



| ICAO

# INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY



# CORSIA Eligible Fuels – Sustainable Aviation Fuels (SAF) SAF Policy, Regulatory Frameworks and Financing

ICAO Secretariat

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# International Aviation's Climate Goals

2010



Collective medium-term global aspirational goal: **carbon neutral growth from 2020** (CNG2020)

2022

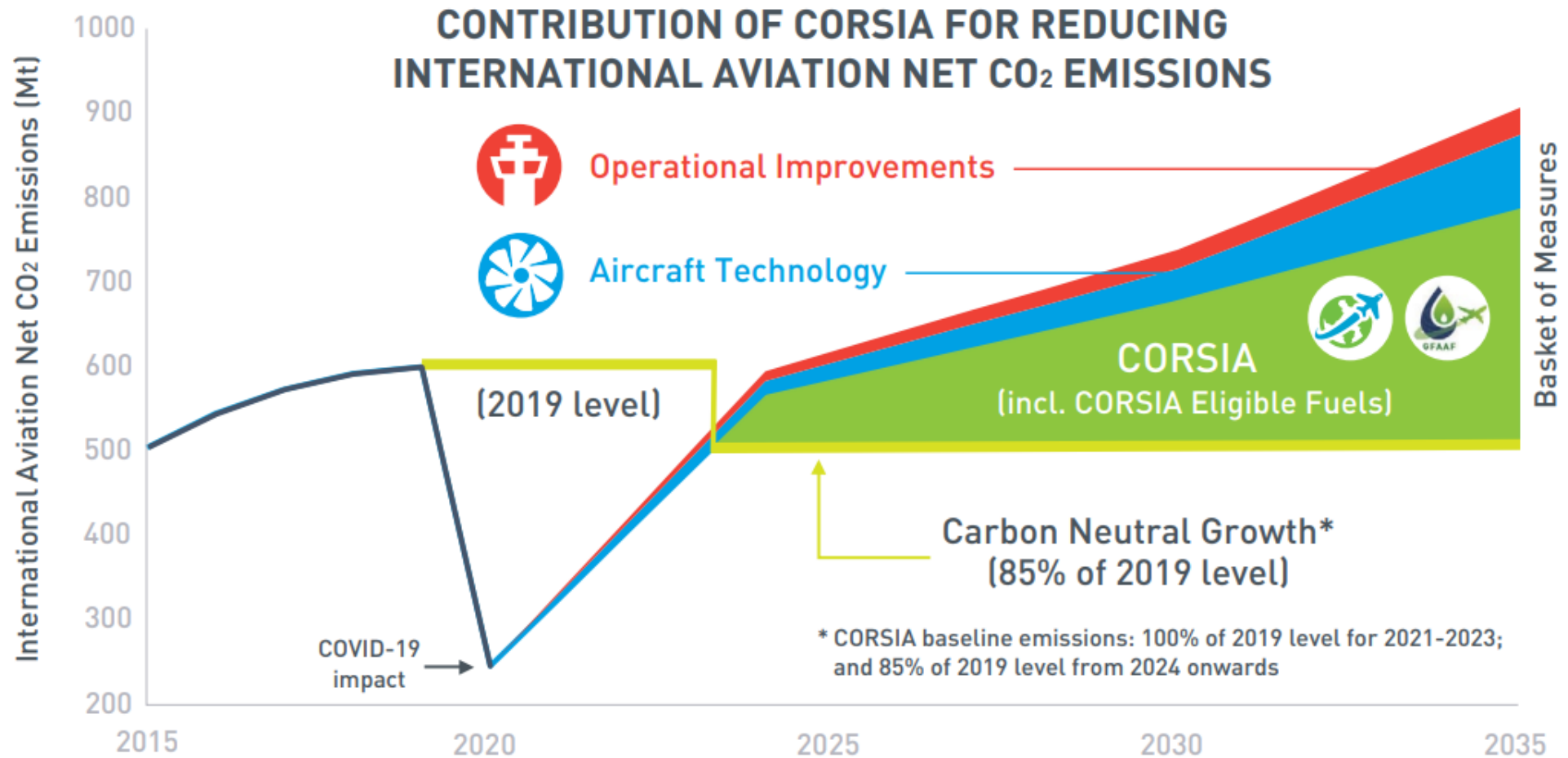


Long-term global aspirational goal (LTAG): **net zero carbon emissions** from international aviation by **2050**

2023



Collective global aspirational Vision: **to reduce CO<sub>2</sub> emissions by 5% by 2030** using aviation cleaner energies.





# Annex 16 volume 4 Definitions - Fuels and CORSIA

SAF conversion processes defined as "a type of technology used to convert a feedstock into aviation fuel".

SAF conversion processes are evaluated and approved by organizations such as ASTM International.

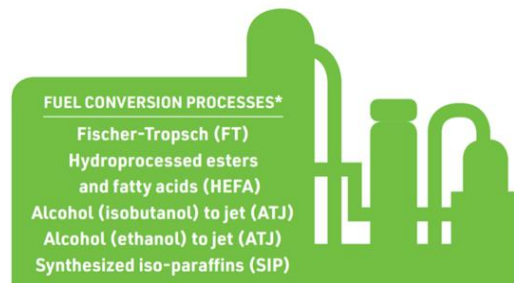
To be eligible for use within the ICAO Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), SAF must also meet a set of sustainability criteria

CORSIA Eligible Fuel: a CORSIA sustainable aviation fuel or a CORSIA lower carbon aviation fuel, which an operator may use to reduce their offsetting requirements.

