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ICAO CORSIA
Implementation Elements

CORSIA Eligible Fuels

Overview

- The CORSIA Implementation Package

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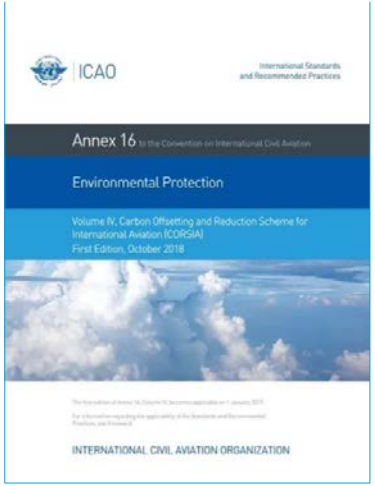
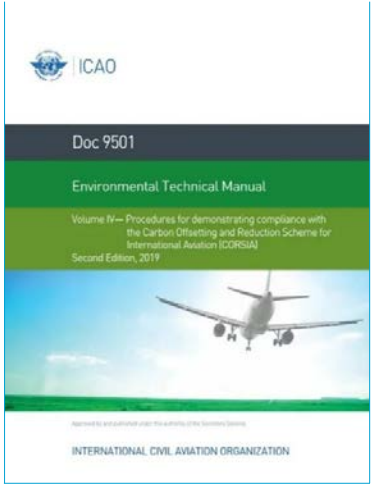


Annex 16, Volume IV (CORSIA SARPs)



ETM Volume IV
(2nd edition)

CORSIA Implementation Elements
(ICAO documents)

- The five (5) 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)

All Documents are on the ICAO CORSIA Website www.icao.int

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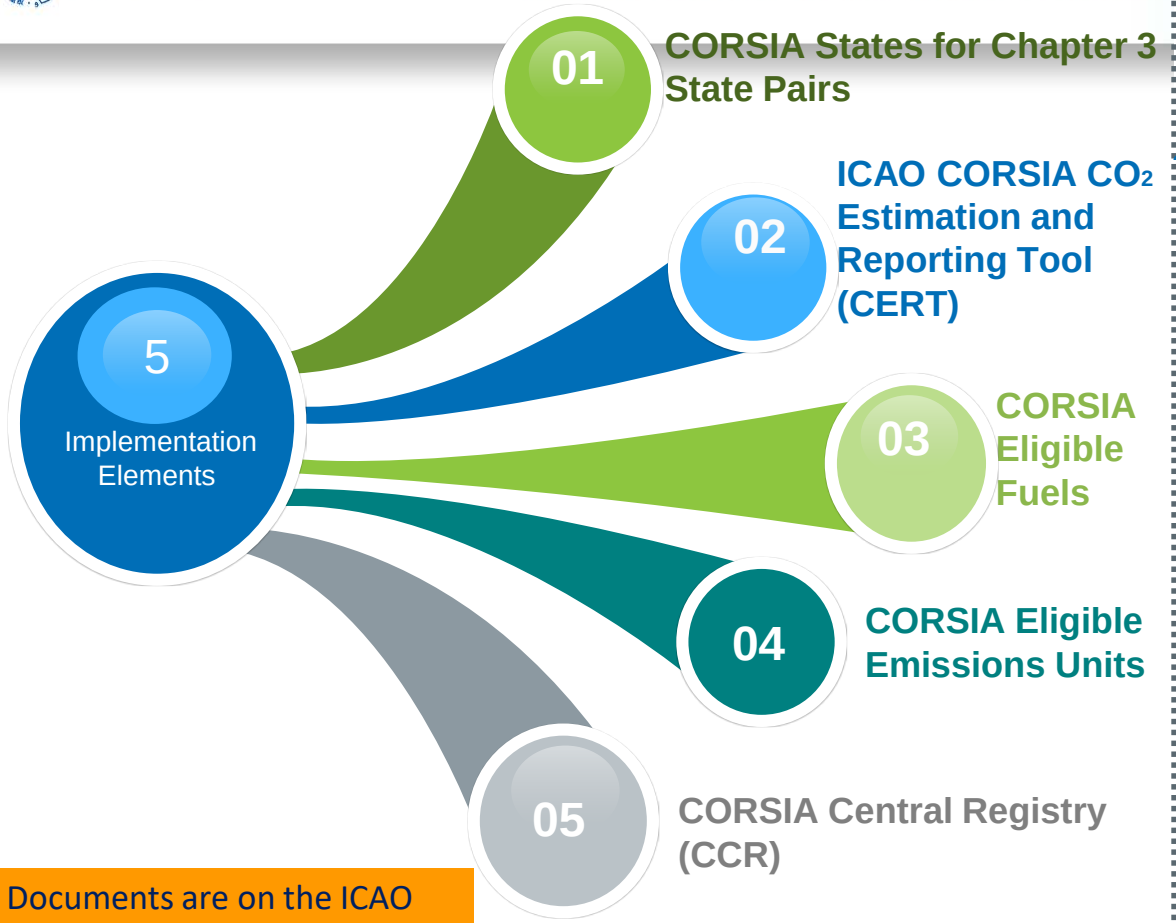


