



ASSEMBLÉE — 42^e SESSION

COMITÉ EXÉCUTIF

Point 17 : Protection de l'environnement – Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA)

EXPOSÉ RÉCAPITULATIF DE LA POLITIQUE PERMANENTE ET DES PRATIQUES DE L'OACI DANS LE DOMAINE DE LA PROTECTION DE L'ENVIRONNEMENT – RÉGIME DE COMPENSATION ET DE RÉDUCTION DE CARBONE POUR L'AVIATION INTERNATIONALE (CORSIA)

(Note présentée par le Conseil de l'OACI)

RÉSUMÉ ANALYTIQUE

Une proposition de révision de la résolution A41-22 de l'Assemblée, intitulée *Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement – Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA)*, est soumise pour adoption. Les modifications proposées tiennent compte des faits nouveaux survenus depuis la 41^e session de l'Assemblée en matière de mise en œuvre du CORSIA.

Une fois adoptées par l'Assemblée, les résolutions révisées A41-22, A41-20 et A41-21 de l'Assemblée remplaceront les résolutions A41-20, A41-21 et A41-22 et constitueront l'Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement.

Suite à donner : L'Assemblée est invitée à :

- a) prendre acte des progrès substantiels accomplis depuis la 41^e session de l'Assemblée, notamment la mise en œuvre solide du CORSIA et de ses exigences en matière de surveillance, déclaration et vérification (MRV) des émissions de CO₂ par les États et les exploitants d'aéronefs, conformément à l'Annexe 16, volume IV ;
- b) accueillir favorablement l'élaboration et l'actualisation en temps utile, par le Conseil, des éléments de mise en œuvre du CORSIA, notamment les carburants admissibles CORSIA, les unités d'émissions admissibles CORSIA et le Registre central du CORSIA ;
- c) encourager les États et les autres parties prenantes concernées à augmenter rapidement la production et la certification des carburants admissibles CORSIA, et à prier instamment le Conseil, avec la contribution technique du Comité de la protection de l'environnement en aviation (CAEP), d'accélérer la certification et l'approbation de la durabilité des matières premières et des filières de carburant, afin de maximiser l'extensibilité et d'accroître les possibilités afin que les États de toutes les régions puissent contribuer à une décarbonation inclusive du secteur de l'aviation internationale ;
- d) convenir de l'importance cruciale de délivrer des lettres d'autorisation pour faciliter l'accès et la disponibilité des unités d'émissions admissibles CORSIA pour les exploitants d'aéronefs, et à inviter les gouvernements des pays où ont lieu des activités productrices d'unités d'émissions admissibles CORSIA à délivrer de telles lettres ;

e) demander au Conseil, avec la contribution technique du CAEP, de continuer à évaluer et à suivre régulièrement l'évolution de l'offre et de la demande de carburants et d'unités d'émissions admissibles CORSIA afin que les exploitants d'aéronefs puissent satisfaire aux exigences de compensation du CORSIA, tout en garantissant la qualité et la durabilité de ces carburants et unités d'émissions ; f) accueillir favorablement le succès continu du Programme d'assistance, de renforcement des capacités et de formation de l'OACI pour le CORSIA (AGIR pour le CORSIA), attribuable aux contributions et à la participation des États membres, et à demander aux États de maintenir leur participation et leur appui au programme AGIR pour le CORSIA ; g) encourager un plus grand nombre d'États à participer volontairement au CORSIA ; h) examiner les informations contenues dans la présente note, en ce qui concerne les travaux du Conseil sur l'examen périodique du CORSIA de 2025, dont fait état l'appendice B ; i) adopter la version révisée de la résolution de l'Assemblée, <i>Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement – Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA)</i>, présentée dans l'appendice C.	
<i>Objectifs stratégiques :</i>	La présente note de travail se rapporte à l'objectif stratégique <i>L'aviation est durable sur le plan environnemental</i> .
<i>Incidences financières :</i>	Les activités de l'OACI décrites dans la note de travail de l'Assemblée ci-jointe seront entreprises sous réserve des ressources prévues au budget ordinaire pour 2026-2028 et/ou provenant de contributions extrabudgétaires, selon ce que dictera le Plan d'activités 2026-2028 de l'OACI.
<i>Références :</i>	Doc 10184, <i>Résolutions de l'Assemblée en vigueur</i> (au 7 octobre 2022)

1. INTRODUCTION

1.1 À sa 41^e session, l'Assemblée de l'OACI a adopté la résolution A41-22 sur le CORSIA, qui contient les modifications apportées aux éléments de conception du CORSIA recommandés par le Conseil de l'OACI à la suite de ses travaux sur l'examen périodique du CORSIA de 2022, à savoir : pour le niveau de référence du CORSIA, utilisation des émissions de 2019 pour la phase pilote (2021-2023) et utilisation de 85 % des émissions de 2019 après la phase pilote (2024-2035) ; pour le calcul des obligations de compensation au titre du CORSIA, modification du pourcentage des facteurs de croissance sectorielle et individuelle de l'exploitant pour le faire passer à 100 % et à 0 % respectivement (pour la période 2030-2032), et à 85 % et à 15 % respectivement (pour la période 2033-2035) ; pour le seuil applicable aux nouveaux venus, modification de l'année des émissions de référence qui passe de 2020 à 2019.

1.2 Dans sa résolution A41-22, l'Assemblée a demandé au Conseil de continuer à superviser et à mettre à jour le cadre de mise en œuvre du CORSIA, comme cela a été fait depuis la création du système en 2016, avec le soutien de son Comité du climat et de l'environnement (CEC), de son Organe consultatif technique (TAB) et de son Comité de la protection de l'environnement en aviation (CAEP) (voir la résolution A41-22, paragraphe 19). Depuis la 41^e session de l'Assemblée de l'OACI, les travaux entrepris pour actualiser le cadre de mise en œuvre du CORSIA (voir le paragraphe 2), l'état d'avancement de la mise en œuvre du CORSIA (voir le paragraphe 3) et les résultats de l'examen périodique du CORSIA de 2025 (voir le paragraphe 5 et l'appendice B) montrent que la mise en œuvre du CORSIA est sur la bonne voie et se poursuit comme prévu au moment de son adoption en 2016.

