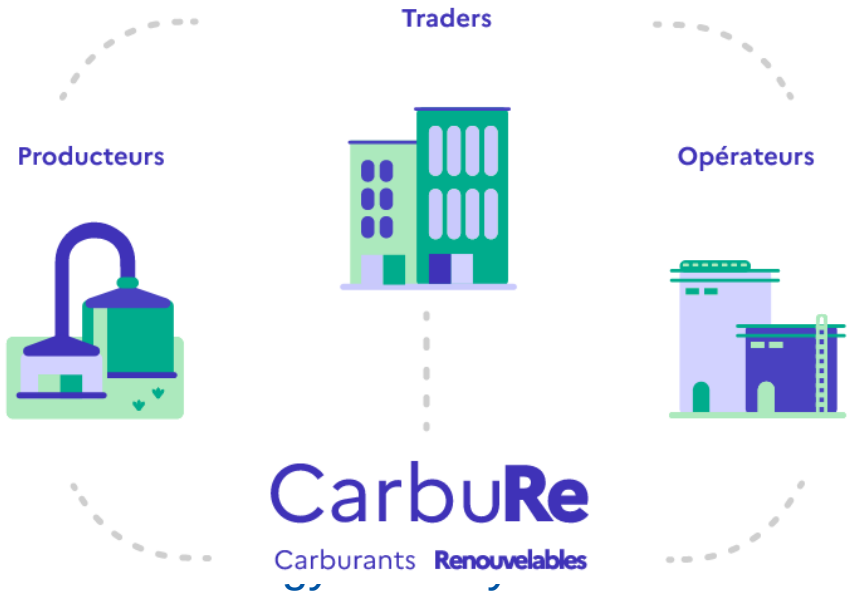
- Concrete application via a mandatory incorporation mandate :
  - **January 2022: blending mandate of 1%** implemented
  - **Mid-2022 :** launch of a working group to address the **industrialization phase** at government level
  - **December 2022 :** study on **PtL fuels potential** in France

2- Focus on French endeavour for SAF

- **TIRUERT : an existing tax instrument**
  - Incentive mechanism to encourage the blending of biofuels in diesel and gasoline, and now kerosene
  - Set-up via the **budget law** & update annually
  - To evolve over the coming years to match our SAF roadmap objectives

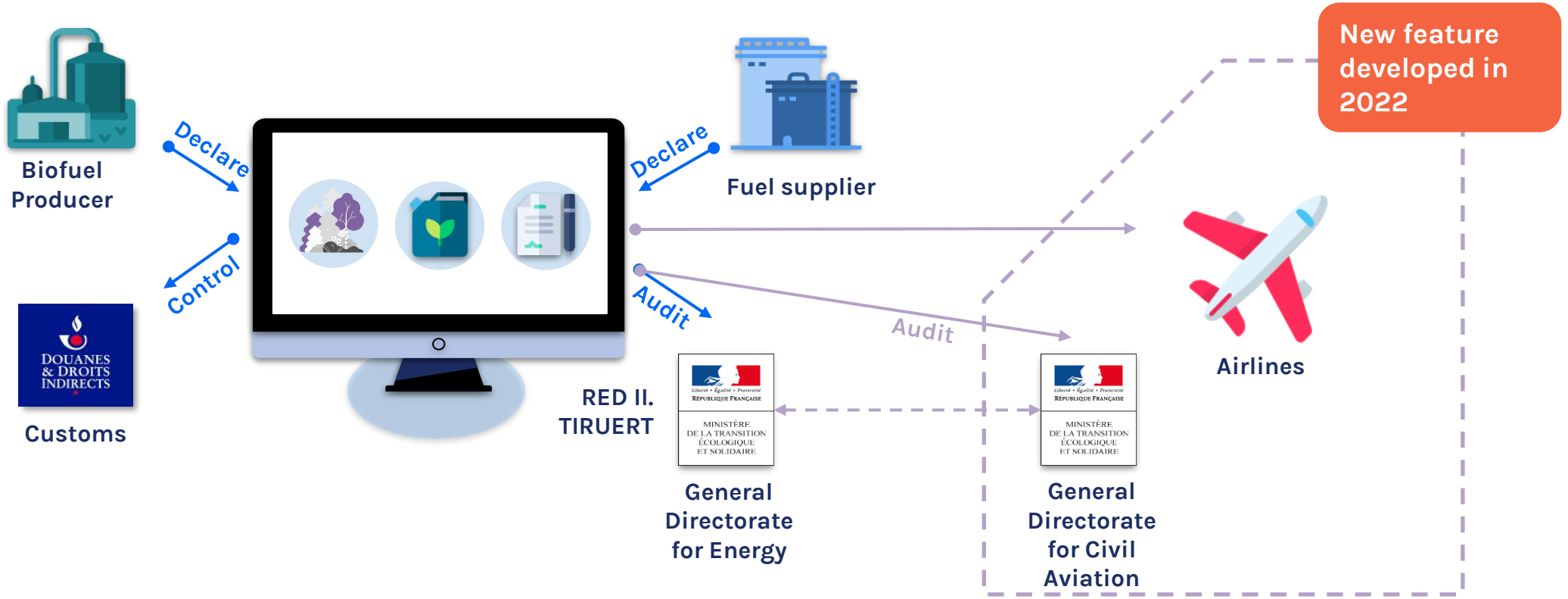
- **Principles**
  - Separate annual objective per type of fuel (non fungible)
  - SAF blending mandate set at **1% since 2022** (in energy)
  - Tax level of **168 € / hectolitres** (at present)