All Documents are on the ICAO CORSIA Website www.icao.int

ICAO Documents

1.*CORSIA States for Chapter 3 State Pairs*

2.ICAO CORSIA CO_2 Estimation and Reporting Tool

3. CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes
4. CORSIA Approved Sustainability Certification Schemes
5. CORSIA Sustainability Criteria for CORSIA Eligible Fuels
6. CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels
7. CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

8. CORSIA Eligible Emissions Units
9. CORSIA Emissions Unit Eligibility Criteria

10. CORSIA Central Registry: Information and Data for the Implementation of CORSIA
11. CORSIA Aeroplane Operator to State Attributions
12. CORSIA 2020 Emissions
13. CORSIA Annual Sector's Growth Factor (SGF)
14. CORSIA Central Registry (CCR): Information and Data for Transparency

CORSIA

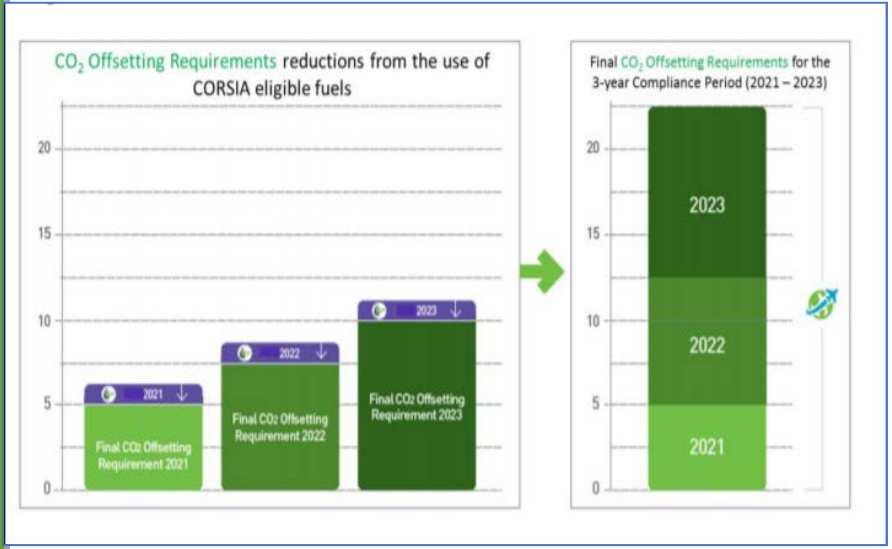
Two ways for an aeroplane operator to comply with CORSIA:

- Offsetting with CORSIA Eligible Emissions Units

- **Claiming Emissions Reductions from CORSIA Eligible Fuels**

All Documents are on the ICAO CORSIA Website www.icao.int

CORSIA Eligible Fuels



This figure provides an illustration of accounting the benefits from CORSIA Eligible Fuels

Annex 16, Volume IV provides the following definitions in this respect:

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*."

- **CORSIA sustainable aviation fuel**: "A renewable or waste-derived aviation fuel that meets the CORSIA Sustainability Criteria under this Volume."

