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INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY





ICAO

ENVIRONMENT

CORSIA Eligible Fuels

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1

Overview of CORSIA Eligible Fuels (CEF)



CORSIA eligible fuel (CEF) is CORSIA sustainable aviation fuel (SAF) or CORSIA lower carbon aviation fuel (LCAF), which an operator may use to reduce its offsetting requirements.

CEF needs to be certified based on the CORSIA Sustainability Criteria, including its life-cycle emissions values, by an approved Sustainability Certification Scheme (SCS)

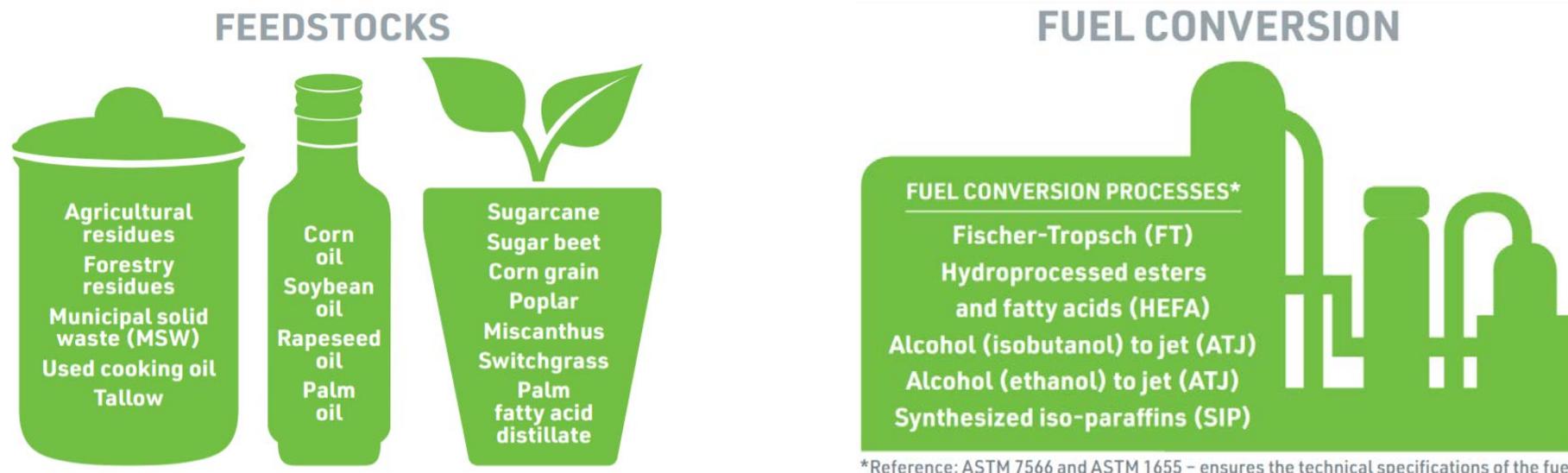
SAF Definition

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

LCAF definition

LCAF is defined as a *fossil-based aviation fuel* that meets the **CORSIA Sustainability Criteria**





- **More feedstocks and conversion processes will become available as the industry evolves.**
- **Up-to-date information is available on the ICAO website**

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

<https://www.icao.int/environmental-protection/GFAAF/Pages/Conversion-processes.aspx>





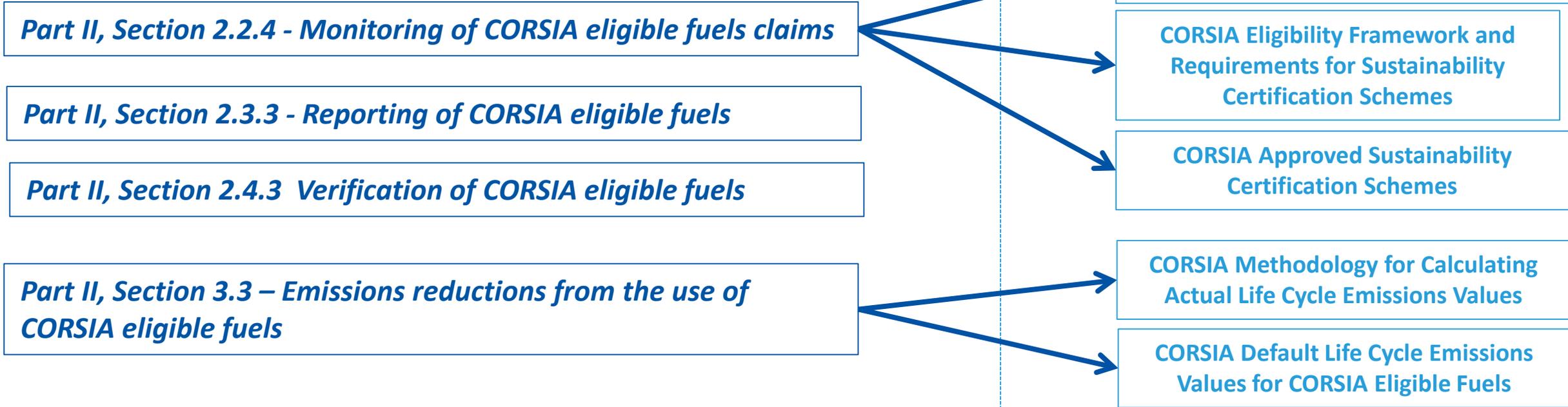
References to CEF under Annex 16, Volume IV

Main Stakeholders:

Fuel Producers; Sustainability Certification Schemes (SCS); Aeroplane Operators; Verification Bodies, States

Annex 16 Vol. IV References

Five “ICAO Documents” referenced in Annex 16 Vol. IV





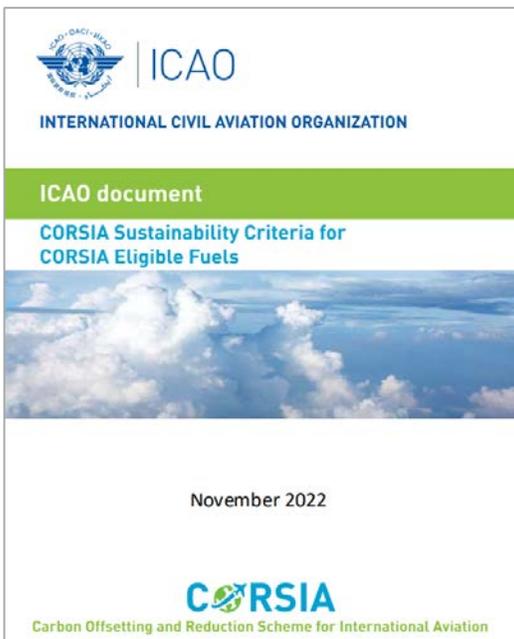
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Sustainability of CEF