- **Recent development**
  - Mandate level raised to 1,5% in 2024
  - **Upgrade of the biofuel management platform** developed by th



2- Focus on French endeavour for SAF

- Inclusion of the aviation sector
- To ensure airlines can access sustainability information for SAF blended & acquired in France



2- Focus on French endeavour for SAF

- **Moving toward industrialisation requires collaborative work from the transport, energy and industry sectors**
  - Mid-February 2023 : high level task force on SAF **launched by 3 Ministers**
  - SAF value-chain stakeholders' consultation on-going
  - To identify roadblocks to be removed and to draw adequate measure(s) to be implemented in order to support the development of a SAF production value chain at an industrial level
  - Timeline : mid-2023

2- Focus on French endeavour for SAF

- **Lessons learned**
  - SAF is a challenging cross-sectoral topic to address
  - For investments to be made : regulation continuity and harmonisation are paramount, at national / Regional / Global levels
  - Enhanced consultation of all stakeholders (from energy to airlines) is key
  - Technology neutral approach is important

Thank you for your attention

04. United Arab Emirates

Aviation and energy are key sectors in the UAE

Aviation is a major economic sector in the UAE:

UAE Direct investment
270+ Billion USD

Commercial airports
10

DXB airport
1st International
3rd Passengers

GDP share (GCAA, 2018)
15%

Commercial aircrafts
884+

Market size (RPK|RTK)
3rd Worldwide

2030 GDP impact (ACI, 2019)
88.1 Billion USD

Jet fuel production (Statista, 2018)
10.5 Million tons

Aviation emissions
6th Worldwide

The UAE is a global energy leader actively pursuing decarbonization:

The **UAE Net Zero by 2050 Strategic Initiative** focuses on **clean energy solutions** and will invest over **AED 600 billion** in the renewable energy sector.

The **UAE Hydrogen Leadership Roadmap** announced during the UN COP26 Meeting envisions the creation of a **blue and green hydrogen industrial ecosystem** in the country capable of capturing **25% of the global hydrogen trade by 2030**.

The O&G sector is key in the UAE's climate vision:

2031 GDP from industry (Operation 300bn)
300 Billion AED

2030 output capacity (S&P Global, 2021)
5.0 Million b/d

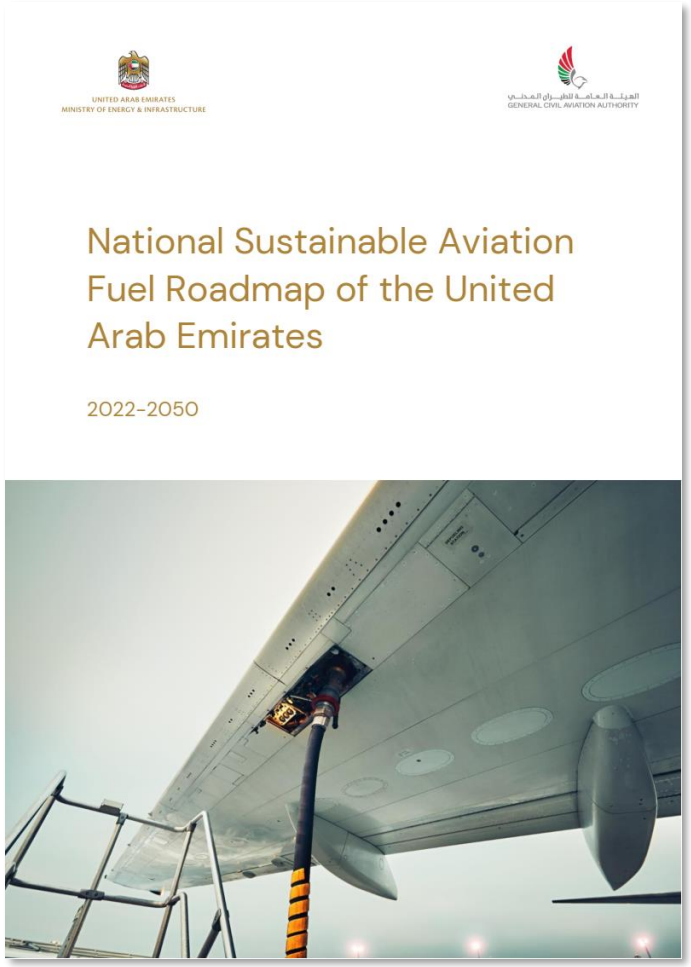
2030 GHG Emissions (Vision 2030, 2021)
25% Reduction

2030 RES capacity (TAQA JV, 2021)
30 GW green H_2

* All figures before the COVID-19 pandemic:

UAE SAF Roadmap

2022-2050: Key strategic points



5 Sustainable Aviation Fuel (SAF) principles are highlighted with the intent to accelerate the decarbonization of the UAE's aviation sector and transform it into a **regional hub for low carbon aviation fuels**

Principle 1: Establishing the ambition

Principle 2: Accelerating SAF Technology Deployment and Innovation

Principle 3: Developing the National Regulatory Environment for SAF

Principle 4: Building Local Capacity to Boost In-Country Value

Principle 5: Leading International Collaboration

Participants

The UAE SAF Committee

Emirates
Etihad Airways
Dubai Airports
HSBC
BEEAH
ADNOC
bp
Shell
Boeing
Safran
IATA
Khalifa University
Masdar

Knowledge Partner

ICF

Establishing the ambition

1

Establishing the Ambition: 700 million liters SAF by 2030

By 2030, the UAE will develop domestic SAF capacity sufficient to produce 700 million liters of SAF on an annual basis.

With 700 million liters of SAF by 2030 target, the UAE can both boost low carbon growth of its aviation industry, and can unlock export opportunities