- **CORSIA lower carbon aviation fuel**: "A fossil-based aviation fuel that meets the CORSIA Sustainability Criteria under this Volume."

CORSIA Eligible Fuels – 5 ICAO Documents

CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes

CORSIA Approved Sustainability Certification Schemes

CORSIA Sustainability Criteria for CORSIA Eligible Fuels

CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels

CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

Available on the ICAO CORSIA website

CORSIA Eligible Fuels

Annex 16 Vol. IV References

2.2.4.1 The **aeroplane operator** that intends to claim for emissions reductions from the use of CORSIA eligible fuels shall use a CORSIA eligible fuel that meets the CORSIA Sustainability Criteria as defined within **the ICAO document entitled "CORSIA Sustainability Criteria for CORSIA Eligible Fuels"** that is available on the ICAO CORSIA website.

2.2.4.2 The **aeroplane operator** that intends to claim for emissions reductions from the use of CORSIA eligible fuels shall only use CORSIA eligible fuels from fuel producers that are certified by an **approved Sustainability Certification Scheme** included in **the ICAO document entitled "CORSIA Approved Sustainability Certification Schemes"**, that is available on the ICAO CORSIA website. Such certification schemes meet the requirements included in **the ICAO document entitled "CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes"**, that is available on the ICAO CORSIA website.

3.3.1 The **aeroplane operator** that intends to claim for emissions reductions from the use of CORSIA eligible fuels in a given year shall compute emissions reductions as follows:

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

3.3.2 If a Default Life Cycle Emissions value is used, then the **aeroplane operator** shall use **the ICAO document entitled "CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels"** that is available on the ICAO CORSIA website for the calculation in 3.3.1.

3.3.3 If an Actual Life Cycle Emissions value is used, then an **approved Sustainability Certification Scheme** shall ensure that the methodology, as defined in **the ICAO document entitled "CORSIA Methodology for Calculating Actual Life Cycle Emissions Values"** that is available on the ICAO CORSIA website, has been applied correctly.

"ICAO Documents" Referenced in Annex 16 Vol. IV, and associated "Supporting Documents"

ICAO document
CORSIA Sustainability Criteria for CORSIA Eligible Fuels

ICAO document
CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes

ICAO document
CORSIA Approved Sustainability Certification Schemes

ICAO document
CORSIA Default Life Cycle Emissions Values *for CORSIA Eligible Fuels*

CORSIA Supporting Document
LCA Methodology

ICAO document
CORSIA Methodology for Calculating Actual Life Cycle Emissions Values

This chart presents the relation between these 5 CORSIA Eligible Fuels documents and the respective Annex 16 Vol. IV references

CORSIA Eligible Fuels -1

CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes

Sustainability Certification Schemes (SCS): Organizations that

1. Certify economic operators against the sustainability criteria and
2. Ensure that economic operators calculate actual life cycle emissions values using the agreed methodology.

SCS define sustainability certification requirements, set requirements for certification bodies, auditors and accreditation bodies, and monitor effectiveness of the assurance system.

The approval of SCS is exclusively carried out by the ICAO Council with the technical assistance of CAEP, which assesses the compliance of the SCS with the eligibility requirements listed in this ICAO document.

Only the SCS that meet all the eligibility requirements will be included in the list of approved SCS.

CORSIA Eligible Fuels -2

CORSIA Approved Sustainability Certification Schemes

The **Sustainability Certification Schemes** are approved by the ICAO Council as meeting the requirements included in the first edition of the ICAO document "*CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes*"

- The SCS listed **are eligible to certify CORSIA eligible fuel producers (economic operators) for compliance** with the ICAO document "*CORSIA Sustainability Criteria for CORSIA eligible fuels*", and
- They **ensure that the methodology** defined in the ICAO document "*CORSIA Methodology for Calculating Actual Life Cycle Emissions Values*" **has been applied correctly**