Sustainability of CEF

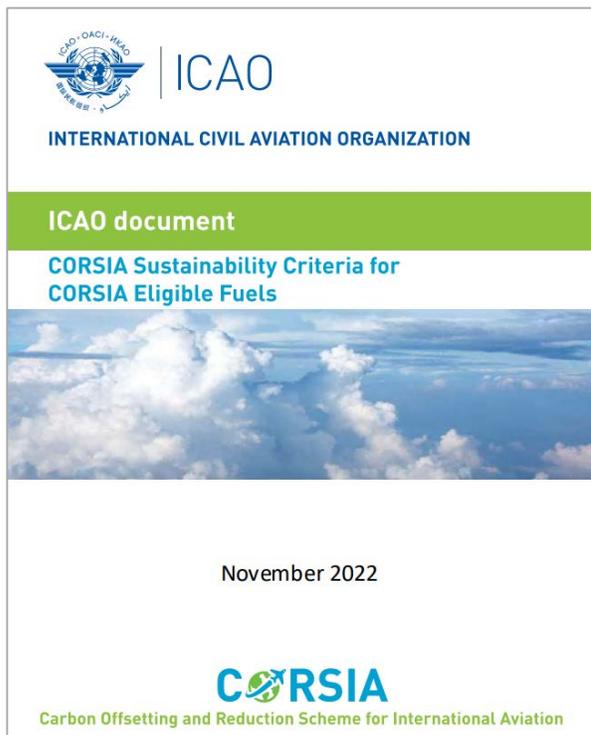
CEF shall meet the Sustainability Criteria defined in the ICAO document “CORSSIA Sustainability Criteria for CORSIA Eligible Fuels” (Annex 16, Vol. IV, 2.2.4.1)



Sustainability Themes
1. Greenhouse Gases (GHG)
2. Carbon stock
3. GHG emission reduction permanence
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
11. Land use rights and land use
12. Water use rights
13. Local and social development
14. Food security

**Carbon-reduction themes
(applicable during CORSIA pilot phase, 2021-2023)**

**Environmental and socio-economic Themes, and GHG permanence
(Applicable after CORSIA pilot phase, from 2024, in addition to Carbon-reduction themes)**



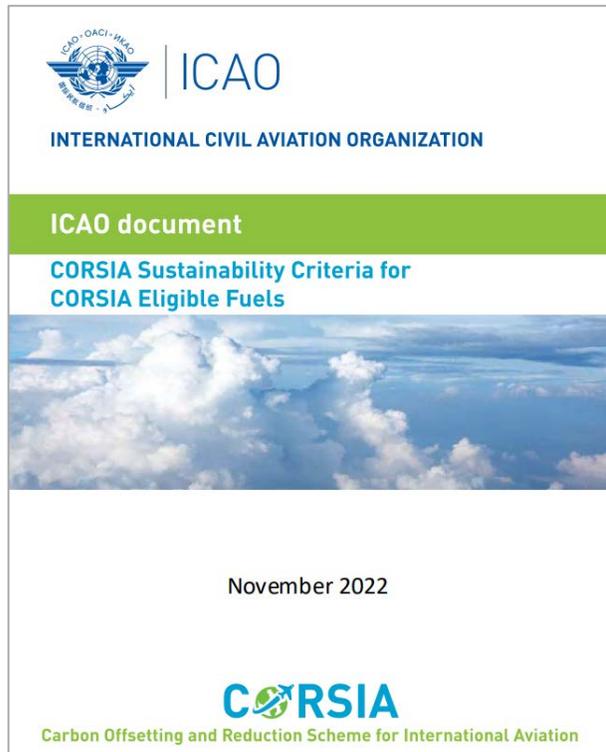
**Sustainability Theme 1:
Greenhouse Gases**
CORSIA eligible fuel should generate lower carbon emissions on a life cycle basis



Criterion: net GHG emissions reductions of at least 10% on a life cycle basis.

*<https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Eligible-Fuels.aspx>

CEF shall meet the Sustainability Criteria defined in the ICAO document “CORSA Sustainability Criteria for CORSIA Eligible Fuels” (Annex 16, Vol. IV, 2.2.4.1)



**Sustainability Theme 2
Carbon stock**
CORSIA eligible fuel should not be made from biomass obtained from land with high carbon stock.



Criterion 2.1: no use of biomass obtained from converted land or aquatic systems
Criterion 2.2: direct land use change (DLUC) emissions to be considered in the event of land use conversion
Land conversion threshold: 1 January 2008.

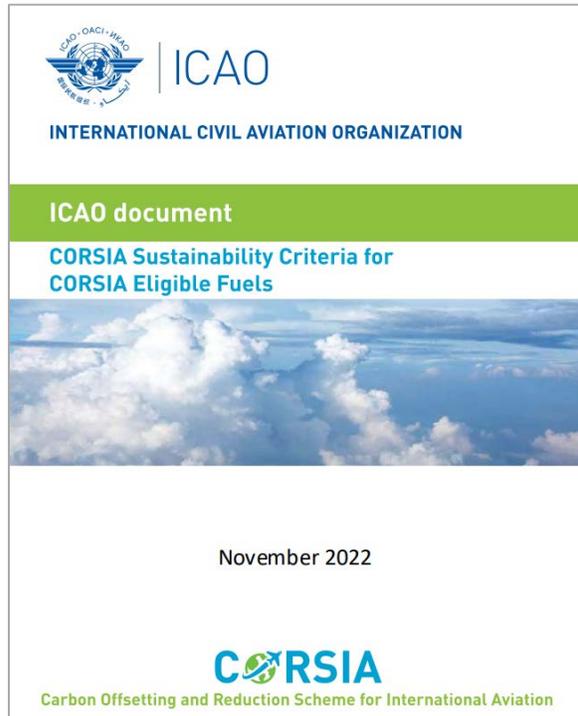
**Sustainability Theme 3
GHG Emission Reduction
Permanence**
Emissions reductions attributed to CEF should be permanent