- SAF is defined as a **renewable or waste-derived aviation fuel** that meets the CORSIA Sustainability Criteria
- LCAF is defined as a **fossil-based aviation fuel** that meets the CORSIA Sustainability Criteria

**11**  
Approved conversion  
processes  
(11+ under evaluation)

## FUEL CONVERSION



\*Reference: ASTM 7566 and ASTM 1655 - ensures the technical specifications of the fuel

## FEEDSTOCKS



- **Annex 16 Vol IV SARPs on SAF**

- CORSIA includes methodologies that allow aircraft operators to reduce its offsetting requirements through the use of SAF and Lower Carbon Aviation Fuels (LCAF).
- These include globally-accepted **sustainability criteria** and **life cycle methodologies**.



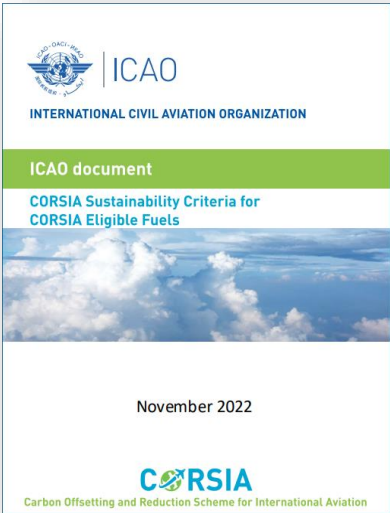
**CORSIA regulations are critically important for any Sustainable Aviation Fuel (SAF) projects.**

- States developing SAF projects **must ensure that fuels meet these criteria to be recognized under CORSIA**
  - ICAO developed **model CORSIA regulations**

## Sustainability of Aviation Fuels

a **set of Sustainability Criteria** was approved by the ICAO Council, in the context of consideration of Sustainable Aviation Fuels and Lower Carbon Aviation Fuels under CORSIA. These Criteria are registered in the ICAO document "CORSIA sustainability criteria for CORSIA eligible fuels".

<https://www.icao.int/CORSIA/corsia-eligible-fuels>



Sustainability themes	
1. Greenhouse Gases (GHG)	Carbon-reduction themes
2. Carbon Stock	
3. GHG emissions reduction permanence	Environmental themes
4. Water	
5. Soil	
6. Air	
7. Conservation	
8. Waste and chemicals	
9. Seismic and vibrational impacts (only for LCAF)	
10. Human and labour Rights	Socio-economic themes
11. Land Use Rights and Land Use	
12. Water use rights	
13. Local and social development	
14. Food security	

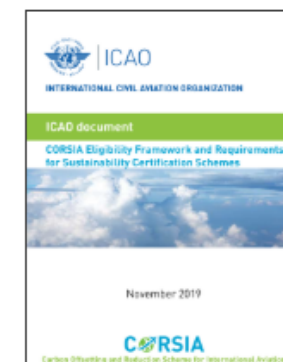
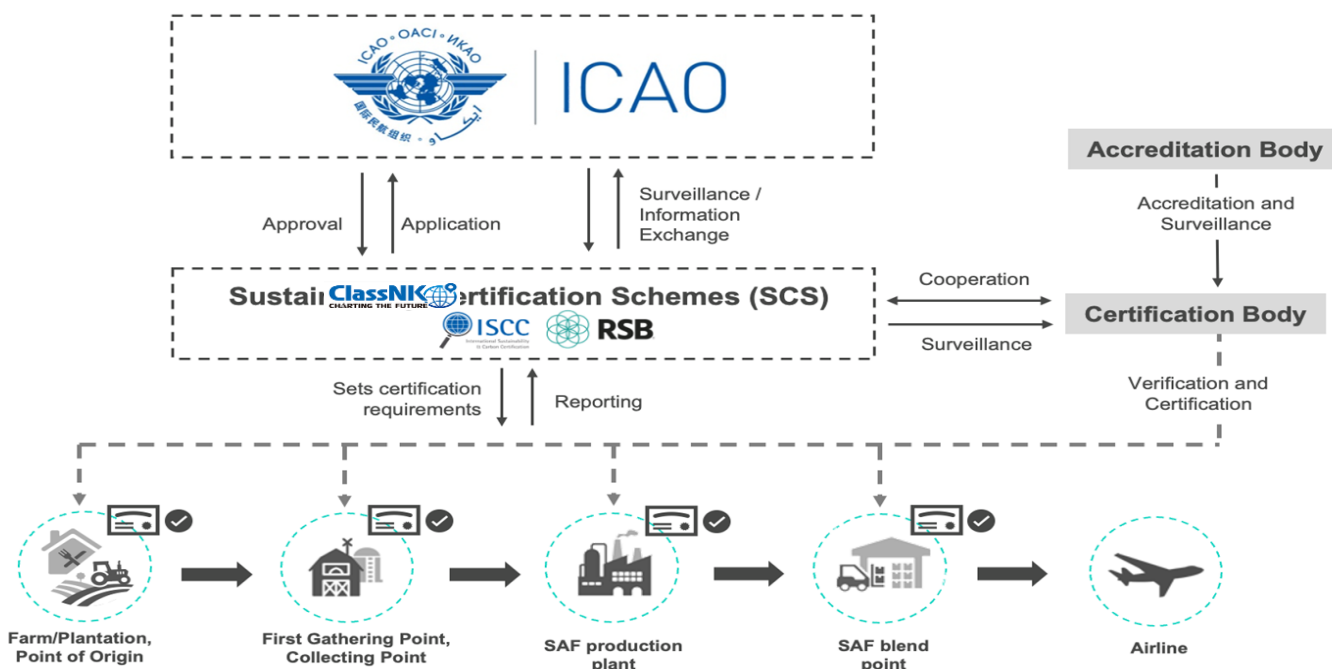
**All themes** applicable for batches of CEF produced by certified fuel producer **on or after 1 January 2024**

