Session 5: CORSIA Calculation of CO₂ Offsetting Requirements

ICAO Secretariat
A reminder from the previous presentations...
• MRV system is a key component of CORSIA implementation:
  – *Monitoring* of fuel use on each international flight and calculation of related CO₂ emissions
  – *Reporting* of CO₂ emissions information between operators, States and ICAO
  – *Verification* of reported emissions data to ensure completeness and avoid misstatements

This presentation...
• Overview how CORSIA CO₂ Offsetting Requirements are calculated (based on the MRV system)
• Overview how compliance with the CORSIA CO₂ Offsetting Requirements is achieved
Session 5:
CORSIA Calculation of CO₂ Offsetting Requirements
Part 1
Part II, Chapter 3 of the Annex 16, Volume IV:

**CO₂ Offsetting Requirements** from International Flights and Emissions Reductions from the **Use of CORSIA eligible fuels**, specifically:

- Applicability of CO₂ Offsetting Requirements (Chapter 3, 3.1)
- CO₂ Offsetting Requirements for Individual Operators (Chapter 3, 3.2)
- Emissions Reductions from the Use of CORSIA eligible fuels (Chapter 3, 3.3)
- Total final CO₂ Offsetting Requirements for a given compliance period with Emissions Reductions from the Use of CORSIA eligible fuels (Chapter 3, 3.4)
• Annex 16 Vol. IV – Part II Chapter 3, 3.1 *

  – From 1 January 2021 to 31 December 2035, the offsetting requirements shall be applicable to an aeroplane operator with international flights between participating States.

  – New entrants (aeroplane operators) are exempted from the CORSIA offsetting requirements for the first 3 years or until its annual emissions exceed 0.1% of total 2020 emissions, whichever comes first.

* In accordance with Assembly Resolution A39-3, paragraphs 9, 10, 12
• ICAO CORSIA Implementation Elements

  – One of the Implementation Elements "CORSIA States for Chapter 3 State Pairs" will provide information on States participating in the CORSIA that define the international routes between State pairs subject to offsetting requirements for every year from 2021.
Applicability of CO₂ Offsetting Requirements: Route-based Approach

Routes subject to MRV of CO₂ emissions:
ALL ICAO MEMBER STATES with aeroplane operators conducting international flights are required to monitor, report and verify (MRV) CO₂ emissions from these flights every year from 2019, independent of their participation in the CORSIA.

Routes subject to offsetting requirements:
Emissions from international flights where both the origin and destination States participate in the CORSIA, are subject to offsetting requirements every year from 2021. Reference: A39-3, paragraph 10.
The State shall calculate, for each of the operators attributed to it, the amount of CO₂ emissions required to be offset in a given year prior to consideration of the CORSIA eligible fuels:

\[ OR_y = \%S_y \times (OE_y \times SGF_y) + \%O_y \times (OE_y \times OGF_y) \]

- \( OR_y \) = Offsetting requirements in year \( y \);
- \( OE_y \) = CO₂ emissions covered by CORSIA in year \( y \);
- \( SGF_y \) = Sector’s Growth Factor;
- \( OGF_y \) = Individual growth factor;
- \( \%S_y \) = Per cent sectoral in year \( y \);
- \( \%O_y \) = Per cent individual in year \( y \).
CO₂ Offsetting Requirements for Individual Operators

- **2021 - 2029: 100% sectoral approach:**

  \[ OR_y = OE_y \times \frac{(SE_y - SE_{B,y})}{SE_y} \]

In pilot phase (2021-2023), each State can choose \( OE_y \) either:

- The operator’s emissions in a given year (i.e. 2021, 2022, 2023); or
- The operator’s emissions referring back to a single year of 2020.

The State shall notify ICAO which option it has selected by 30 June 2020.

**Note:** Sector’s Growth Factor (SGF\(_y\)) is calculated by ICAO every year from 2021.

**In practice, the State will...**

1. Use the operator’s reported emissions
2. Use the sector’s growth factor, calculated by ICAO
3. Multiply 1. with 2. to determine the operator’s offsetting requirements

Reference: Assembly Resolution A39-3, paragraph 11.
Example of how the State would calculate offsetting requirements in 2023 if it chooses to use the aeroplane operator’s CO₂ emissions in a given year (i.e. 2023).