2. ACTUALISATION DU CADRE DE MISE EN ŒUVRE DU CORSIA

2.1 Le cadre de mise en œuvre du CORSIA s'articule autour des trois éléments suivants : les normes et pratiques recommandées (SARP) de l'Annexe 16 – *Protection de l'environnement*, volume IV – *Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA)* ; les éléments indicatifs du Doc 9501, *Manuel technique environnemental* (ETM), volume IV ; et cinq éléments de mise en œuvre du CORSIA : la participation volontaire au CORSIA ; l'outil d'estimation et de déclaration des émissions de CO₂ (CERT) du CORSIA de l'OACI ; les carburants admissibles CORSIA ; les unités d'émissions admissibles CORSIA ; et le Registre central du CORSIA (RCC).

Annexe 16, volume IV

2.2 En mars 2023, le Conseil a adopté l'Amendement n° 1 de l'Annexe 16, volume IV, qui tient compte des modifications apportées aux éléments de conception du CORSIA dans la résolution A41-22 et des recommandations techniques découlant de la réunion CAEP/12, tenue en février 2022. L'Amendement n° 1 de l'Annexe 16, volume IV, est devenu applicable au moment où la deuxième édition de l'Annexe 16, volume IV, est devenue applicable le 1^{er} janvier 2024, ce qui coïncide avec le début de la première phase du CORSIA (2024-2026).

2.3 La réunion du CAEP/13, tenue en février 2025, a recommandé l'apport d'amendements mineurs à l'Annexe 16, volume IV, afin de clarifier les questions liées à la surveillance, à la déclaration et à la vérification (MRV) des émissions de CO₂, actuellement à l'étude par le Conseil, et qui seraient applicables à partir du 1^{er} janvier 2027.

Doc 9501, volume IV

2.4 En octobre 2023, l'OACI a publié la troisième édition du Doc 9501, volume IV, qui contient des orientations techniques sur la mise en œuvre du CORSIA actualisées par le CAEP pour aider les parties concernées dans la mise en œuvre des SARP figurant dans la deuxième édition de l'Annexe 16, volume IV.

2.5 La réunion CAEP/13, tenue en février 2025, a recommandé des modifications au Doc 9501, volume IV, à savoir des orientations supplémentaires sur les questions liées aux carburants admissibles CORSIA. La publication de la quatrième édition du Doc 9501, volume IV, est prévue pour le dernier trimestre de 2025.

Éléments de mise en œuvre du CORSIA

2.6 Les cinq éléments de mise en œuvre du CORSIA sont pris en compte dans 14 documents de l'OACI auxquels l'Annexe 16, volume IV, renvoie directement. Ces documents contiennent des éléments qui sont indispensables à la mise en œuvre du CORSIA et dont le Conseil a approuvé la publication sur le site web de l'OACI. Depuis la 41^e session de l'Assemblée de l'OACI, le Conseil a continué d'examiner et d'approuver les mises à jour des 14 documents de l'OACI, conformément au calendrier présenté dans l'appendice A de la présente note.

3. ÉTAT D'AVANCEMENT DE LA MISE EN ŒUVRE DU CORSIA

Participation volontaire au CORSIA

3.1 L'Assemblée de l'OACI a vivement encouragé tous les États à participer volontairement à la phase pilote et à la première phase du CORSIA, étant donné qu'une plus grande participation augmentera l'intégrité environnementale du régime [voir la résolution A41-22, paragraphe 9, alinéa c)]. Le document de l'OACI intitulé *CORSIA States for Chapter 3 State Pairs* (États du CORSIA pour les paires d'États du Chapitre 3) est actualisé chaque année pour prendre en compte la liste des États qui définit les paires d'États assujetties à des obligations de compensation au titre du CORSIA pour une année donnée à partir de 2021¹. Depuis l'Assemblée, le nombre d'États qui participent volontairement n'a cessé d'augmenter pour atteindre 126 États en 2024, 129 États en 2025 et 130 États en 2026.

Surveillance, déclaration et vérification (MRV) des émissions de CO₂

3.2 La mise en œuvre efficace du CORSIA repose sur la surveillance, la déclaration et la vérification (MRV) systématiques des émissions annuelles de CO₂ par tous les exploitants d'aéronefs effectuant des vols internationaux. Conformément aux dispositions de l'Annexe 16, volume IV, de nombreux exploitants peuvent appliquer des procédures simplifiées pour la surveillance et la déclaration des émissions de CO₂ en utilisant le CERT du CORSIA de l'OACI², dont les mises à jour annuelles sont élaborées par le CAEP et approuvées par le Conseil.

3.3 Sur la base des données communiquées par les exploitants, les États sont tenus de soumettre à l'OACI des données annuelles sur les émissions de CO₂ par l'intermédiaire du RCC, ainsi que des informations sur des points tels que : la liste des exploitants ; la liste des organismes de vérification accrédités ; les réductions des émissions associées aux carburants admissibles CORSIA ; les annulations d'unités d'émissions admissibles CORSIA. Ces informations servent de fondement pour les documents de l'OACI relatifs au RCC, publiés sur le site web de l'OACI³. En mars 2024, l'OACI a lancé une nouvelle version du Registre, harmonisée avec les obligations actualisées en matière de déclaration figurant dans la deuxième édition de l'Annexe 16, volume IV.