# Regulatory framework - Sustainability Certification

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Compliance with the **Sustainability Criteria** is granted on the basis of independent attestation by **CORSIA approved Sustainability Certification Schemes (SCSs)**.

**CORSIA eligible fuels** come from fuel producers that are **certified** by a **Sustainability Certification Scheme (SCS)** approved by the **ICAO Council** to perform this certification.



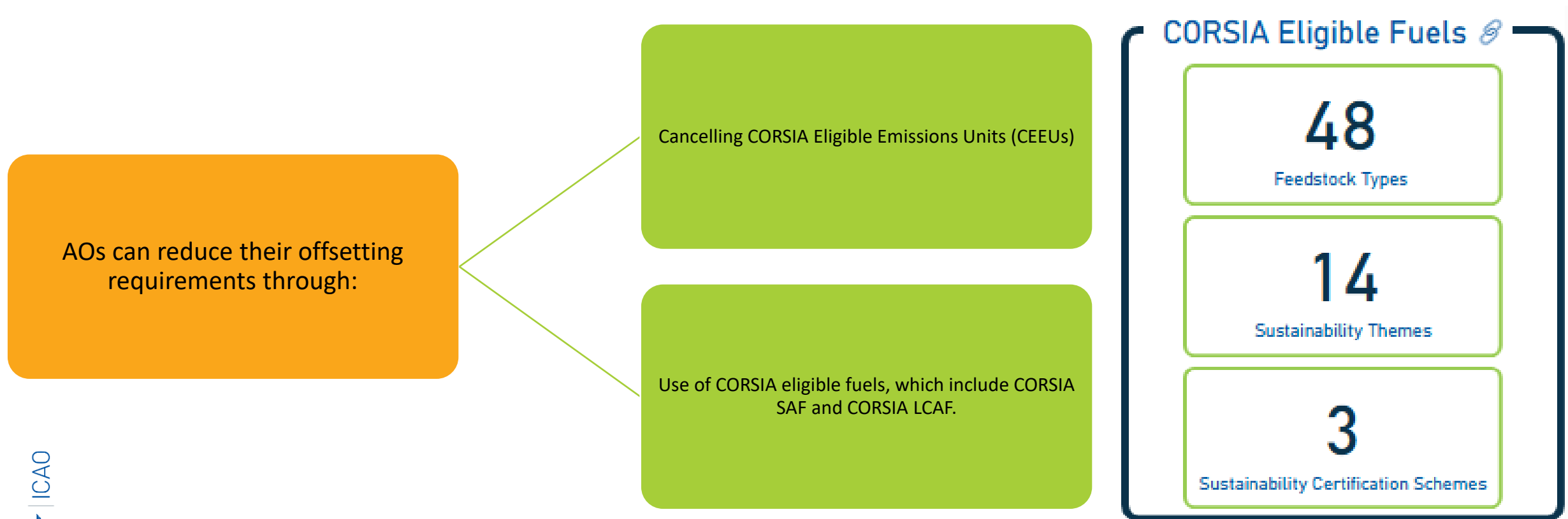
**CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes**  
Fourth Edition,  
June 2025

**CORSIA Approved Sustainability Certification Schemes\***  
Third Edition,  
October 2024

<https://www.icao.int/CORSIA/corsia-eligible-fuels>



# Annex 16 Vol IV: Offsetting requirements



# Calculating an aeroplane operator's offsetting requirements

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$$\text{Operator's Annual CO}_2 \text{ Offsetting Requirements} = \text{Operator's Annual CO}_2 \text{ Emissions subject to Offsetting Requirements} \times \text{Growth Factor*}$$

- The **Sector's Growth Factor**: represents the international aviation sector's global average growth of emissions in a given year. It will be applied as a common factor for all individual operators participating in the scheme for the calculation of their offsetting requirements. **ICAO will calculate the Sector's Growth Factor** every year based on the reported CO<sub>2</sub> emissions data from States to ICAO; and
- The **Individual Growth Factor**: represents an individual operator's growth factor of emissions in a given year.