Calculated by ICAO

Reported by operators

Calculated by States

Illustration of calculation of offsetting requirements in year e.g., 2021 (if the aeroplane operator chooses to use its CO₂ emissions in the given year y)

\[ OR_{2023} = OE_{2023} \times SGF_{2023} = 6\,000\,000\,\text{tonnes} \times 13.580247\% = 814\,815\,\text{tonnes} \]

where:
- \( OR_{2023} \) = Aeroplane operator’s offsetting requirements in the given year y;
- \( OE_{2023} \) = Aeroplane operator’s CO₂ emissions covered by Annex 16, Volume IV, Part II, Chapter 3, 3.1 in the given year y; and
- \( SGF_{2023} \) = Sector’s Growth Factor.

* from flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 3, 3.1
Emissions Reductions from the Use of CORSIA Eligible Fuels

• Recap: From 2021, operators can claim emissions reductions by reporting on CORSIA eligible fuels.

• Annex 16 Vol. IV – Part II Chapter 3, 3.3
  – 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:

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

  \( ER_y \) = Emissions Reductions from the use of CORSIA eligible fuels in the given year \( y \) (in tonnes);

  \( FCF \) = Fuel Conversion Factor, equal to 3.16 kg CO₂/kg fuel for Jet-A fuel / Jet-A1 fuel and 3.10 kg CO₂/kg fuel for AvGas or Jet-B fuel;

  \( MS_{f,y} \) = Total mass of a neat (unblended) CORSIA eligible fuel claimed in the given year \( y \) (in tonnes);

  \( LS_f \) = Life cycle emissions value for a CORSIA eligible fuel (in gCO₂e/MJ); and

  \( LC \) = Baseline life-cycle emissions values for aviation fuel (= 89 gCO₂e/MJ for jet fuel, and =95 gCO₂e/MJ for AvGas).
Emissions Reductions from the Use of CORSIA Eligible Fuels

• ICAO CORSIA Implementation Elements
  – One of the Implementation Elements "CORSIA Eligible Fuels" will provide the necessary methodologies to determine the emissions reductions from the use of CORSIA eligible fuels.

In practice, the operator will...
1. Use the amounts of CORSIA eligible fuels purchased, based on purchase records
2. Use the life-cycle emissions values to determine emissions reduction factors
3. Submit valid sustainability certification document
4. Report and claim reduction of offsetting requirements
CO₂ Offsetting Requirements with Emissions Reductions from the Use of CORSIA Eligible Fuels

- **Total final offsetting requirements** are those CO₂ emissions required to be offset and are determined by subtracting the requirements with emissions reductions from the use of CORSIA eligible fuels.

- Annex 16 Vol. IV – Part II Chapter 3, 3.4
  - The amount of CO₂ emissions required to be offset by an operator, after taking into account emissions reductions from the use of CORSIA eligible fuels in a given compliance period (2021 - 2035), shall be calculated by the State:

  \[
  \text{FOR}_c = (\text{OR}_{1,c} + \text{OR}_{2,c} + \text{OR}_{3,c}) - (\text{ER}_{1,c} + \text{ER}_{2,c} + \text{ER}_{3,c})
  \]

  \(\text{FOR}_c\) = Operator’s total final offsetting requirements in given compliance period c;
  \(\text{OR}_{y,c}\) = Operator’s offsetting requirements in given year y (y = 1, 2 or 3) of compliance period c; and
  \(\text{ER}_{y,c}\) = Emissions reductions from use of CORSIA eligible fuels in given year y (y = 1, 2 or 3) of compliance period c.

**Recommendation**: The aeroplane operator is encouraged to make CORSIA eligible fuel claims on an annual basis. However, the aeroplane operator has the option to decide when to make a CORSIA eligible fuel claim within a given compliance period.

In practice, the State will... sum up the operator’s offsetting requirements for the 3 year compliance cycle, and corresponding reductions from CORSIA eligible fuels, to determine the operator’s total final offsetting requirements during the cycle.
The State accounts for the benefits from the use of CORSIA eligible fuels and informs the operator of its total final CO$_2$ offsetting requirements for a 3-year compliance period.
Session 5: Compliance with the CORSIA CO$_2$ Offsetting Requirements

Part 2
Part II, Chapter 4 of the Annex 16, Volume IV:

Provides States and operators with procedures how to comply with CO₂ offsetting requirements by cancelling eligible emissions units, specifically:

- Cancelling CORSIA Eligible Emissions Units (Chapter 4, 4.2)
- Reporting Emissions Unit Cancellation (Chapter 4, 4.3)
- Verification of Emissions Unit Cancellation Report (Chapter 4, 4.4)

• Note: Appendix 1 additionally provides administration procedures relevant to Chapter 4.
Cancelling CORSIA Eligible Emissions Units – What are Emissions Units?