Criterion 3.1: implementation of operational practices to monitor, mitigate and compensate non-permanence resulting from carbon capture and sequestration (CCS) activities.
Criterion 3.2 (LCAF only) – addresses GHG release from closure and post-closure period of oil and gas wells

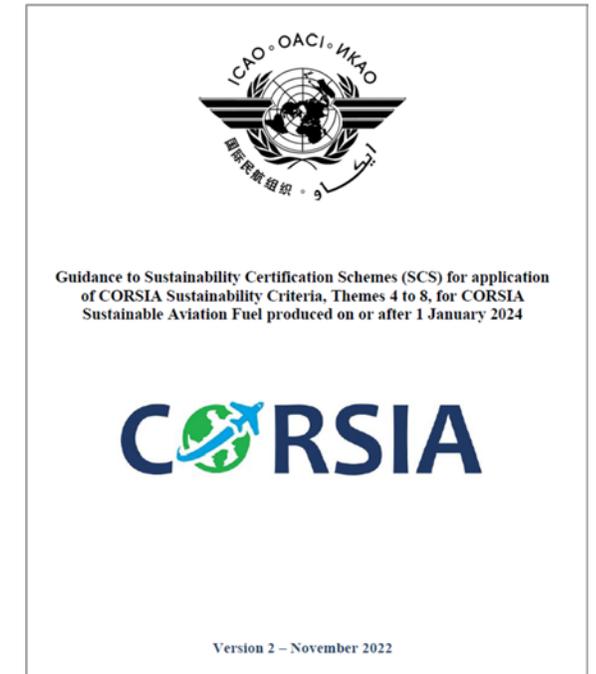
ICAO Council approves the CORSIA Sustainability Criteria for CEF

CEF shall meet the Sustainability Criteria defined in the ICAO document “CORSA Sustainability Criteria for CORSIA Eligible Fuels” (Annex 16, Vol. IV, 2.2.4.1)

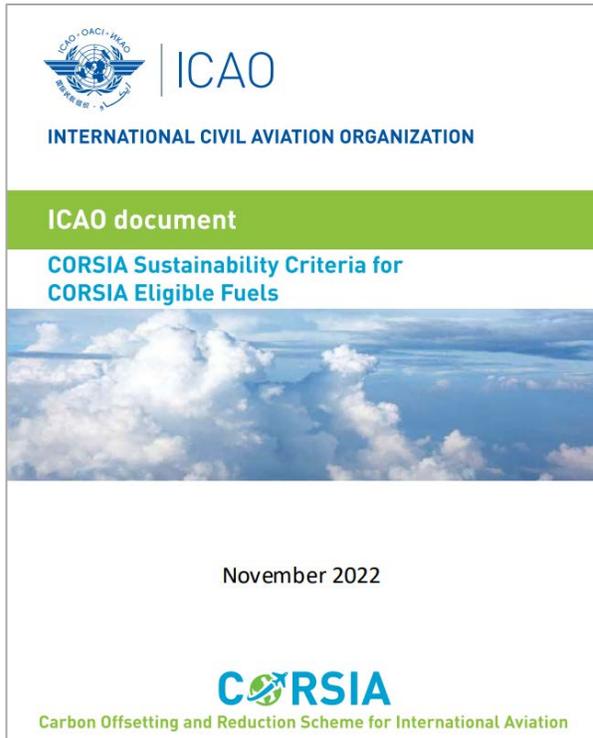


Environmental Sustainability Themes
4. Water
5. Soil
6. Air
7. Conservation
8. Waste and Chemicals
9. Seismic and Vibrational Impacts (Only for LCAF)

Specific Guidance is available for application of these Sustainability Criteria



CEF shall meet the Sustainability Criteria defined in the ICAO document “CORISIA Sustainability Criteria for CORSIA Eligible Fuels” (Annex 16, Vol. IV, 2.2.4.1)



- ### Socio-Economic Sustainability Themes
- 10. Human and labour rights
 - 11. Land use rights and land use
 - 12. Water use rights
 - 13. Local and social development
 - 14. Food security

10, 11 and 12 can be demonstrated by a national attestation from the State

13 and 14 can be met by reporting actions being taken to meet the related criteria

Who certifies the compliance with the Sustainability Criteria?

ICAO Council approves “Sustainability Certification Schemes (SCS) ” that will:

- ensure compliance of CEF with the Sustainability Criteria; and
- ensure that Life-cycle emission value of CEF has been obtained correctly.

SCSs shall meet specific requirements before being approved.

**ICAO document
“CORSA Eligibility Framework
and Requirements for SCSs”**



Provides the requirements that an SCS needs to meet in order to be eligible under CORSA

**ICAO document
“CORSA Approved SCSs”**



Provides the list of approved SCSs under CORSA.
Two SCSs approved as of 2023: ISCC and RSB.



3

Life-cycle Emissions of CEF



Life cycle emissions of CEF

CORSIA Sustainability Theme 1 requires lower carbon emissions on a life cycle basis.



CORSIA Sustainability Criterion 1.1 requires net greenhouse gas emissions reductions of at least 10% compared to a baseline.

These requirements are met with a Life cycle assessment of the CEF:

CEF Life cycle emission value (L_{CEF})
Unit – gCO₂e/MJ



Core Life cycle assessment (core LCA value)
emissions associated with all steps of CEF production and use