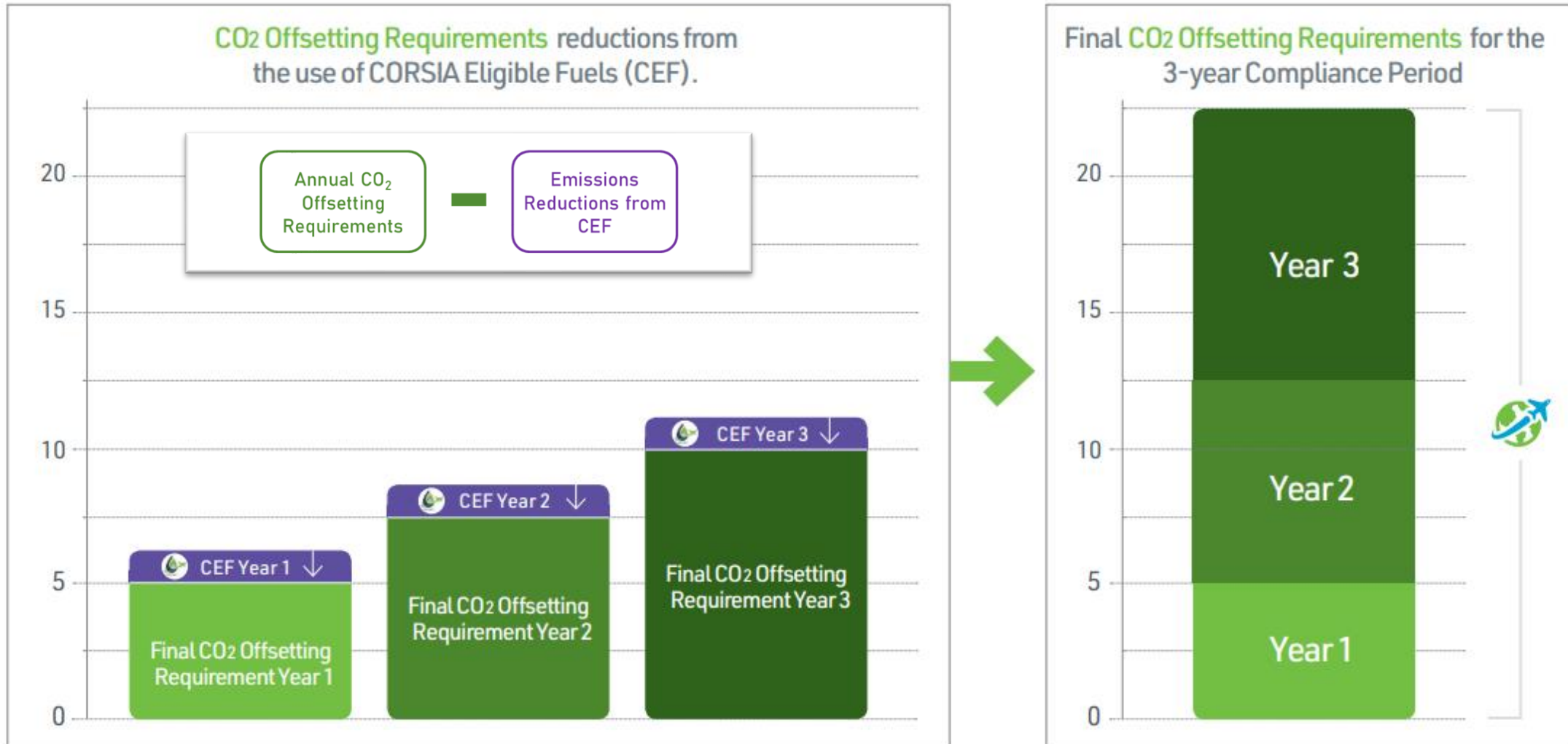
From 2021 to 2032: 100% sectoral and 0% individual

$$\text{AO's CO}_2 \text{ Offsetting Requirements} = \text{AO's CO}_2 \text{ Emissions between participating States} \times \left( 100\% \times \text{Sector Growth factor (\%)} + 0\% \times \text{Individual Growth factor (\%)} \right)$$

From 2033 to 2035: 85% sectoral and 15% individual

$$\text{AO's CO}_2 \text{ Offsetting Requirements} = \text{AO's CO}_2 \text{ Emissions between participating States} \times \left( 85\% \times \text{Sector Growth factor (\%)} + 15\% \times \text{Individual Growth factor (\%)} \right)$$

# Illustration- Calculating Offsetting requirements using CEFs



## Illustration- Calculating Offsetting requirements using CEFs

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FCF = Fuel Conversion Factor, fixed value, 3.16 for Jet-A/ Jet A/ TS-1 or No. 3 Jet fuel or 3.10 for AvGas/Jet B ( kg CO<sub>2</sub>/kg fuel)

$L_{CEF}$  = Life cycle emission value for a CORSIA eligible fuel (g CO<sub>2</sub>e/MJ)

$$ER_y = FCF * \left[ \sum_f MS_{f,y} * \left( 1 - \frac{L_{CEF}}{LC} \right) \right]$$

$MS_{f,y}$  = Total mass of CEF claimed in the year y

LC = Baseline life cycle emissions fixed value, 89 for Jet-A/ Jet A/ TS-1 or No. 3 Jet fuel or 95 for AvGas ( gCO<sub>2</sub>e/MJ)