Target

700 million liters/year SAF Production by 2030

Investment

3 to 5 SAF Facilities

$7bn to $9bn Investment in Value Chain by 2030

Benefits

18,000 New Jobs in the UAE

4.8 Mt Accumulated Emission Reduction

$1.7bn Accumulated SAF Export

Accelerating SAF Technology Deployment and Innovation

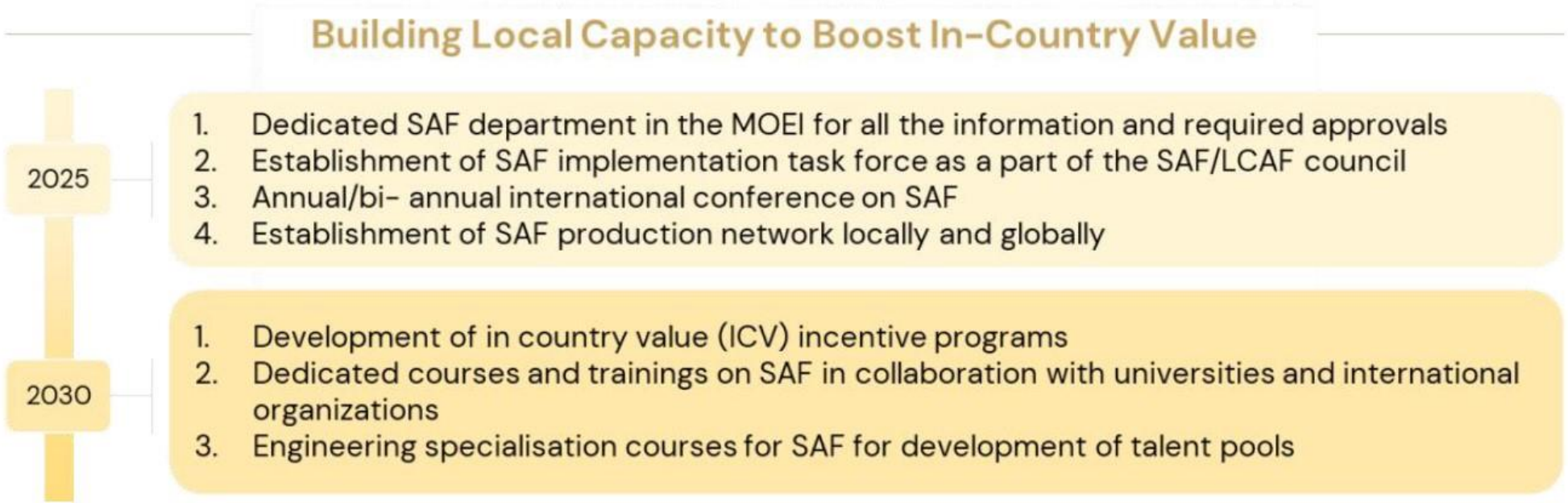
Principle 2: Accelerating SAF Technology Deployment and Innovation

"The UAE will support research, development and demonstration (RD&D) of SAF technologies and deployment of early-stage facilities to produce SAF at a commercial scale by 2025. The need for further RD&D support across SAF technology pathways is crucial, as the most promising SAF production pathways applicable to the UAE are still in the early stages of commercialization (mid - Technology Readiness Levels, TRL). The UAE is seeking to unleash the potential of these emerging technologies through collaborative RD&D support. To achieve this, the UAE could establish a research center focusing on SAF production, bringing together industry and academia under a unified strategic research agenda. Providing financial support for SAF RD&D and production will enable the UAE to create a SAF ecosystem which supports and attracts sustainable research and industrial activity for the purposes of achieving sustainable aviation." (UAE SAF Roadmap, 2022)

A **dedicated RD&D center**, pursuing a unified research agenda focused on bringing **mid-TRL technologies forward in the path to commercialization** is essential to accomplish the UAE SAF strategy