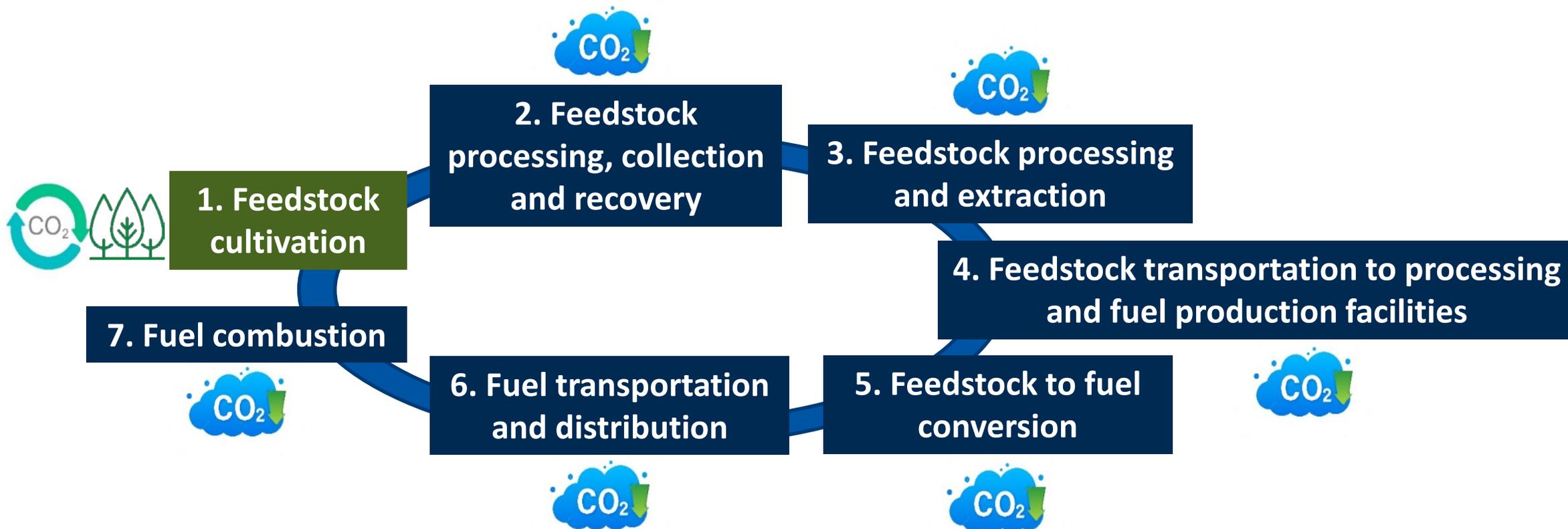


Induced Land use Change (ILUC value)
Emissions associated with possible land use change generated by feedstock production

For LCAF, only core LCA values are considered (ILUC is considered zero).

Core Life cycle assessment (core LCA value)

Emissions associated with all steps of CEF production and use





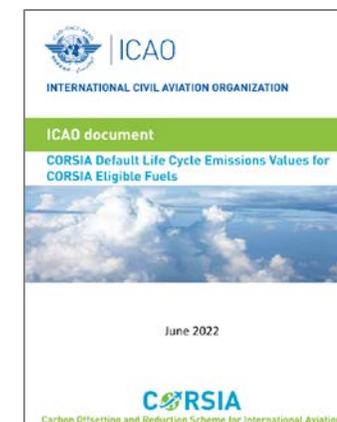
How is the life cycle emission of CEF obtained?

CORSIA allows two options:

DEFAULT Life Cycle Emissions

ICAO document “CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels”

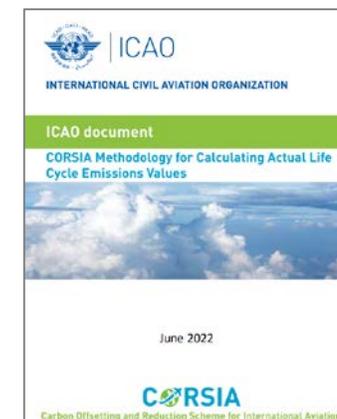
- Default emission values, as a function of the feedstocks and conversion processes.
- Look-up table: simpler process, but emission values are higher (more conservative assumptions)
- Only available for SAFs



ACTUAL Life Cycle Emissions

ICAO document “CORSIA Methodology for Calculating Actual Life Cycle Emissions Values”

- Provides fuel producers with flexibility to calculate their specific values.
- Only option available for LCAF.



Example: default life cycle emissions of sugarcane ethanol ATJ in Brazil

Production step	Associated emissions (gCO ₂ e/MJ)
Feedstock growth	-74
Feedstock cultivation Feedstock processing, collection and recovery Feedstock processing and extraction	16.9
Feedstock transportation to processing and fuel production facilities	1.6
Feedstock to fuel conversion	5.2
Fuel transportation and distribution	0.4
fuel combustion on aircraft engine	74
total (core LCA value)	24.1
Induced Land use Change (ILUC value)	8.7
SAF Life cycle emission value (L_{CEF}) = core LCA + ILUC	32.8



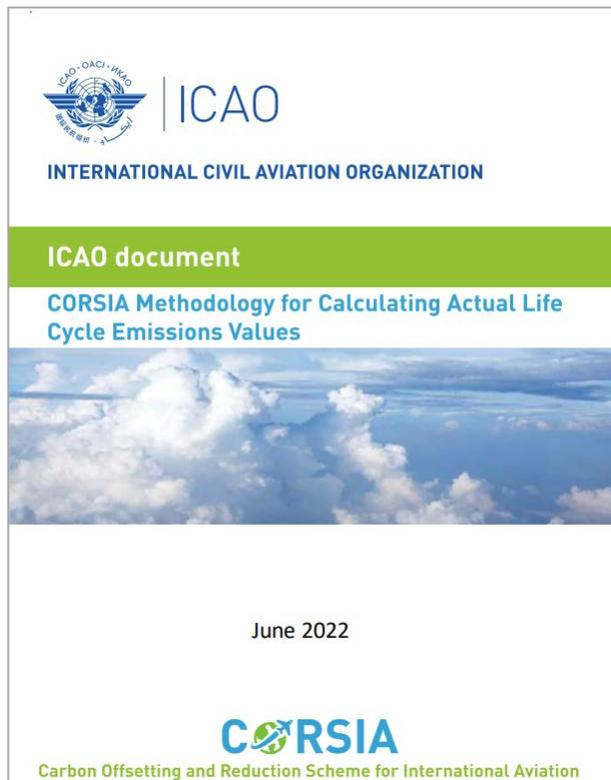
63% emission reduction on a life cycle basis
 (Compared with Baseline emission value of 89 gCO₂e/MJ)





ICAO document

“CORISIA Methodology for Calculating Actual Life Cycle Emissions Values”



- Allows fuel producers to obtain life cycle emissions that are specific to their production practices
- Provides methodologies to claim zero ILUC value:
 - Feedstock classified as a waste, residue, or by product (Section 4)
 - Use of low LUC risk practices (Section 5)
- Provides methodologies for crediting avoided landfill emissions, and recycling (Section 6)
- Includes LCA methodologies for LCAF (Section 7).