Name of the Sustainability Certification Scheme	Date of approval	Website	Applications and other Supporting Information	Application date
International Sustainability and Carbon Certification (ISCC)	18/Nov/2020	https://www.iscc-system.org/	https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-SCS-evaluation-ISCC.aspx	30/Apr/2020
Roundtable on Sustainable Biomaterials (RSB)	18/Nov/2020	https://rsb.org/	https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-SCS-evaluation-RSB.aspx	30/Apr/2020

CORSIA Eligible Fuels -3

CORSIA Sustainability Criteria for CORSIA Eligible Fuels

Two agreed initial Sustainability Criteria for the CORSIA Pilot Phase (SAF and LCAF)

- Net GHG emissions reductions of at least 10% on a life cycle basis.
- No feedstock from deforested areas

CORSIA SUSTAINABILITY CRITERIA FOR CORSIA ELIGIBLE FUELS

Theme	Principle	Criteria
1. Greenhouse Gases (GHG)	Principle: CORSIA eligible fuel should generate lower carbon emissions on a life cycle basis.	Criterion 1: CORSIA eligible fuel shall achieve net greenhouse gas emissions reductions of at least 10% compared to the baseline life cycle emissions values for aviation fuel on a life cycle basis.
2. Carbon stock	Principle: CORSIA eligible fuel should not be made from biomass obtained from land with high carbon stock.	Criterion 1: CORSIA eligible fuel shall not be made from biomass obtained from land converted after 1 January 2008 that was primary forest, wetlands, or peat lands and/or contributes to degradation of the carbon stock in primary forests, wetlands, or peat lands as these lands all have high carbon stocks.
		Criterion 2: In the event of land use conversion after 1 January 2008, as defined based on IPCC land categories, direct land use change (DLUC) emissions shall be calculated. If DLUC greenhouse gas emissions exceed the default induced land use change (ILUC) value, the DLUC value shall replace the default ILUC value.

CORSIA Eligible Fuels -3

CORSIA Sustainability Criteria for CORSIA Eligible Fuels

CORSIA SUSTAINABILITY CRITERIA FOR CORSIA ELIGIBLE FUELS

Theme	Principle	Criteria
1. Greenhouse Gases (GHG)	Principle: CORSIA eligible fuel should generate lower carbon emissions on a life cycle basis.	Criterion 1: CORSIA eligible fuel shall achieve net greenhouse gas emissions reductions of at least 10% compared to the baseline life cycle emissions values for aviation fuel on a life cycle basis.
2. Carbon stock	Principle: CORSIA eligible fuel should not be made from biomass obtained from land with	Criterion 1: CORSIA eligible fuel shall not be made from biomass obtained from land converted after 1 January 2008 that was primary forest, wetlands, or peat lands and/or contributes to degradation of the carbon stock in primary forests, wetlands, or peat lands as these lands all have high carbon stocks. Criterion 2: In the event of land use

For next CORSIA Phases:

- 10 additional themes provisionally approved for SAF
  - Water; Soil; Air; Conservation; Waste and Chemicals; Human and labour rights; Land use rights and land use; Water use rights; Local and social development; and Food security.
- Ongoing work on additional themes for LCAF

CORSIA Eligible Fuels 4 and 5

The emissions reductions from its use in a given year are **based on their life cycle emission values, which depend on the feedstock, conversion process, and region where the fuel was produced.**

In CORSIA, there are two options to obtain the life cycle emissions of SAF:

ICAO document "*CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels*"

Default emission values for a given SAF, as a function of the feedstock and conversion process

This document is updated on a yearly basis

ICAO document "CORSIA Methodology for Calculating Actual Life Cycle Emissions Values"

Allows calculation of specific emissions values for a given SAF

CORSIA Eligible Fuels

CORSIA Eligible Fuels -4

CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels

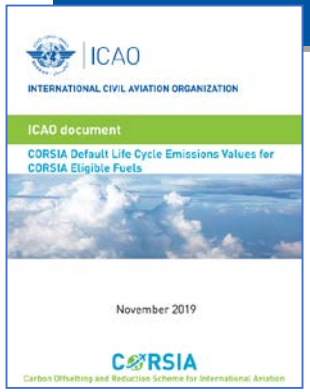
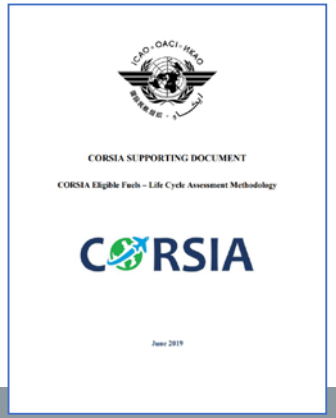