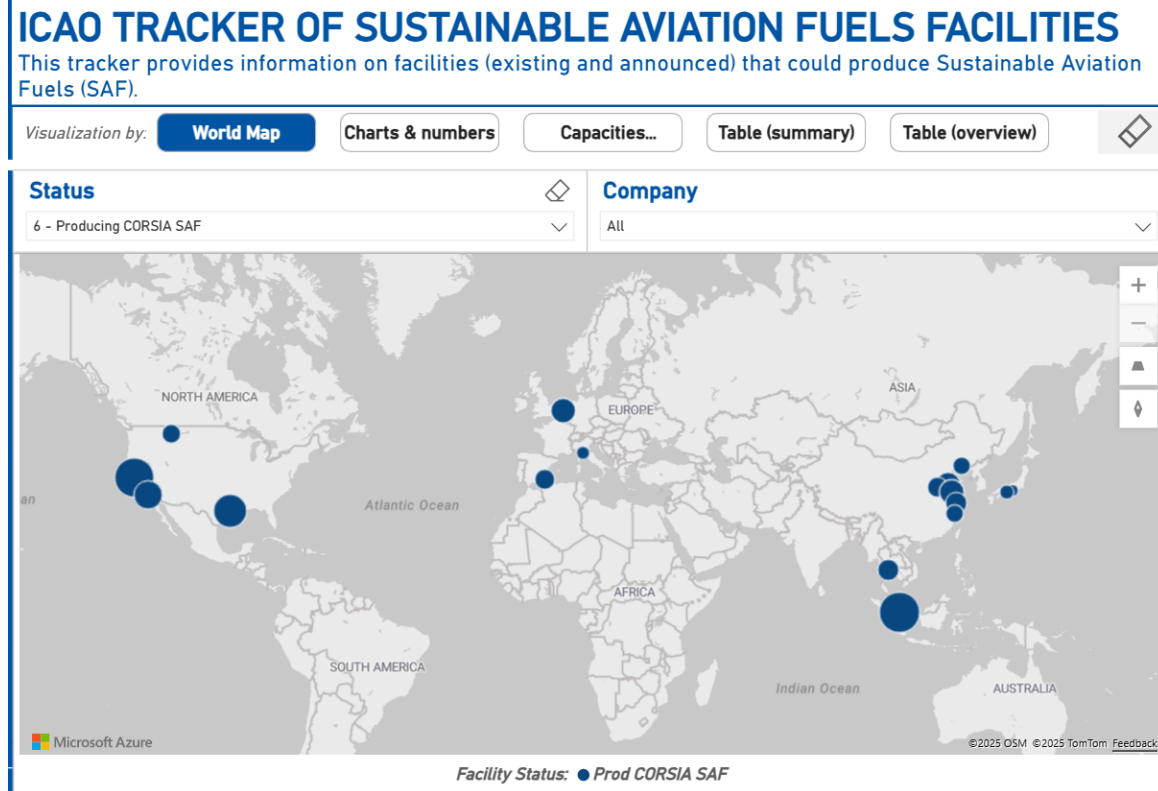
Example: If, in 2021, an operator uses 10,000 tonnes of Jet-A Fuel produced from Used Cooking Oil (Default  $L_{CEF} = 13.9 \text{ g CO}_2\text{e/MJ}$ ), the amount of emissions reductions will be:



$$ER_{2021} = 3.16 \times \left[ 10.000 \times \left( 1 - \frac{13.9}{89} \right) \right] = 26.665 \text{ tonnes of CO}_2$$

# Production facilities – CORSIA eligible fuels

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**CORSIA-certified refineries are getting in service**

**4.4MT/year**  
Current production capacity - CORSIA-certified SAF  
(25 SAF refineries)

**88% of current SAF production capacity is CORSIA compliant**  
(25 out of 49 operating SAF refineries)



<https://www.icao.int/SAF/SAF-production-facilities>



# ICAO Guidance provides details on various policy options, divided into 3 impact areas and 8 categories

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- The ICAO Global Framework for Sustainable Aviation Fuels (SAF), Lower Carbon Aviation Fuels (LCAF) and other Aviation Cleaner Energies
  - includes a collective global aspirational Vision to *reduce CO<sub>2</sub> emissions in international aviation by 5 per cent by 2030*, compared to zero cleaner energy use; and
  - is built across four building blocks: *policy and planning; regulatory frameworks; implementation support; and financing.*
    - These building blocks are interconnected and need to advance and work together to achieve their intended purpose.

The infographic titled "ICAO Global Framework for SAF, LCAF and other Aviation Cleaner Energies" outlines the framework's goals and structure. It states that the framework aims to facilitate the global scale-up of SAF, LCAF, and other aviation cleaner energies by providing greater clarity, consistency, and predictability to all stakeholders. It supports a global scale-up of aviation cleaner energies, including a collective global aspirational vision to reduce CO<sub>2</sub> emissions in international aviation by 5% by 2030 through the use of SAF, LCAF, and other aviation cleaner energies (compared to zero cleaner energy use). The framework provides clarity, consistency, and predictability to all stakeholders on 4 Building Blocks: 1) policy and planning, 2) regulatory framework, 3) implementation support, and 4) financing. It also monitors the implementation progress on emissions reductions and means of implementation, aspires to have cleaner energy production facilities in all regions by CAA/4 (no later than 2028), and updates the vision at CAA/4 on the basis of market developments. Each State's special circumstances and respective capability will inform its ability to contribute to the vision. The four building blocks are: 1. Policy and Planning, 2. Regulatory Framework, 3. Implementation Support, and 4. Financing. A QR code is provided for more information, and the ICAO logo is at the bottom.