4

Claiming Emission Reductions from CEF



Emission reductions are related to the life cycle emissions value of the CEF

Note: Second edition of Annex 16 Vol IV will use the acronym “ L_{CEF} ” to represent the life cycle emissions of the CEF.

Fuel Conversion Factor, fixed value,

3.16 for Jet-A/ Jet-A1 or 3.10 for AvGas/ Jet B
[kg CO₂/kg fuel]

life cycle emissions value (LS_f) of the CEF.

CEF emissions reductions (ER_y)

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

Total mass of CEF claimed
in the year y, by fuel type f [tonnes]

Baseline life cycle emissions,
fixed value, 89 for jet fuel or
95 for AvGas
[gCO₂e/MJ]

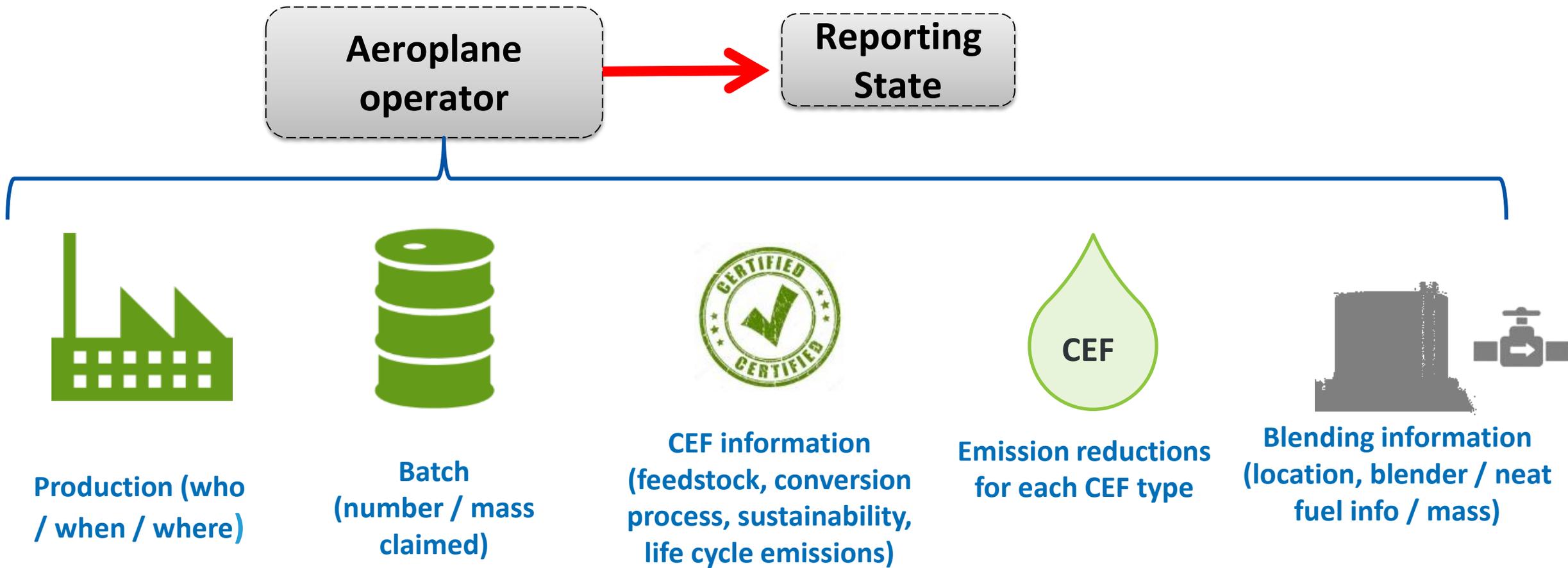
Example: If, in 2021, an operator uses 10,000 tonnes of Jet-A fuel produced from Used Cooking Oil (default $LS_f=13.9$ gCO₂e/MJ*), the amount of emissions reductions will be:

$$ER_{2021} = 3.16 * \left[10,000 * \left(1 - \frac{13.9}{89} \right) \right] = 26,665 \text{ tonnes of CO}_2$$



Claiming Emissions Reductions from CEF

Information flow – from Aeroplane Operator to State*

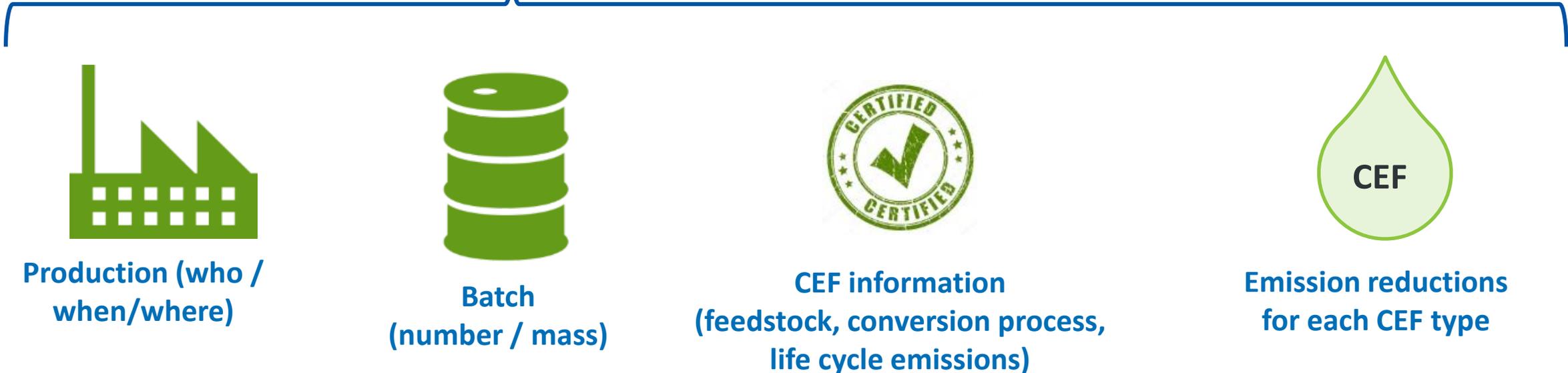
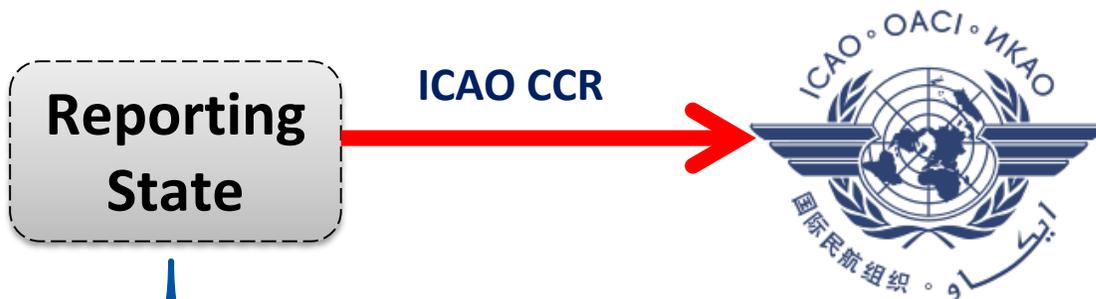