¹ Page web sur les États participant volontairement au CORSIA : <https://www.icao.int/environmental-protection/CORSIA/Pages/state-pairs.aspx>

² Page web sur le CERT du CORSIA : <https://www.icao.int/environmental-protection/CORSIA/Pages/CERT.aspx>

³ Page web sur le Registre central du CORSIA : <https://www.icao.int/environmental-protection/CORSIA/Pages/CCR.aspx>

3.4 Depuis la 41^e session de l'Assemblée de l'OACI, les États ont présenté des données sur les émissions de CO₂ par l'intermédiaire du RCC pour les trois années de la phase pilote du CORSIA (c'est-à-dire 2021, 2022 et 2023), comme suit :

- en 2022, 107 États ont présenté des données sur les émissions de CO₂ de 2021, l'OACI ayant appliqué la méthode de remplacement des données manquantes par des valeurs de substitution pour 23 États supplémentaires ; les émissions totales de CO₂ pour 2021 s'élevaient à 290 mégatonnes, les données CCR représentant une couverture des émissions de 96,5 % ;
- en 2023, 115 États ont présenté des données sur les émissions de CO₂ de 2022, l'OACI ayant appliqué la méthode de remplacement des données manquantes par des valeurs de substitution pour 21 États supplémentaires ; les émissions totales de CO₂ pour 2022 s'élevaient à 429 mégatonnes, les données CCR représentant une couverture des émissions de 97,7 % ;
- en 2024, 121 États ont présenté des données sur les émissions de CO₂ de 2023, l'OACI ayant appliqué la méthode de remplacement des données manquantes par des valeurs de substitution pour 15 États supplémentaires ; les émissions totales de CO₂ pour 2023 s'élevaient à 530 mégatonnes, les données CCR représentant une couverture des émissions de 99,0 %.

Facteur de croissance sectorielle annuelle du CORSIA et calcul des obligations de compensation

3.5 Sur la base des informations communiquées par les États, complétées au moyen de la procédure de remplacement des données manquantes par des valeurs de substitution, l'OACI a publié des éditions annuelles du document de l'OACI intitulé *CORSIA – Facteur de croissance sectorielle (SGF) annuelle* qui établit la valeur du SGF pour les années 2021, 2022 et 2023. Étant donné que les valeurs SGF₂₀₂₁, SGF₂₀₂₂ et SGF₂₀₂₃ sont nulles, aucune obligation de compensation n'a été accumulée au cours de la phase pilote du CORSIA.

3.6 L'évolution des émissions annuelles de CO₂ déclarées montre que le SGF pourrait avoir une valeur positive à partir de 2024, ce qui créerait des obligations de compensation pour les exploitants d'aéronefs. Cette possibilité met encore plus l'accent sur l'importance d'une mise en œuvre continue et solide du système MRV du CORSIA, étant donné que le calcul par l'OACI des valeurs SGF annuelles repose sur la communication systématique des données sur les émissions annuelles de CO₂, conformément aux dispositions de l'Annexe 16, volume IV.

Unités d'émissions admissibles CORSIA

3.7 L'admissibilité des unités d'émissions utilisées par les exploitants d'aéronefs pour satisfaire aux obligations du CORSIA en matière de compensation est définie dans le document de l'OACI intitulé *CORSIA – Unités d'émissions admissibles*⁴, qui est régulièrement actualisé par le Conseil, en fonction des recommandations techniques du TAB. Les évaluations annuelles de l'admissibilité des programmes potentiels d'unités d'émissions sont fondées sur les critères d'admissibilité des unités d'émissions CORSIA.

3.8 À l'issue de la dernière évaluation effectuée par le TAB en 2024, 11 programmes d'unités d'émissions étaient admissibles à titre de fournisseurs d'unités d'émissions admissibles CORSIA pour

⁴ Page web sur les unités d'émissions admissibles CORSIA : <https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Emissions-Units.aspx>

la phase pilote du CORSIA. Étant donné qu'aucune obligation de compensation n'a été créée au cours de cette phase, les exploitants n'ont pas besoin dans ce cas-ci d'acheter ou d'annuler ces unités d'émissions à partir du CORSIA.

3.9 Six programmes d'unités d'émissions sont actuellement admissibles à fournir des unités d'émissions admissibles CORSIA pour la première phase du CORSIA. Le TAB rend compte régulièrement au Conseil de l'offre potentielle d'unités d'émissions admissibles CORSIA, en soulignant que la disponibilité sur le marché des unités d'émissions est subordonnée à l'obtention d'une attestation du pays hôte (également connue sous le nom d'autorisation du pays hôte en vertu de l'article 6 de l'Accord de Paris de la Convention-cadre des Nations Unies sur les changements climatiques), une mesure importante pour éviter la double réclamation des unités utilisées dans le contexte du CORSIA.

3.10 À cet égard, le Conseil a demandé au Secrétariat de renforcer ses activités de sensibilisation sur cette question. L'OACI a donc envoyé aux États une lettre dans laquelle les gouvernements des pays où ont lieu des activités productrices d'unités d'émissions admissibles CORSIA sont encouragés à délivrer des lettres d'autorisation, afin que les exploitants d'aéronefs puissent y accéder et en disposer plus aisément (voir A42-WP/26).

Carburants admissibles CORSIA

3.11 Dans le cadre de la mise en œuvre du CORSIA, les exploitants d'aéronefs peuvent réduire leurs obligations de compensation au titre du CORSIA au cours d'une année donnée en réclamant des réductions d'émissions au titre des carburants admissibles CORSIA. Les cinq documents de l'OACI relatifs aux carburants admissibles CORSIA ont été régulièrement actualisés depuis la 41^e session de l'Assemblée de l'OACI⁵, ce qui a conduit aux principaux faits nouveaux suivants.

- En novembre 2022, le Conseil a approuvé les critères de durabilité pour les carburants d'aviation à moindre émission de carbone (LCAF) produits à partir du 1^{er} janvier 2024, en plus des critères de durabilité précédemment approuvés pour les carburants d'aviation durable (SAF).
- En juin 2023, le Conseil a décidé que deux programmes de certification de la durabilité précédemment approuvés pour la certification SAF pendant la phase pilote du CORSIA étaient également approuvés pour la certification à compter du 1^{er} janvier 2024, un troisième programme ayant été approuvé en octobre 2024.
- Le Conseil a approuvé des mises à jour régulières des documents de l'OACI *CORSIA – Valeurs par défaut des émissions pendant le cycle de vie des carburants admissibles* et *CORSIA – Méthode de calcul des valeurs réelles des émissions pendant le cycle de vie*, qui contiennent des informations pertinentes pour le calcul des réductions d'émissions provenant des carburants admissibles CORSIA.