**ICAO ENVIRONMENT** ICAO Global Framework for SAF, LCAF and other Aviation Cleaner Energies

The ICAO Global framework aims to facilitate the global scale-up of SAF, LCAF and other aviation cleaner energies by providing greater clarity, consistency and predictability to all stakeholders.

Supports global scale up of aviation cleaner energies:

- Collective global aspirational Vision to reduce CO<sub>2</sub> emissions in international aviation by 5 % by 2030 through the use of SAF, LCAF and other aviation cleaner energies (compared to zero cleaner energy use)
- Provides clarity, consistency and predictability to all stakeholders on 4 Building Blocks as follows:
  - 1) policy and planning, 2) regulatory framework, 3) implementation support, and 4) financing
- Monitors the implementation progress on emissions reductions and means of implementation
- Aspires to have cleaner energy production facilities in all regions by CAA/4 (no later than 2028)
- To update the Vision at CAA/4 on the basis of market developments

Each State's special circumstances and respective capability will inform its ability to contribute to the Vision.

**Four Building Blocks:**

Policy and Planning	Regulatory Framework	Implementation Support	Financing
<b>1. Policy and Planning</b> <ul style="list-style-type: none"><li>• Global aspirational Vision to reduce international aviation CO<sub>2</sub> emissions by 5% by 2030</li><li>• Each State's special circumstances and respective capabilities</li><li>• CAA/4 no later than 2028, with a view to update Vision</li><li>• Collaborative effort across different stakeholders, and encourage State policies, action plans and roadmaps</li><li>• Implementation monitored and periodically reviewed</li></ul>	<b>2. Regulatory Framework</b> <ul style="list-style-type: none"><li>• CORSIA eligibility framework as accepted basis for SAF, LCAF and other aviation cleaner energies</li><li>• Increase the number of SCS, additional fuel production pathways / life-cycle values</li><li>• Parameters for fuel accounting methodologies, leveraging on CORSIA MRV system</li><li>• Study of fuel accounting systems to determine any possible ICAO role</li></ul>	<b>3. Implementation Support</b> <ul style="list-style-type: none"><li>• Robust, targeted and tailored capacity-building and implementation support</li><li>• Building on ACT-CORSIA and ACT-SAF programmes</li><li>• Facilitate partnerships, and exchange of best practices</li><li>• Develop policy toolkit/guidance and support State Action Plans</li><li>• Support feasibility studies, pilot projects, which may facilitate access to investment</li><li>• Support access to technology</li></ul>	<b>4. Financing</b> <ul style="list-style-type: none"><li>• Advocacy and outreach for greater investment in aviation cleaner energy projects, including UN and international financial community</li><li>• Welcome and request for operationalization of ICAO Finvest Hub to facilitate better access to public fund / private investment, to respond to Resolution A41-21, para 18. a)</li><li>• Expedite work to consider the establishment of a climate finance initiative or funding mechanism under ICAO, to respond to A41-21, para 18. b)</li></ul>

Scan the QR code for the full content of the ICAO Global Framework

<https://www.icao.int/environmental-protection/pages/SAF.aspx>

officeenv@icao.int

# ICAO Guidance provides details on various policy options, divided into 3 impact areas and 8 categories

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- The **Long-term global aspirational goal (LTAG)**
  - The 41st ICAO Assembly adopted a long-term global aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050 in support of the UNFCCC Paris Agreement's temperature goal; and
  - The LTAG report shows that SAF has the greatest potential to reduce CO<sub>2</sub> emissions from International Aviation.
- ICAO guidance on policy measures for SAF development and deployment (2024).
  - summarizes potential policies and coordinated approaches for the deployment of SAF, completing a toolbox of guidance material for use by ICAO Member States together with the ICAO SAF Rules of Thumb.
  - *provides some examples of policy approached implemented by ICAO Member States.*

The infographic titled "ICAO Global Framework for SAF, LCAF and other Aviation Cleaner Energies" outlines the framework's goals and structure. It states that the framework aims to facilitate the global scale-up of SAF, LCAF, and other aviation cleaner energies by providing greater clarity, consistency, and predictability to all stakeholders. The framework supports the global scale-up of aviation cleaner energies by facilitating the implementation of the global aspirational vision to reduce CO<sub>2</sub> emissions in international aviation by 5% by 2020 through the use of SAF, LCAF, and other aviation cleaner energies (compared to zero cleaner energy use). It provides clarity, consistency, and predictability to all stakeholders on 4 Building Blocks as follows: 1) policy and planning, 2) regulatory framework, 3) implementation support, and 4) financing. It also monitors the implementation progress on emissions reductions and means of implementation, applying to have cleaner energy production facilities in all regions by CAAP/4 (no later than 2028), and updates the vision at CAAP/4 on the basis of market developments. Each State's special circumstances and respective capability will inform its ability to contribute to the vision. The four building blocks are: 1. Policy and Planning, 2. Regulatory Framework, 3. Implementation Support, and 4. Financing. A QR code is provided to scan for the full content of the ICAO Global Framework, and the URL <https://www.icao.int/environmental-protection/gaegs/SAF.aspx> is listed.