Developing the National Regulatory Environment for SAF

Building Local Capacity to Boost In-Country Value



Leading International Collaboration

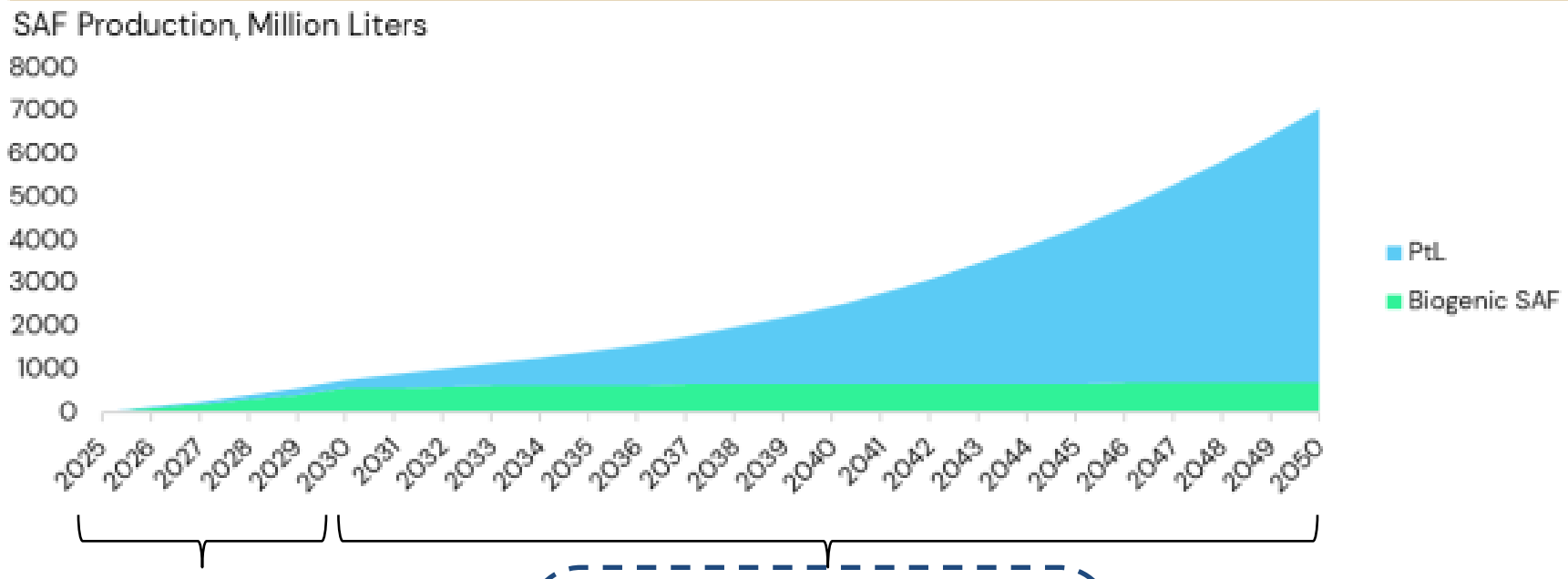
Principle 5: Leading International Collaboration

Aviation is a global industry, and alongside national efforts, the UAE will seek to accelerate the global transition through leadership at ICAO, and support of projects on renewable fuels and energy in other countries. The UAE's commitment to SAF development will meaningfully support the decarbonization of the UAE's aviation industry, and develop the technologies, skills, and methods required for the global transition to a low-carbon aviation industry. However, this is a transition that no country, industry, or company can achieve alone, and collaboration will be essential to success. Poised to host COP28 in 2023, the UAE is uniquely positioned to lead global discourse on SAF production and utilization as part of wider climate change action. Furthermore, as a developing finance, technological, and industrial hub, the UAE can facilitate the global proliferation of SAF best practice, aid in knowledge transfer, and invest and export RD&D. SAF technology is itself underpinned by several low-carbon technologies, including renewable electricity generation and storage, low-carbon hydrogen, carbon capture, and logistics. The financial support and expertise that the UAE already provides to international projects across these technologies is crucial to the broader transition, which compounds the work the UAE is undertaking for SAF. Chapter 5 provides details on how the UAE can support international SAF ambitions. Key initiatives to support this principle by 2030 are given below:

SAF technology pathways that are relevant to the UAE

The UAE SAF roadmap identified a two-stage approach to SAF production at commercial scales, first focused on **biogenic feedstocks**, then moving aggressively into **Power-to-Liquids (PtL)** synthetic fuels

Baseline scenario concludes that 700 ML SAF production by 2030 is a pragmatic target for the UAE



Short-term

Medium- and long-term

Pathway	**HEFA-SPK**	**DIFFERENT OPTIONS**
Feedstock	**UCO, MSW, Vos (Salicornia)**	**H_2, CO_2 (CC)**
Long-term relevance	**SECONDARY**	**PRIMARY**

Mid-TRL

Need for further RD&D

Key Points

- Collaboration
- R&D will play a very important role
- Take advantage of local capacity (e.g., LCAF)

9. Questions and answers

Break for discussion

Questions and answers

10. Closing Remarks

ACT-SAF updates

ACT-SAF platform provides the most recent information:

- List of Partners constantly updated
- ACT-SAF series material available online

ACT-SAF Series

Coordination with ACT-SAF partners identified that many States need conceptual training on SAF.

To address that, ICAO is developing the **ACT-SAF Series of training sessions**, to be held on a monthly basis. This will allow delivering comprehensive training to ACT-SAF Partners on an array of important SAF-related topics, ranging from sustainability, to policy, economics/financing certification and logistics.