3.12 En juin 2024, le Conseil de l'OACI a approuvé la feuille de route de l'OACI pour la mise en œuvre du Cadre mondial de l'OACI pour les SAF, les LCAF et autres énergies plus propres pour l'aviation, et de l'objectif ambitieux à long terme (LTAG). Le Cadre mondial demandait d'accélérer la mise en place et l'approbation de nouveaux programmes de certification de la durabilité, ainsi que d'accélérer l'analyse et l'approbation des valeurs des émissions utilisées dans l'analyse de cycle de vie pour les nouvelles sources et filières de carburants (voir A42-WP/25).

⁵ Page web sur les carburants admissibles CORSIA : <https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Eligible-Fuels.aspx>

3.13 La réunion CAEP/13, tenue en février 2025, a approuvé des orientations supplémentaires pour aider les organismes de vérification à valider les déclarations de réduction d'émissions provenant des carburants admissibles CORSIA. Les orientations, qui figureront dans la quatrième édition du Doc 9501, volume IV, ont été publiées sur le site web de l'OACI en mars 2025⁶, en appui aux activités de vérification menées dans le cadre du CORSIA.

4. RENFORCEMENT DES CAPACITÉS ET ASSISTANCE POUR LE CORSIA

4.1 Le Programme d'assistance, de renforcement des capacités et de formation (de l'OACI) pour le CORSIA (AGIR pour le CORSIA)⁷, lancé en juillet 2018 dans le cadre de l'initiative *Aucun pays laissé de côté*, a pour but d'aider tous les États à mettre en œuvre le CORSIA selon une « approche coordonnée » sous l'égide de l'OACI. Son importance a été soulignée lors des dernières sessions de l'Assemblée (voir la résolution A41-22, paragraphe 21).

4.2 Les partenariats de parrainage, auxquels participent actuellement 136 États (16 États offrant un appui et 120 États demandeurs), constituent la pierre angulaire du programme AGIR pour le CORSIA. La formation dispensée dans le cadre des partenariats a contribué au haut niveau de mise en œuvre du CORSIA, comme en témoignent l'augmentation constante du nombre d'États participant volontairement au régime et la couverture élevée des données sur les émissions de CO₂ présentées par les États par l'intermédiaire du RCC. Pour s'assurer que la mise en œuvre se fait selon une approche coordonnée, comme il est prescrit, le Secrétariat de l'OACI organise chaque année des séances de formation de formateurs.

4.3 En 2019, dans le cadre de son programme de formation, l'OACI a lancé le cours de vérification du CORSIA dans le but de former les organismes de vérification. Le cours a été actualisé en septembre 2023 afin d'harmoniser son contenu avec la deuxième édition de l'Annexe 16, volume IV. En 2025, on a procédé à l'élaboration de trois autres cours relatifs au CORSIA qui s'inscrivent dans le programme de formation de l'OACI, dont deux sont élaborés pour répondre au besoin croissant de formation sur les carburants admissibles CORSIA et les unités d'émissions admissibles CORSIA, et un troisième servant d'introduction au CORSIA. Ces nouveaux cours seront disponibles au dernier trimestre de 2025.

4.4 Le Secrétariat de l'OACI continue d'élaborer et d'actualiser des documents d'information sur le CORSIA: une foire aux questions (FAQ) sur le CORSIA, mise à jour chaque année ; les numéros mensuels du bulletin d'information sur le CORSIA ; et des mises à jour régulières de *Navigating CORSIA – A guide to the scheme's design and implementation* (Naviguer le CORSIA – Guide de conception et de mise en œuvre du régime), un ensemble de présentations préenregistrées accessibles sur le site web de l'OACI.

5. EXAMEN PÉRIODIQUE DU CORSIA DE 2025

5.1 En mars 2023, le Conseil a entamé ses travaux sur l'examen périodique du CORSIA de 2025 en demandant au CAEP d'entreprendre les travaux y relatifs, de s'appuyer sur le processus d'examen du CORSIA de 2022, et de mettre l'accent sur l'évaluation de l'offre, de la demande, des prix et de l'incidence sur les coûts des obligations de compensation au titre du CORSIA.

⁶ <https://www.icao.int/environmental-protection/CORSIA/Documents/Guidance%20on%20verification%20of%20CEF%20claims.pdf>

⁷ Pour plus de détails sur les activités d'AGIR pour le CORSIA, consulter la page web principale du CORSIA à l'adresse www.icao.int/corsia.

5.2 Depuis mars 2024, le CAEP présente régulièrement au Conseil des mises à jour de ses analyses techniques. Le cas échéant, le Conseil a fourni au CAEP des orientations supplémentaires, l'aiguillant sur les domaines sur lesquels ses analyses techniques subséquentes devraient porter. Les contributions du CAEP au Conseil ont été publiées (après examen par le Conseil) sur le site web de l'OACI⁸.

5.3 Les travaux sur l'examen périodique du CORSIA de 2025 se sont déroulés dans un contexte de stabilité de la mise en œuvre du CORSIA, par comparaison avec l'examen périodique du CORSIA de 2022 qui s'est fait pendant la pandémie de COVID-19. Du fait des progrès accomplis dans la mise en œuvre du CORSIA, l'examen périodique du CORSIA de 2025 peut compléter l'analyse prévisionnelle applicable à la première phase et au-delà au moyen d'une évaluation de la mise en œuvre de la phase pilote du CORSIA déjà achevée.

5.4 Après avoir examiné la dernière version des contributions techniques du CAEP en juin 2025, le Conseil a approuvé son rapport sur l'examen périodique du CORSIA de 2025, qui sera présenté à la 42^e session de l'Assemblée de l'OACI (voir l'appendice B de la présente note).