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SCAN ME

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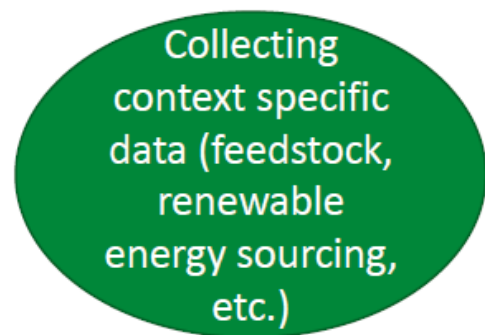
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Impact area: Stimulating Growth of SAF Supply			
1 Government funding for RDD	2 - Targeted incentives and tax relief to expand SAF supply infrastructure	3 - Targeted incentives and tax relief to assist SAF facility operation	4 - Recognition and valorization of SAF environmental benefits
<b>1.1 - Government R&amp;D</b> <b>1.2 - Government demonstration and deployment</b>	<b>2.1 - Capital grants ; 2.2 - Loan guarantee programs</b> <b>2.3 - Eligibility of SAF projects for tax advantaged business status ; 2.4 - Accelerated depreciation/‘bonus’ depreciation</b> <b>2.5 - Business Investment Tax Credit (ITC) for SAF investments 2.6 - Performance-based tax credit</b> <b>2.7 – Bonds / Green Bonds</b>	<b>3.1 Blending incentives: Blender’s Tax Credit</b> <b>3.2 – Production incentives: Producer’s Tax Credit</b> <b>3.3 - Excise tax credit for SAF</b> <b>3.4 - Support for feedstock supply establishment and production</b>	<b>4.1 – Recognize SAF benefits under carbon taxation</b> <b>4.2 - Recognize SAF benefits under cap and-trade systems</b> <b>4.3 - Recognize non-carbon SAF benefits: improvements to air quality</b> <b>4.4 - Recognize non-carbon SAF benefits: reduction in contrails</b>
Impact area: Creating Demand for SAF			Impact area: Enabling SAF Markets
5- Creation of SAF mandates	6 - Update existing policies to incorporate SAF	7 – Demonstrate government leadership	8 - Market enabling activities
<b>5.1 - Mandate renewable energy volume requirements in the fuel supply</b> <b>5.2 - Mandate reduction in carbon intensity of the fuel supply</b>	<b>6.1: Incorporating SAF into existing national policies</b> <b>6.2: Incorporating SAF into existing subnational, regional or local policies</b>	<b>7.1 Policy statement to establish direction</b> <b>7.2: Government commitment to SAF use, carbon neutral air travel</b>	<b>8.1 - Adopt clear and recognized sustainability standards and life cycle GHG emissions methods for certification of feedstock supply and fuel production</b> <b>8.2 - Support development/recognition of systems for environmental attribute ownership and transfer</b> <b>8.3 - Support SAF stakeholder initiatives</b>

# Considerations when developing a SAF ROADMAP

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feasibility studies to identify the capacity and propose specific roadmaps to develop local supply chains



different strategies and policy to promote SAF, depending on the States' specific market background and feedstock availability – maximize environmental benefits



States' decisions can influence market expectations, set targets, develop long-term strategies, establish national goals for SAF



determine if the SAF roadmap should be sector-specific or be a part of a broader national energy strategy



develop suitable regulations and incentives to support the scale-up of commercial production facilities and ensure economic viability and competitiveness

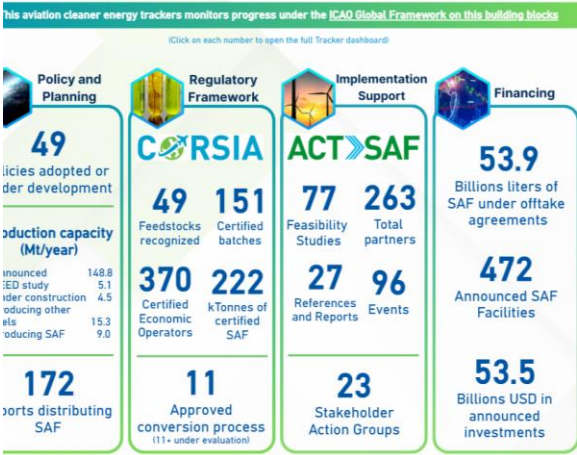




# ICAO ACT SAF



Programme aims to provide tailored support for States in various stages of SAF development and deployment



ICAO Cleaner Energy Tracker Tools monitors the progress under the ICAO Global Framework



## 0 ACT-SAF Knowledge Hub

identified that many States need co

Comprehensive training on an array of SAF-related topics. All the sessions and their materials are available or viewing and downloading.			Studies developed by ICAO and other organisations that aim to evaluate the potential for SAF production at a given State, including feedstock production.		Number of Studies <b>76</b>
			SAF events		
			Compilation of events hosted to discuss global challenges and solutions for further developing SAF.		Upcoming even <b>36</b> Past events <b>59</b>
			Technical References and Reports		