Table 1. CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels

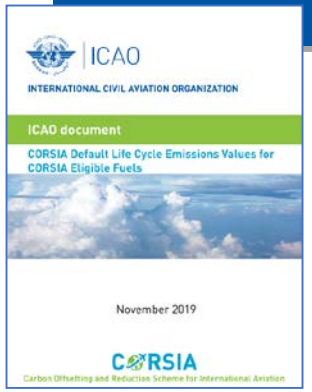
Fuel Conversion Process	Region	Fuel Feedstock	Core LCA Value	ILUC LCA Value	LS_f (gCO_2e/MJ)
Fischer-Tropsch (FT)	Global	Agricultural residues	7.7	0.0	7.7
	Global	Forestry residues	8.3		8.3
	Global	Municipal solid waste (MSW), 0% non-biogenic carbon (NBC)	5.2		5.2
	Global	Municipal solid waste (MSW) (NBC given as a percentage of the non-biogenic carbon content)	NBC*170.5 + 5.2		NBC*170.5 + 5.2
	USA	Poplar (short-rotation woody crops)	12.2	-5.2	7.0
	USA	Miscanthus (herbaceous energy crops)	10.4	-32.9	-22.5
	EU	Miscanthus (herbaceous energy crops)	10.4	-22.0	-11.6
	USA	Switchgrass (herbaceous energy crops)	10.4	-3.8	6.6
Hydroprocessed esters and fatty acids (HEFA)	Global	Tallow	22.5	0.0	22.5
	Global	Used cooking oil	13.9		13.9
	Global	Palm fatty acid distillate	20.7		20.7
	Global	Corn oil (from dry mill ethanol plant)	17.2		17.2
	USA	Soybean oil	40.4	24.5	64.9
	Brazil	Soybean oil	40.4	27.0	67.4
	EU	Rapeseed oil	47.4	24.1	71.5
	Malaysia & Indonesia	Palm oil – closed pond	37.4	39.1	76.5
	Malaysia & Indonesia	Palm oil – open pond	60.0	39.1	99.1
Alcohol (isobutanol) to jet (ATJ)	Global	Agricultural residues	29.3	0.0	29.3
	Global	Forestry residues	23.8		23.8
	Brazil	Sugarcane	24.0	7.3	31.3
	USA	Corn grain	55.8	22.1	77.9
	USA	Miscanthus (herbaceous energy crops)	43.4	-54.1	-10.7
	EU	Miscanthus (herbaceous energy crops)	43.4	-31.0	12.4
	USA	Switchgrass (herbaceous energy crops)	43.4	-14.5	28.9
Alcohol (ethanol) to jet	Brazil	Sugarcane	24.1	8.7	32.8
	USA	Corn grain	65.7	25.1	90.8

The CORSIA Supporting Document "***CORSIA Eligible Fuels - Life Cycle Assessment Methodology***" describes the methodologies used by ICAO to calculate these Default Life Cycle Emissions Values, as well as the process for requesting the inclusion of a new conversion process, feedstock, and/or region on this table