6. MODIFICATIONS DE L'EXPOSÉ RÉCAPITULATIF ACTUEL

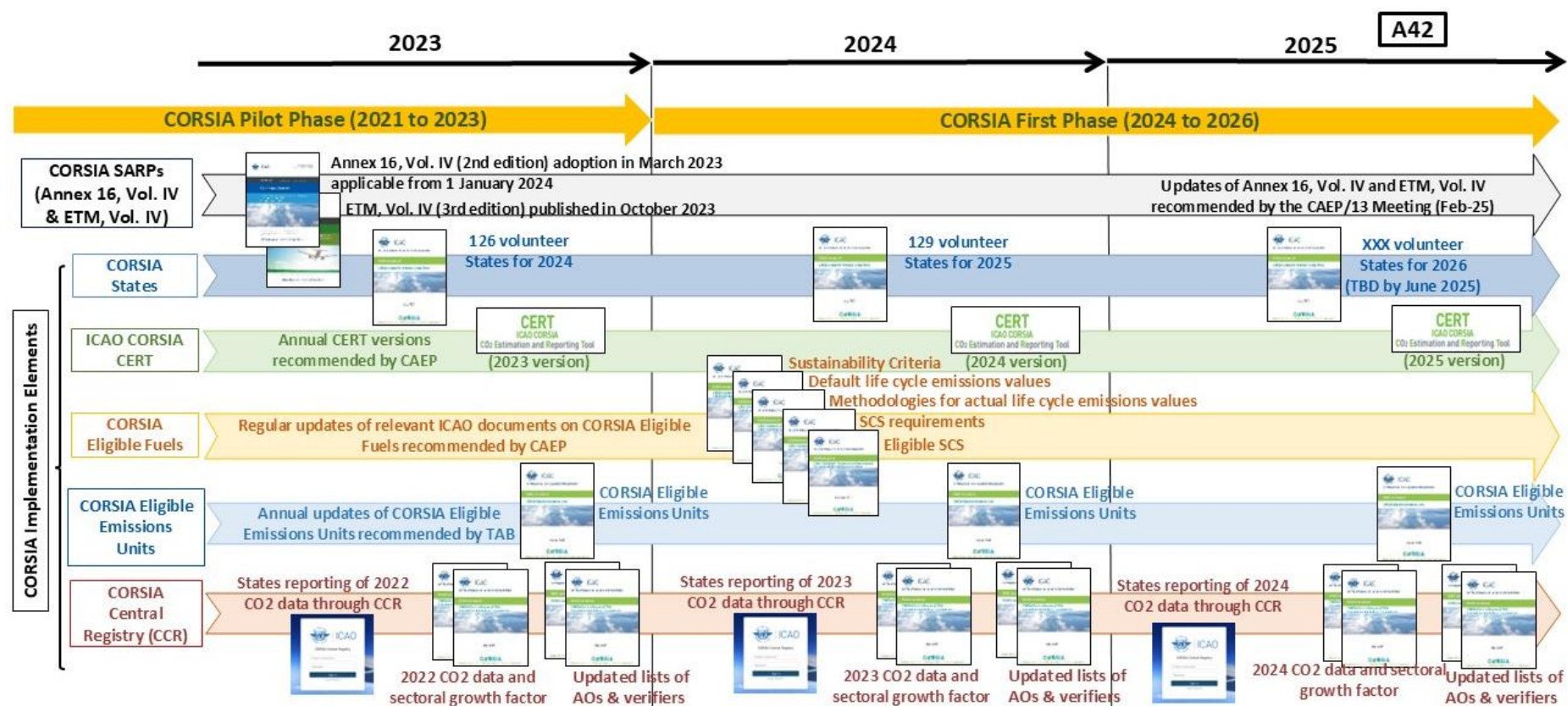
6.1 L'appendice C ci-jointe présente les modifications qu'il est proposé d'apporter à la résolution de l'Assemblée A41-22 afin de tenir compte des faits nouveaux suivants concernant le CORSIA qui sont survenus depuis la 41^e session de l'Assemblée :

- a) les paragraphes du préambule sont en cours de révision pour tenir compte des mises à jour des documents pertinents formant le cadre de mise en œuvre du CORSIA, des résultats de l'examen périodique du CORSIA de 2022 et de la modification de la terminologie par rapport à la Convention-cadre des Nations Unies sur les changements climatiques (CCNUCC) ;
- b) les paragraphes 11 et 12 du dispositif sont en cours de révision pour tenir compte des décisions prises à la 41^e session de l'Assemblée par suite de l'examen périodique du CORSIA de 2022 ;
- c) le paragraphe 20 du dispositif est en cours de révision afin d'adapter la terminologie en fonction de celle de la CCNUCC.

⁸ Voir la page web principale du CORSIA (www.icao.int/CORSIA), section *Examen périodique du CORSIA*.

APPENDIX A

OVERVIEW OF THE MAINTENANCE OF THE CORSIA IMPLEMENTATION FRAMEWORK (2023 – 2025)



A42-WP/28
EX/15
Appendice B
Anglais seulement

APPENDIX B

COUNCIL REPORT TO THE 42ND SESSION OF THE ICAO ASSEMBLY ON THE 2025 CORSIA PERIODIC REVIEW



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**Technical Assessments
in Support of the
2025 Periodic Review**

May 2025



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EXECUTIVE SUMMARY

Background

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is the first global market-based scheme that applies to a sector. It complements other aviation in-sector emissions reductions efforts such as technological innovations, operational improvements and sustainable aviation fuels to meet the ICAO aspirational goal of carbon neutral growth.

Every 3 years, in accordance with the ICAO Assembly Resolution on CORSIA, the Council conducts a Periodic Review of CORSIA. The Committee on Aviation Environmental Protection (CAEP) WG4 CORSIA Tools and Analysis Group (CTAG) conducts technical assessments in support of the CORSIA Periodic Review as requested by the Council.