- Arising from emissions reduction achieved by the implementation of projects elsewhere (various sectors – including domestic aviation)
- Issued by crediting schemes through mechanisms, programmes, projects
- Calculation of the difference between baseline emissions (in the absence of the project activity) and actual emissions (after the project is implemented)

1 tonne of CO₂ = 1 emissions unit
Cancelling CORSIA Eligible Emissions Units – What are Carbon Markets?

- Emissions reduction projects generate emissions units that are sold in carbon markets on a per-tonne basis
- Owners of emissions units can cancel these units to offset emissions
- There are different types of carbon markets: compliance markets; and voluntary markets
- Buying and selling of units affect prices of emissions units

ICAO Seminar on Carbon Markets in February 2018 for further information: https://www.icao.int/Meetings/carbonmarkets/Pages/default.aspx
• Annex 16 Vol. IV – Part II Chapter 4, 4.2

— The operator shall meet its total final CO₂ offsetting requirements for a given compliance period by cancelling CORSIA Eligible Emissions Units* within a CORSIA Eligible Emissions Unit Program registry;

*The ICAO Council will determine the CORSIA eligible emissions units.

Note: “Cancel” means the permanent removal and single use of a CORSIA Eligible Emissions Unit within a CORSIA Eligible Emissions Unit Program designated registry such that the same emissions unit may not be used more than once.

— Request each program registry to make visible on the public website, information on each of the operator’s cancelled CORSIA Eligible Emissions Units.

• ICAO CORSIA Implementation Elements

— One of the Implementation Elements "CORSIA Eligible Emissions Units" will provide information on approved CORSIA Eligible Emissions Units and Emissions Units Criteria.
Cancelling CORSIA Eligible Emissions Units
– Carbon Markets and the CORSIA

A. Generate: Emissions reduction projects generate emissions units.

B. Purchase: Emissions units are purchased in carbon markets on a per-tonne basis, where 1 Emissions Unit = 1 tonne of CO₂.

C. Cancel: Operators cancel CORSIA eligible emissions units. Cancellation takes place within a registry designated by a CORSIA Eligible Emissions Unit Program.

D. Publish: Operators request each CORSIA Eligible Emissions Unit Program Registry to make visible the cancelation information on the registry’s public website.

The ICAO Council will determine the CORSIA eligible emissions units.
Reporting of Emissions Unit Cancellation

• Annex 16 Vol. IV – Part II Chapter 4, 4.3 and Appendix 5
  – For a given compliance period, operator shall report to the State the cancellation of CORSIA Eligible Emissions Units by submitting an Emissions Unit Cancellation Report. (Appendix 5, Table A5-7)
  – State shall approve the Emissions Unit Cancellation Report and submit to ICAO. (Appendix 5, Table A5-8)

Table A5-7. Emissions Unit Cancellation Report from operator to State
Reporting of Emissions Unit Cancellation

Aeroplane operators

- Purchase / Cancel emissions units for compliance
- Request that cancellation of Eligible Emissions Units is communicated on the respective Eligible Emissions Units Program Registries websites
- Compile emissions unit cancellation information and draft Emissions Unit Cancellation Report
- Submit report to State

State

- Report to ICAO the required information regarding emissions unit cancellation

ICAO

- Compile and publish emissions units information via the ICAO CORSIA Central Registry
Reporting in CORSIA (recap)

- Reporting of CO₂ Emissions
  (Annex 16, Volume IV, Part II, Chapter 2, 2.3)

Covered in Session 4:
CORSIA MRV System: Reporting and verification of CO₂ emissions

- Reporting emissions units cancellation
  (Annex 16, Volume IV, Part II, Chapter 4, 4.3)

Covered in this Session 5:
CORSIA Calculation of CO₂ offsetting requirements
Verification in CORSIA