*Annex 16, Vol. IV, Part II, Appendix 5, Table A5-1 and A5-2



Claiming Emissions Reductions from CEF

Information flow – from State to ICAO*



*Annex 16, Vol. IV, Part II, Appendix 5, Table A5-6



Claiming Emissions Reductions from CEF

Information and Data for Transparency*

ICAO will make information submitted through the CCR available on the ICAO CORSIA website



Production (who / when/where)



Batch (numbers / mass)



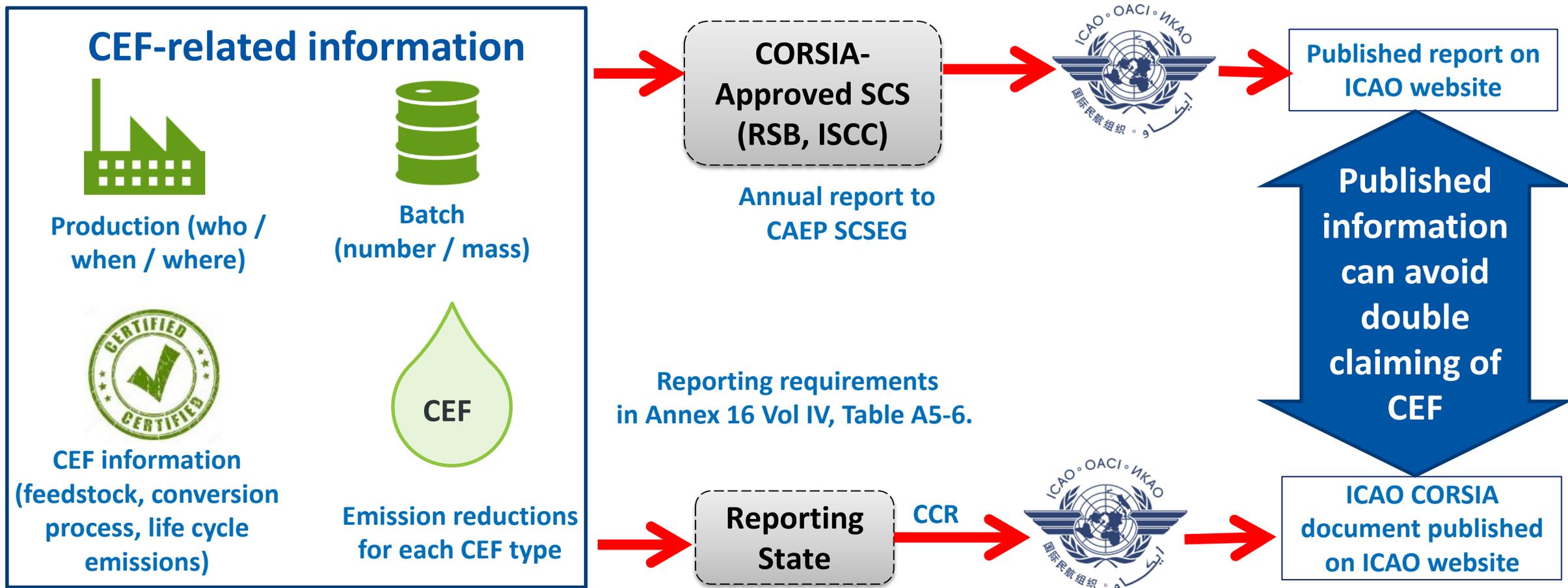
CEF information (feedstock, conversion process, life cycle emissions)

*Annex 16, Vol. IV, Part II, Appendix 5, Table A5-6



State and SCSs reporting to ICAO

CEF information will be reported to ICAO and published

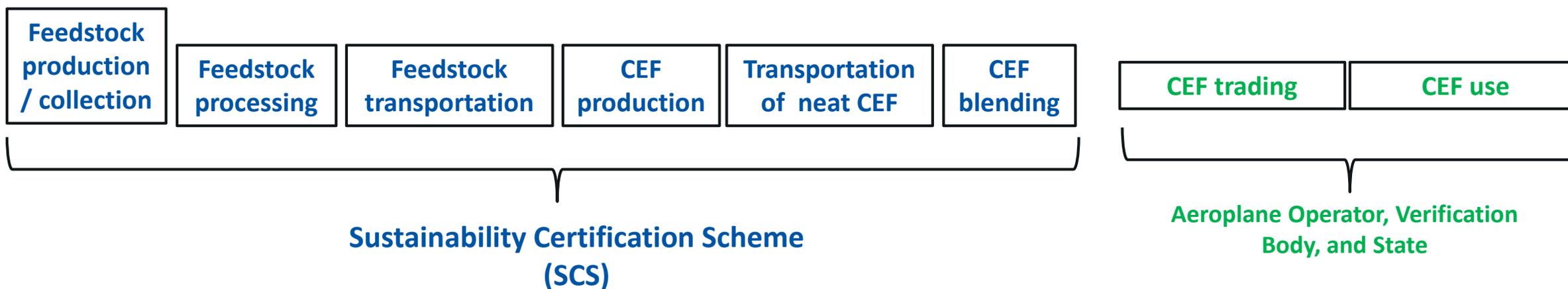




CORSIA MRV Responsibilities

- The CORSIA MRV responsibilities include SCSs, Aeroplane Operators, Verification Bodies, and States**