At its 228th session in March 2023, the Council requested CAEP to undertake work in order to support the Council on the 2025 CORSIA periodic review building upon the 2022 CORSIA review process, with a focus on the assessment of supply, demand, price and cost impact of the CORSIA offsetting requirements; and perform technical analyses to facilitate the development of a methodology for the periodic review. Following the consideration of interim technical assessments, the Council also made specific requests to CAEP from its 231st through 234th Sessions.

This document presents a comprehensive summary of the assessments in support of the 2025 CORSIA Periodic Review by CAEP provided to the 235th Session of the Council.

The 2025 CORSIA Periodic Review comprises two key components:

- *backward-looking assessment*: The 2025 CORSIA Periodic Review provided a unique opportunity to look back in time and assess how CORSIA worked during the Pilot Phase (2021-2023) in context of forward-looking projections anticipated during the 2022 CORSIA Periodic Review, and
- *updated forward-looking assessments*: Estimates of offsetting requirements (i.e., demand), supply and price of CORSIA Eligible Emissions Units (CEEU) and emissions reductions from CORSIA Eligible Fuels (CEF) were updated using the latest traffic forecasts and other relevant assumptions on the expected implementation of CORSIA.

Review of CORSIA's Pilot Phase (2021-2023)

Leveraging data reported to ICAO through the CORSIA Monitoring, Reporting and Verification (MRV), the CAEP collected data and tracked actual/historical CO₂ emissions from international aviation from 2019 to 2023. The actual historical CO₂ emissions were placed in context of projections of CO₂ emissions that were presented to the Council as part of the 2022 CORSIA Periodic Review prior to the 41st Assembly. It was observed that actual CO₂ emissions followed a low forecast scenario in 2021, but the international aviation sector exhibited a stronger recovery in CO₂ emissions in 2022 and 2023.

Given the effects of the COVID-19 global pandemic on international aviation and despite the recovery since 2020, CO₂ emissions from international aviation subject to offsetting requirements remained below the 2019 CORSIA sector baseline in 2021, 2022 and 2023. As a result, the Sector Growth Factors (SGFs) were 0% for all three years of the CORSIA Pilot Phase meaning that there was no offsetting required during the Pilot Phase of CORSIA.

Despite the absence of offsetting requirements, markets started to develop and prepare to meet the expected future demand for emissions reductions from CEF and CEEU.

Updated forward looking CORSIA analyses

The CAEP has updated its forward-looking assessments of CO₂ emissions based on the latest (CAEP/13) ICAO/CAEP Traffic Forecasts. CO₂ emissions from international aviation are expected to return to 2019 level by 2026, 2027 and 2029 respectively under the high, mid and low CAEP/13 traffic scenarios.



Given updated CO₂ emissions projections and the 85% of 2019 CORSIA baseline starting in 2024, offsetting requirements are expected to start in 2024 under all CAEP/13 traffic scenarios.

Cumulative offsetting requirements could range from ≈950 to ≈1500 MtCO₂ from 2024 to 2035 and ≈105 to ≈150 MtCO₂ during the First Phase (2024-2026). The range of offsetting requirements from 2021 to 2035 is within the range of estimates of offsetting requirements from the 2022 CORSIA Periodic Review analyses presented to the Council in June 2022 where, under an 85% of 2019 baseline for 2024-2035, offsetting requirements were estimated to range from 600 to 2100 MtCO₂.

To understand and assess how future offsetting requirements (focusing on the First Phase of CORSIA from 2024 to 2026) may be addressed, the CAEP developed updated scenarios for emissions reductions from CEFs. The CAEP considered the latest short term CEF production data through 2030. In 2024, the global production of Sustainable Aviation Fuel (SAF) reached 1 million tonnes, representing ≈0.6% of international aviation jet fuel consumption and ≈0.3% of global aviation fuel consumption. For the First Phase of CORSIA (2024-2026), global SAF production may reach levels up to the “moderate” scenario. Estimates of production provide an upper bound on the potential contribution of emissions reductions from CEF.

Given the uncertainty in how aeroplane operators may choose to address offsetting requirements (i.e., mix of emissions reductions from CEF and/or cancelled CEEUs), a scenario-based assessment was conducted. Offsetting Requirements may be addressed with:

- (1) CEEUs (only),
- (2) emissions reductions from CEF according to the Moderate CEF short term production scenario with 50% of CEF claimed under CORSIA and the rest is addressed with CEEUs, and
- (3) emissions reductions from CEF according to the Moderate CEF short term production scenario with all CEF claimed under CORSIA and the rest with CEEUs.

The scenario-based analysis suggests that emissions reduction from CEF may address up to ≈ 15 % of offsetting requirements (≈ 130 MtCO₂) during the First Phase of CORSIA. The remainder (i.e., final offsetting requirements) would be addressed using CEEUs.

Absolute quantities of emissions reductions from CEF and/or CEEUs used to meet offsetting requirements were then monetized to estimate the cumulative costs of compliance from 2024 to 2026 using the following assumptions and data:

- a) Unit Prices of Emissions Reductions from CEF: The cost abatement (i.e., CEF Premium / tCO₂ abated) from the emissions reductions from CEF could range from ≈ \$600-800 per tCO₂. The CEF Premium is calculated as the difference between the Unit Price of SAF (≈ \$2.0 per Liter in 2024) and the unit price of Conventional Jet Fuel (≈ \$0.7 per Liter for 2024).
- b) Unit Prices of Emissions Units: The CAEP has updated its estimates of the prices of emissions units for the First Phase of CORSIA. Based on limited price information and data available and for the purpose of CAEP analyses, the average price of emissions units was estimated to range from \$10 to \$40 per tCO₂ during the First Phase of CORSIA.