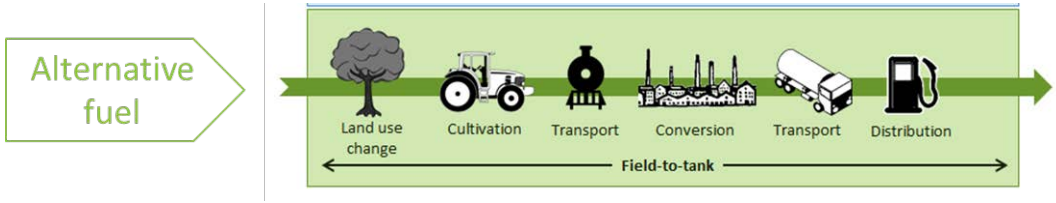
CORSIA Eligible Fuels -4

CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels



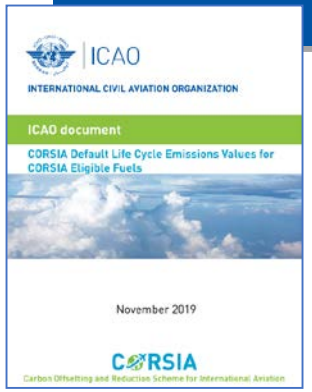
The **life-cycle emissions values of a CORSIA Eligible Fuel** is composed of two main elements:

1) **Core Life Cycle Assessment (LCA) emissions**, which include the **emissions associated** with: feedstock cultivation, feedstock harvesting, collection and recovery, feedstock processing and extraction, feedstock transportation to processing and fuel production facilities, feedstock to fuel conversion processes, fuel transportation and distribution, and fuel combustion in an aircraft engine



CORSIA Eligible Fuels -4

CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels



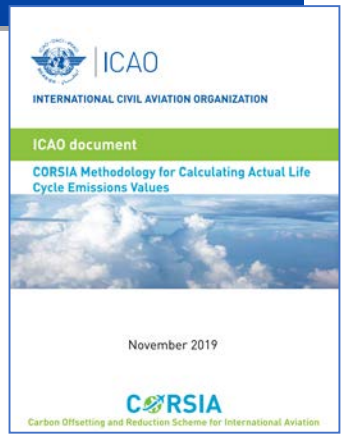
The **life-cycle emissions values of a CORSIA Eligible Fuel** is composed of two main elements:

2) **Induced land-use change (ILUC) emissions** – CORSIA Eligible Fuel production may require some additional land to be used, and generate land use change GHG emissions.

These could occur where the new CORSIA Eligible Fuel production is taking place (direct land use change) but also in other locations due to the displacement of crops (or animals) for which the land was previously used (indirect land use change)

CORSIA Eligible Fuels -5

CORSIA Methodology for Calculating Actual Life Cycle Emissions Values



Allows calculation of specific emissions values for a given SAF

Sustainability Certification Schemes (SCS) need to **ensure that the methodology has been applied correctly**

FAQs

Who certifies CORSIA Eligible Fuel in order to be used in CORSIA?

- An aeroplane operator that intends to claim for emissions reductions from the use of CORSIA Eligible Fuels shall only use CORSIA Eligible Fuels from fuel producers that are certified **by an approved Sustainability Certification Scheme.**

Where can one find a list of approved Sustainability Certification Schemes?

- in the ICAO document entitled “CORSIA Approved Sustainability Certification Schemes”, which is available on the ICAO CORSIA website.

Which life cycle emissions values will be used for calculating the emissions reductions from CORSIA Eligible Fuels?

There are two possibilities to obtain the life cycle emission value of a given CORSIA Eligible Fuel:
An aeroplane operator can use a "**default life cycle emissions value**" from the ICAO Document entitled "CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels"; or:

An operator can use an "**actual life cycle emissions value**", based on the methodologies defined in the ICAO document entitled "CORSIA Methodology for Calculating Actual Life Cycle Emissions Values". In this case, an approved Sustainability Certification Scheme shall ensure that the methodology has been applied correctly.

- We have seen that there are two ways for an aeroplane operator to comply with CORSIA:
  - **Offsetting with CORSIA Eligible Emissions Units**
  - Claiming Emissions Reductions from CORSIA Eligible Fuels

All Documents are on the ICAO CORSIA Website www.icao.int

CORSIA Eligible Emissions Units – 2 ICAO Documents

The ICAO CORSIA Implementation Element "CORSIA Eligible Emissions Units" is reflected in two ICAO documents referenced in Annex 16, Volume IV .

CORSIA Eligible Emissions Units

CORSIA Emissions Unit Eligibility Criteria

Available on the ICAO CORSIA website


Thank you