- Verification is an essential part of the CORSIA, as it ensures the accuracy of the information related to:
  - The amount of CO$_2$ emissions from international flights
    (Annex 16, Volume IV, Part II, Chapter 2, 2.4)
  - The purchase of emissions units from eligible programmes to address offsetting requirements
  - The cancellation of eligible emissions units
  - The confirmation of the single use of eligible emissions units
    (Annex 16, Volume IV, Part II, Chapter 4, 4.4)

Covered in Session 4: CORSIA MRV System: Reporting and verification of CO$_2$ emissions

Covered in this Session 5: CORSIA Calculation of CO$_2$ offsetting requirements
Verification of Emissions Unit Cancellation Report

• Annex 16 Vol. IV – Part II Chapter 4, 4.4 and Appendix 6
  – The operator shall engage a verification body for the verification of its Emissions Unit Cancellation Report;
  – Verification body shall conduct the verification according to ISO 14064-3:2006, and the relevant requirements in Appendix 6;
  – Submission of Emissions Unit Cancellation Report and Verification Report to State by aeroplane operator and verification body;
  – State shall perform an order of magnitude check of the Emissions Unit Cancellation Report.
  – Verification body shall be accredited to ISO 14065:2013 and the relevant requirements in Appendix 6 by a national accreditation body.
Verification of Emissions Unit Cancellation Report

**Aeroplane operators**

- Purchase / Cancel emissions units for compliance
- Request that cancellation of Eligible Emissions Units is communicated on the respective Eligible Emissions Units Program Registries websites
- Compile emissions unit cancellation information and draft Emissions Unit Cancellation Report
- Submit report to State

**State**

- Report to ICAO the required information regarding emissions unit cancellation

**ICAO**

- Compile and publish emissions units information via the ICAO CORSIA Central Registry

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**Cancel Report**
Verification of Emissions Unit Cancellation Report

Aeroplane operators

1. Purchase / Cancel emissions units for compliance
2. Request that cancellation of Eligible Emissions Units is communicated on the respective Eligible Emissions Units Program Registries websites
3. Compile emissions unit cancellation information and draft Emissions Unit Cancellation Report
5. Submit verified Emissions Unit Cancellation Report and associated Verification Report to State

State

6. Receive and conduct an order of magnitude check of the verified Emissions Unit Cancellation Report
7. Report to ICAO the required information regarding emissions unit cancellation

Accredited 3rd party verifier

5. Submit verified Emissions Unit Cancellation Report and associated Verification Report to State

ICAO

8. Compile and publish emissions units information via the ICAO CORSIA Central Registry
Session 5:
CORSIA Calculation of CO₂ Offsetting Requirements

Summary

CORSIA
CORSIA Compliance with Offsetting Requirements

1. The State calculates the offsetting requirements attributed to an aeroplane operator.

\[
\text{Operator’s annual emissions} \times \text{Growth Factor} = \text{CO}_2 \text{ offset requirements}
\]

In a given year from 2021, the Growth Factor is the percent increase in the amount of emissions from the baseline, and is calculated by ICAO.

The Growth Factor changes every year taking into account both the sector’s and the individual operator’s emissions growth.
The operator reports the use of CORSIA eligible fuels for a 3-year compliance period. The State accounts for the benefits from the use of CORSIA eligible fuels and informs the operator of its total final CO$_2$ offsetting requirements for a 3-year compliance period.
The operator purchases and cancels eligible emissions units equivalent to its total final CO₂ offsetting requirements for the compliance period.

A. Generate: Projects generate emissions units.
B. Purchase: Emissions units are purchased in carbon markets by aeroplane operators.
C. Cancel: Operators cancel CORSIA eligible emissions units within a registry designated by a CORSIA Eligible Emissions Unit Program.
D. Publish: Operators request each CORSIA Eligible Emissions Unit Program Registry to make visible the cancelation information on the registry’s public website.

The operator provides a verified Emissions Units Cancellation Report to the State, who checks the Report and informs ICAO.
CORSIA Compliance with Offsetting Requirements

1. The State calculates the offsetting requirements attributed to an aeroplane operator.

2. The operator reports the use of CORSIA eligible fuels for a 3-year compliance period.

3. The State accounts for the benefits from the use of CORSIA eligible fuels and informs the operator of its total final CO$_2$ offsetting requirements for a 3-year compliance period.

4. The operator purchases and cancels eligible emissions units equivalent to its total final CO$_2$ offsetting requirements for the compliance period.

5. The operator provides a verified Emissions Units Cancellation Report to the State, who checks the Report and informs ICAO.
Questions?
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