Combining unit price information with quantities of emissions reductions from CEF and/or CEEUs, the total cumulative costs associated with addressing offsetting requirements from 2024 to 2026 could range from ≈ \$1B to \$5B using CEEUs (only) to ≈ \$10B to \$20B using a mix of CEEUs and emissions reductions from CEF assuming that all the available CEF, according to the latest CAEP Moderate scenario, are claimed towards CORSIA.



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BACKGROUND

High Level Description of CORSIA

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is the first global market-based scheme that applies to a sector. It complements other aviation in-sector emissions reduction efforts such as technological innovations, operational improvements and sustainable aviation fuels to meet the ICAO aspirational goal of carbon neutral growth.

The CORSIA Periodic Review

Background on the First (2022) CORSIA Periodic Review

Paragraph 17 of Assembly Resolution A40-19 includes a provision that the ICAO Council will conduct a periodic review of the CORSIA every three years from 2022. In this regard, the Council, in June 2020, highlighted the importance of undertaking the 2022 periodic review, with technical contribution of the CAEP, which will offer an opportunity to examine the impact of COVID-19 on CORSIA on various issues, including the impact on the baseline beyond the pilot phase.

In March 2021, the ICAO Council agreed on the process and methodology for the CORSIA periodic review towards 2022, and on the framework for the consideration of inputs from its subsidiary bodies such as the CAEP and the Technical Advisory Body (TAB).

Following several interim assessments, in March 2022, CAEP provided further inputs to the 225th Session of the ICAO Council regarding the 2022 CORSIA periodic review, including further assessment of COVID-19 impacts on CORSIA (C-WP/15326), including:

- Assessment of COVID-19 impacts on CORSIA and its baseline,
- Assessment of the costs of CORSIA implementation on States and aeroplane operators, and
- Review of the analysis of possible market distortions (in the context of CORSIA design elements).

In June 2022, the 226th Session of the ICAO Council requested CAEP to undertake further analysis on the impacts of COVID-19 on CORSIA and its baseline, building upon the analyses delivered by CAEP during the 225th Council Session in March 2022. The objective of the requested analysis was to estimate the CORSIA offsetting requirements and the regional breakdown, using the average of 2019 and 2020 emissions as the agreed baseline in Assembly Resolution A40-19, as well as the following scenarios for the CORSIA baseline after the pilot phase (2024 to 2035): (1) 2019 emissions only; (2) a percentage of 2019 emissions, which reflects an equivalent level to the average of 2019 and 2020 emissions; and (3) the mid-point between the baseline scenarios (1) and (2) above;

The ICAO Council, following consideration of the additional CAEP analysis and other design elements of CORSIA, agreed on a series of proposals for consideration by the 41st Session of the ICAO Assembly, namely:

- Use of 2019 emissions as the CORSIA baseline for the pilot phase (2021 – 2023);
- Use of 85% of 2019 emissions as the CORSIA baseline after the pilot phase (2024 – 2035); and
- Changes to the percentage use of the sectoral and individual operator's growth factors for the calculation of offsetting requirements under CORSIA, as follows:
 - 2030 - 2032: 100% sectoral and 0 % individual; and
 - 2033 - 2035: 85 % sectoral and 15% individual

The 41st Session of the ICAO Assembly considered the Council proposals and adopted the Resolution A41-22 on CORSIA including the design adjustments above, as reflected in Assembly Working Paper A41-WP/659.



The 2025 CORSIA periodic review

In March 2023, the ICAO Council requested CAEP to undertake work to support the Council on the 2025 CORSIA periodic review, building upon the 2022 CORSIA review process, with a focus on the assessment of supply, demand, price and cost impact of the CORSIA offsetting requirements. The Council also requested CAEP to perform technical analyses to facilitate the development of a methodology for the periodic review.

In March 2024, CAEP presented to the 231st Session of the ICAO Council a status update on CORSIA analyses with a proposed preliminary schedule of further updates to the CORSIA analyses (C-WP/15562). The updated CORSIA analyses included, inter alia, the development of proxy CAEP/13 CO₂ emissions trends; estimations of offsetting requirements through 2035; assessment of regional impacts; estimations of final offsetting requirements after emissions reductions from CEFs; impacts on aeroplane operators; and estimates of costs associated with CORSIA.

The Council reviewed CAEP's inputs and noted that, in order to support the Council in undertaking the 2025 CORSIA periodic review, CAEP would provide the Council with further updated CORSIA analyses, as well as the schedule of subsequent updates, during the 232nd Session, including updated information on the price of CEEUs and CEFs.

In June 2024, CAEP presented to the 232nd Session of the ICAO Council further updates to the CORSIA analyses and to the schedule of subsequent updates (C-WP/15587). The Council reviewed CAEP's inputs and requested CAEP to provide subsequent updates of the CORSIA analyses to support the Council in undertaking the 2025 CORSIA periodic review, as per the schedule presented by CAEP. The Council also emphasized the need for further information to be provided on the supply, regional distribution and price of CEEUs and CEFs, as a key input to the 2025 CORSIA periodic review and to any recommendations that would form part of the report by the Council to the 42nd Session of the Assembly.

In October 2024, CAEP provided the 233rd Session of the ICAO Council with a status report on its technical work to support the Council in undertaking the 2025 CORSIA periodic review (C-WP/15630), noting that updates to the CORSIA analyses had been limited in scope since the previous update. The Council reviewed CAEP's inputs and requested CAEP to provide further updates on the CORSIA analyses to support the Council in undertaking the 2025 CORSIA periodic review during the 234th Session, as per the schedule presented by CAEP, with a particular emphasis on matters related to the overall supply, demand and price of CEFs and CEEUs, as well as the related impacts on the implementation of the scheme.