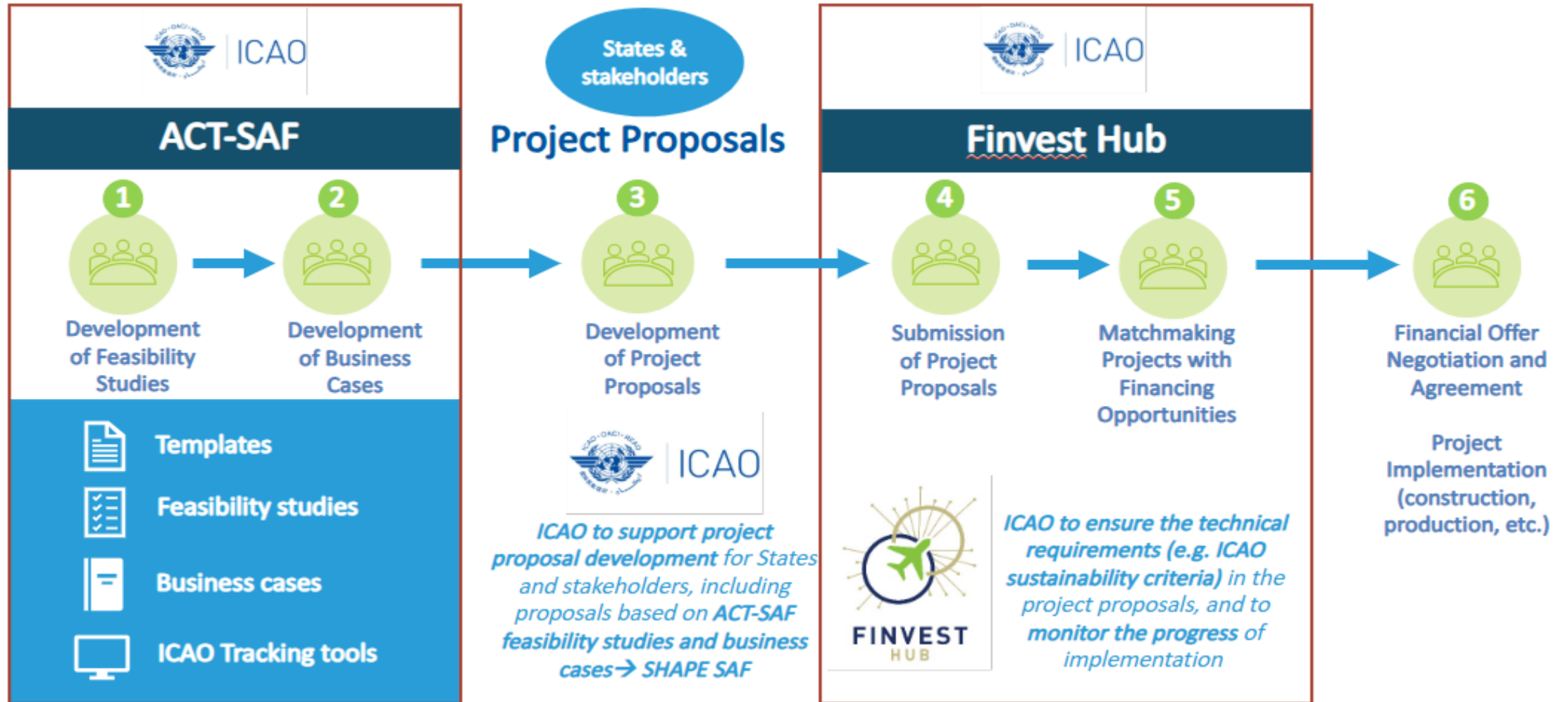
#	Topic	link video	link presentation
20	2025 Updates on the CORSIA regulatory framework for SAF Part I – new CORSIA default LCA values	link	link
19	Building bankable SAF projects	link	link
18	Understanding SAF Clearing Houses	link	link
17	From Vision to Reality - Sweden	link	link
16	Aviation and Green Taxonomy	link	link
15	Coprocessing and revamping how to use existing refineries to produce SAF	link	link
14	Update on 100% SAF testings and	link	link



# The Finvest Hub

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FINVEST is an initiative of the ICAO designed to enable, facilitate, and connect Sustainable Aviation Fuel (SAF) projects with investment and financing opportunities.



# Launch of the Finvest Hub

Part of ICAO's commitment to decarbonizing international aviation, FINVEST aims to be a bridge between sustainable aviation fuel projects and the capital required to scale it globally.



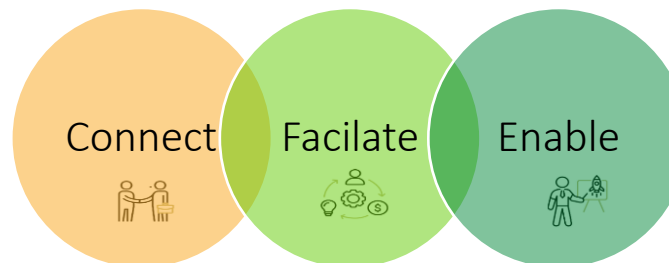
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**Finvest@ETAF platform**

The Energy Transition Accelerator Financing (ETAF) Platform, led by the International Renewable Energy Agency (IRENA), is a multi-stakeholder climate finance facility designed to mobilise more than USD 4 billion annually by 2030 for renewable energy projects in developing countries.



ICAO Finvest aims to accelerate the aviation clean energy transition by **linking the right projects with the right capital** and ensuring they are prepared to succeed. Our activities are built around three pillars



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# Thank You