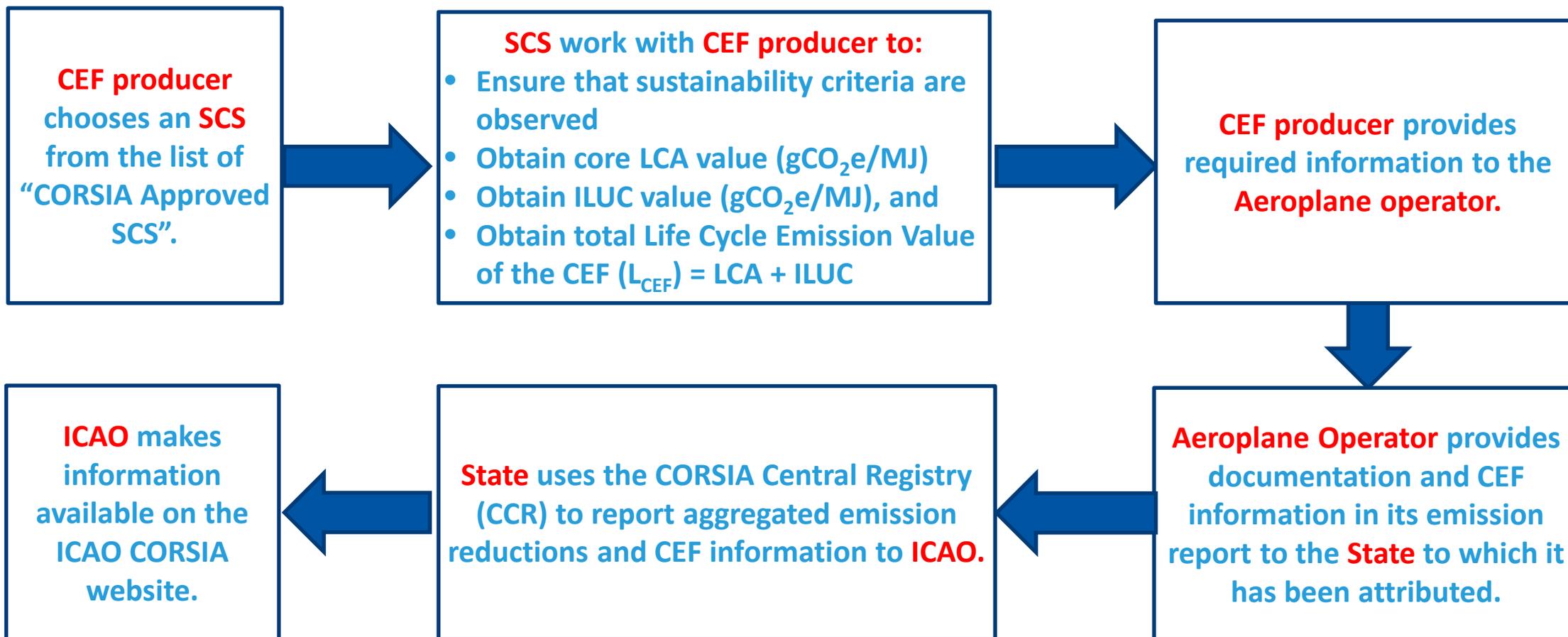
- The Sustainability Certification Scheme (SCS) under CORSIA takes the certification responsibility for the feedstock production, collection, processing and transportation, and the CEF production, transportation and blending.
- After the CORSIA eligible fuel is blended, the Aeroplane Operator that purchased the CEF takes the responsibility of tracking the CEF use, through the CORSIA Monitoring, Reporting and Verification (MRV) process, with the involvement of a third-party Verification Body.
- The State to which the Aeroplane Operator is attributed takes the responsibility of overseeing the data submitted by the Aeroplane Operator and submitting to ICAO, through the CORSIA MRV process.





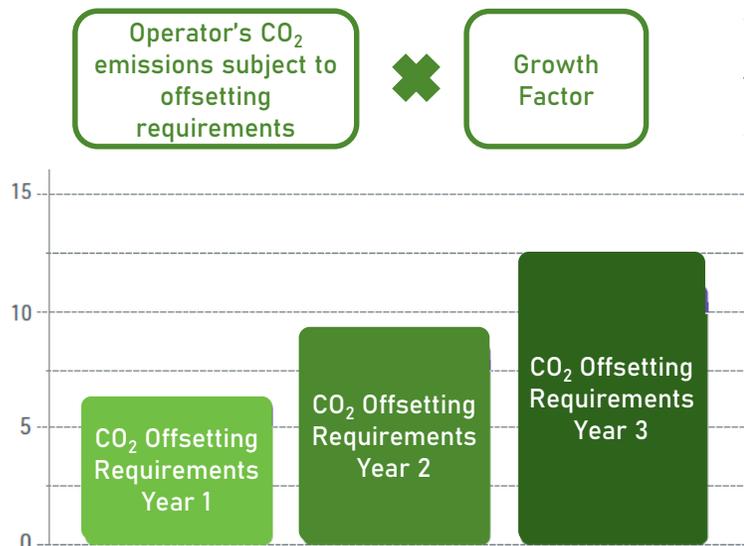
Summary - Claiming Emissions Reductions from CEF

CORSIA and CEF - Flow of actions from Stakeholders

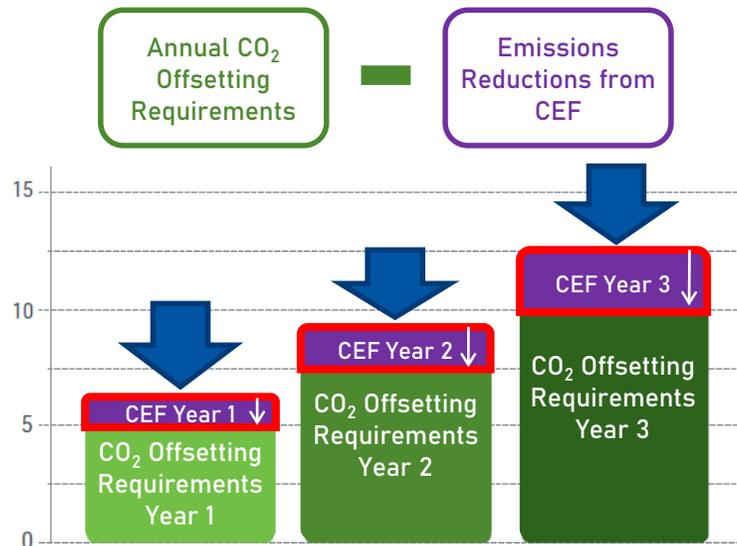


An aeroplane operator can reduce its CORSIA offsetting requirements by claiming emissions reductions from the use of CORSIA Eligible Fuels (CEF)