The ACT-SAF Series will empower the ACT-SAF Partners with training material designed with the support of Supporting States and Organisations from the air transport, fuels and finance sectors, as well as academics and actors with niche expertise such as SAF reporting under CORSIA.

Want to participate on the ACT-SAF Series? Join ACT-SAF now (click here to access the ACT-SAF Terms and Conditions). Participation is open to all States and Organizations interested in further action on SAF.

ACT-SAF Series	Date	Topics	Contributor(s)	Abstract	Video and Presentation
#1	25 November 2022	An introduction to SAF	ICAO	• Introduction to ACT-SAF • Basics of SAF	Download Presentation
#2	25 January 2023	SAF sustainability and reporting under CORSIA	ISCC RSB Verifavia	• process for sustainability certification of SAF • Reporting and verificaiton of SAF Claims under CORSIA	Download Presentation
#3	23 February 2023	SAF technology and certification	Airbus US FAA Safran	• specifications for aviation turbine fuels • process for approval for new production pathways	Download Presentation
#4	23 March 2023	SAF policies	Brazil, European	• Practical experiences	

ICAO ACT-SAF Platform

Here you will find more information on our ACT-SAF Participants*

Latest news on ACT-SAF

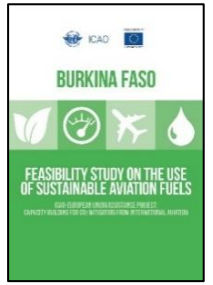
Date	Latest news	Link
16/02/2023	ACI joins ACT-SAF	
12/01/2023	Cote d'Ivoire offers financial resources to ACT-SAF	
22/12/2022	Netherlands offers financial resources to ACT-SAF	
20/12/2022	France offers financial resources to ACT-SAF	
17/11/2022	ICAO launches the ACT-SAF Series of training events on SAF	
20/10/2022	Argentina signs the ACT-SAF Terms and Conditions	

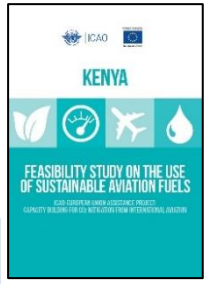
https://www.icao.int/environmental-protection/Pages/act-saf.aspx

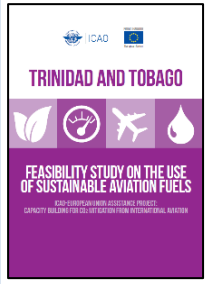
ACT-SAF updates – Feasibility Studies

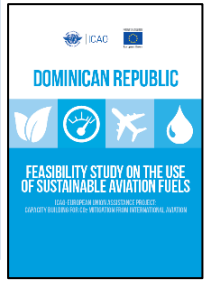
ACT SAF

1. Many feasibility studies will be developed in ACT-SAF
   - Three new feasibility studies under existing ICAO-EU project (Zimbabwe, Côte d'Ivoire and Cabo Verde), ICAO and World Bank project being structured, studies also being pursued by ACT-SAF partners
   - **Financial resources provided by ACT-SAF partners will allow MANY additional feasibility studies**
2. A template for SAF feasibility studies will be developed under ACT-SAF
   - Allow comparability between results, harmonized structure , facilitate outreach of results









ACT-SAF partners are invited to identify experts/consultants that could contribute to these two initiatives

Development of the ICAO template of feasibility studies	Development of ACT-SAF feasibility studies

Requirement: Expertise with development of clean energy studies *(not necessarily ACT-SAF focal point – any identified expert is welcome).*

Contact ICAO to participate on this effort (officeenv@icao.int)

ACT-SAF updates

ACT SAF

Key request - conceptual training on SAF

ACT-SAF Series (preliminary list of sessions)
✓ #1 Introduction to SAF
✓ #2 SAF sustainability and reporting under CORSIA
✓ #3 SAF production technology and certification
✓ #4 SAF policies
#5 SAF market outlook
#6 SAF economics and financing (June)
#7 SAF logistics (July)
#8 SAF Feasibility Assessment (September)

NEXT: 25 May 8-10 AM EST

- Future sessions on specific aspects
- Subject to review – **feedback welcome**

https://www.icao.int/environmental-protection/Pages/ACT-SAF-Series.aspx

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Paris

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Bangkok

THANK YOU