- ① **CO₂ Offsetting Requirements** calculated by the State for each year



- ② Emissions reductions claimed from the use of CORSIA Eligible Fuels (CEF)



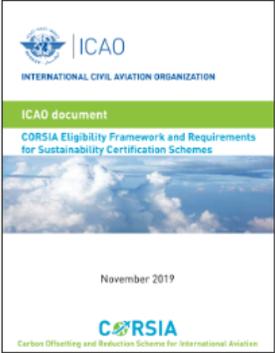
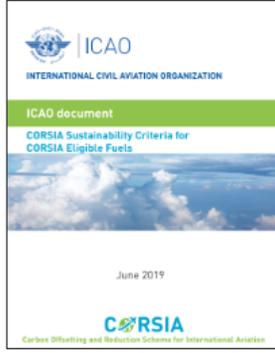
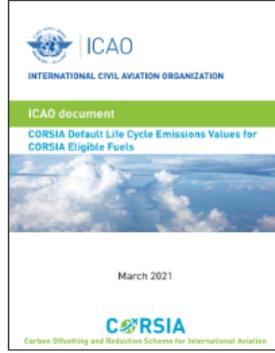
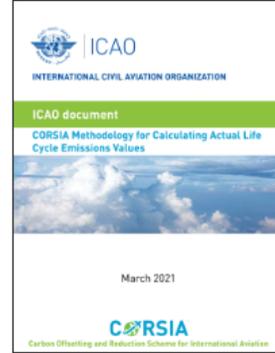
- ③ Total Final CO₂ Offsetting Requirements for a 3-year Compliance Period



Total final CO₂ offsetting requirements will be met by operators through the cancellation of CORSIA eligible emissions units

All documents are available in the **CORSIA Eligible Fuels website**

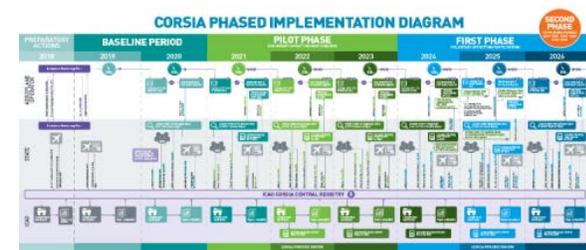
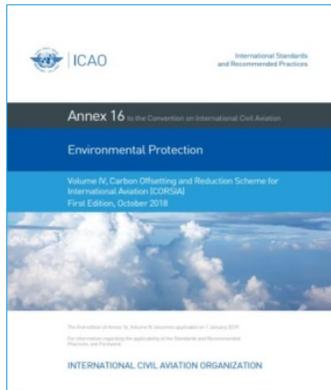
*<https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Eligible-Fuels.aspx>

 <p>ICAO document CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes November 2019 CORSIA Carbon Offsetting and Reduction Scheme for International Aviation</p>	 <p>ICAO document CORSIA Approved Sustainability Certification Schemes November 2020 CORSIA Carbon Offsetting and Reduction Scheme for International Aviation</p>	 <p>ICAO document CORSIA Sustainability Criteria for CORSIA Eligible Fuels June 2019 CORSIA Carbon Offsetting and Reduction Scheme for International Aviation</p>	 <p>ICAO document CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels March 2021 CORSIA Carbon Offsetting and Reduction Scheme for International Aviation</p>	 <p>ICAO document CORSIA Methodology for Calculating Actual Life Cycle Emissions Values March 2021 CORSIA Carbon Offsetting and Reduction Scheme for International Aviation</p>
<p>CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes Second Edition, June 2022</p>	<p>CORSIA Approved Sustainability Certification Schemes* Second Edition, June 2023</p>	<p>CORSIA Sustainability Criteria for CORSIA Eligible Fuels** Third Edition, November 2022</p>	<p>CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels*** Fourth Edition, June 2022</p>	<p>CORSIA Methodology for Calculating Actual Life Cycle Emissions Values Third Edition, June 2022</p>



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CORSIA AT A GLANCE SERIES: CORSIA IMPLEMENTATION COMPONENTS

CORSIA AT A GLANCE SERIES: EMISSIONS MONITORING PLAN

CORSIA AT A GLANCE SERIES: EMISSIONS MONITORING OPTIONS

CORSIA AT A GLANCE SERIES: CORSIA CO2 ESTIMATION AND REPORTING TOOL (CERT)

CORSIA AT A GLANCE SERIES: CORSIA VERIFICATION

CORSIA AT A GLANCE SERIES: CORSIA CENTRAL REGISTRY

CORSIA AT A GLANCE SERIES: PUBLICATION OF INFORMATION AND DATA FROM CORSIA CENTRAL REGISTRY

CORSIA AT A GLANCE SERIES: CORSIA VERIFICATION

CORSIA AT A GLANCE SERIES: CORSIA ELIGIBLE FUELS

CORSIA AT A GLANCE SERIES: CORSIA EMISSIONS UNITS CRITERIA (CEUC)



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Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

CORSIA News (click here to consult the complete list)

19-25 Jan 2019
Trinidad & Tobago and Jamaica received training under the ACT-CORSIA Buddy Partnership with Germany

CORSIA IMPLEMENTATION

- Assembly Resolution A39-3
SARPs - Annex 16 Volume IV
Environmental Technical Manual - Volume IV (New)
ICAO CORSIA Implementation Elements
CORSIA States for Chapter 3 State Pairs
ICAO CORSIA CO2 Estimation and Reporting Tool (CERT)
CORSIA Eligible Fuels
CORSIA Eligible Emissions Units
CORSIA Central Registry (CCR)

Additional Material for CORSIA Implementation



ACT CORSIA

- CORSIA Buddy Partnerships
Model Regulations
Frequently Asked Questions
Brochure and Leaflets
Videos
Seminars
Online Tutorials
Background Information



For more information, please visit our website: http://www.icao.int/corsia