In March 2025, CAEP presented to the 234th Session of the ICAO Council a comprehensive update to the CORSIA analyses (C-WP/15676). The updated CORSIA analyses follows the structure of the analyses presented at the previous 232nd Session, with a focus on those elements previously identified by the Council as a priority for further CAEP inputs, namely on matters related to the supply, regional distribution and price of CEEUs and CEFs. The Council reviewed CAEP's inputs and recognized the significant amount of analytical work undertaken by CAEP representing important technical contributions in support of the Council's work on the 2025 CORSIA periodic review. The Council also noted that CAEP would provide further updates to the CORSIA analyses during the 235th Session of the Council in June 2025, including on the supply of CEFs and CEEUs and their prices, and subsequent costs of the scheme, bearing in mind that the Council would need to finalize the 2025 CORSIA periodic review during the 235th Session and provide its related recommendations to the 42nd Session of the ICAO Assembly.



ASSESSMENT APPROACH IN SUPPORT OF THE 2025 CORSIA PERIODIC REVIEW

High level approach

The 2025 CORSIA Periodic Review comprises (1) **a backward-looking assessment** of how CORSIA worked during the Pilot Phase in context of projections anticipated during the 2022 Review, and (2) **updated forward-looking assessments** based on the latest historical data and traffic forecasts.

As shown in Figure 1 and as presented in Working Papers submitted up to the 226th Session of the Council (June 2022), the assessments in support of the 2022 CORSIA periodic review were mostly focusing on forward-looking assessments in the context of the ongoing impacts and recovery from the COVID-19 global pandemic on the international aviation sector and its emissions. These assessments included scenario-based estimations of future offsetting requirements under different CORSIA baseline options. The 2022 CORSIA periodic review based on analyses through the first part of 2022, submitted to Council at the 225th and 226th Sessions (March and June 2022, respectively) towards the 41st Session of the ICAO Assembly in Oct. 2022, was also conducted in the middle of the pilot phase of CORSIA. As such there was very limited (relevant) historical data on the functioning of CORSIA given that the pilot phase started on 1 January 2021.

Given the additional time and experience gained since the 2022 CORSIA periodic review, the 2025 CORSIA periodic review provides an opportunity for conducting a more in-depth review of the functioning of CORSIA since the last review, including the pilot phase. As such, the high-level approach for the 2025 CORSIA periodic review comprises two key components:

- a backward-looking review of how CORSIA worked during the pilot phase in context of projections anticipated during the 2022 review, and
- an update of the forward-looking assessments based on the latest historical data and most recent ICAO traffic forecast.

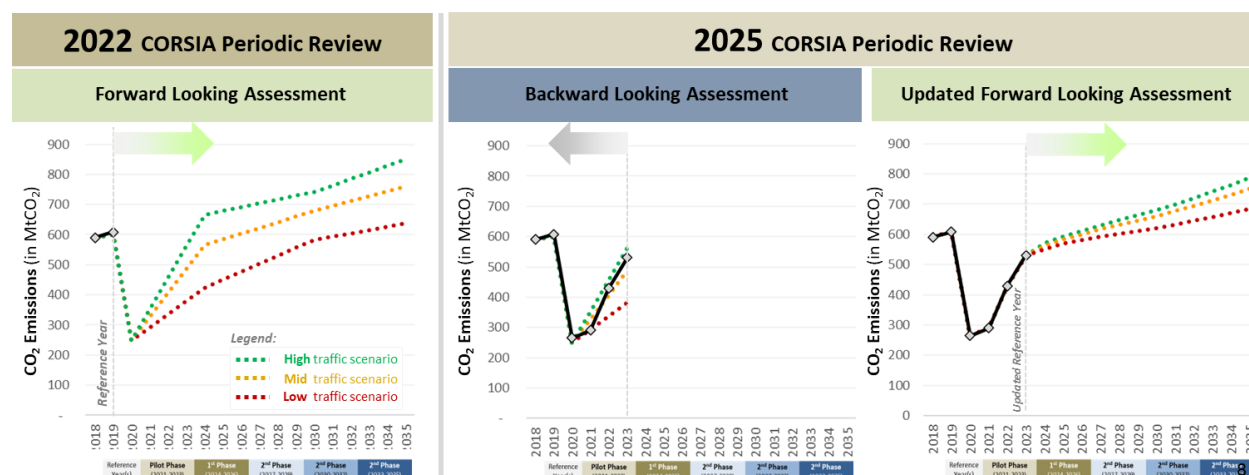


Figure 1 | CORSIA Periodic Reviews: High Level Approach



CORSIA Periodic Review Assessment Approach: Summary of Scope, Data, Processes and Outcomes

Figure 2 shows the details on the two key components of the 2025 CORSIA periodic review: backward-looking review and updated forward-looking assessments. This includes the descriptions of key metrics that are tracked and modelled, data sources, analysis processes and outcomes.

The forward-looking assessment depicts the approach underlying assessments by the CAEP/WG4 and presented to CAEP and Council to date. This includes the estimations of offsetting requirements and how they may be met in the future, at what costs to States and operators as well as considerations on the impacts on operators and international aviation. This process typically starts with the integration of ICAO traffic forecasts (either used directly by WG4 towards the proxy/interim CAEP trends or as input to official CAEP trends generally available at the end of a CAEP cycle). This step results in a set of scenarios for CO₂ emissions from international aviation. Detailed modelling by WG4 and the application of the CORSIA rules (or alternative policy assumptions) allows for the assessment of annual offsetting requirements through 2035. For forward-looking assessments, scenarios of how offsetting requirements may be addressed using emissions reductions from CEF and/or CEEUs are then developed. These estimates are then translated into costs to aeroplane operators under several unit price assumptions and scenarios. The costs of the implementation of MRV requirements are also estimated. Given estimates of future offsetting requirements, net CO₂ emissions through 2035 are assessed and placed in context of the Carbon Neutral Growth 2020 Goal (based on 2019 actual CO₂ emissions as proxy for pre-COVID 2020 emissions level). The forward-looking assessment also analyzes the impact of CORSIA offsetting requirements on aeroplane operators.

The left-hand side of Figure 2 shows details on the approach supporting the backward-looking assessment. A posteriori and by collecting historical data available through the year of the assessment (e.g., 2024), actual CO₂ emissions are tracked to understand how CORSIA has been functioning.

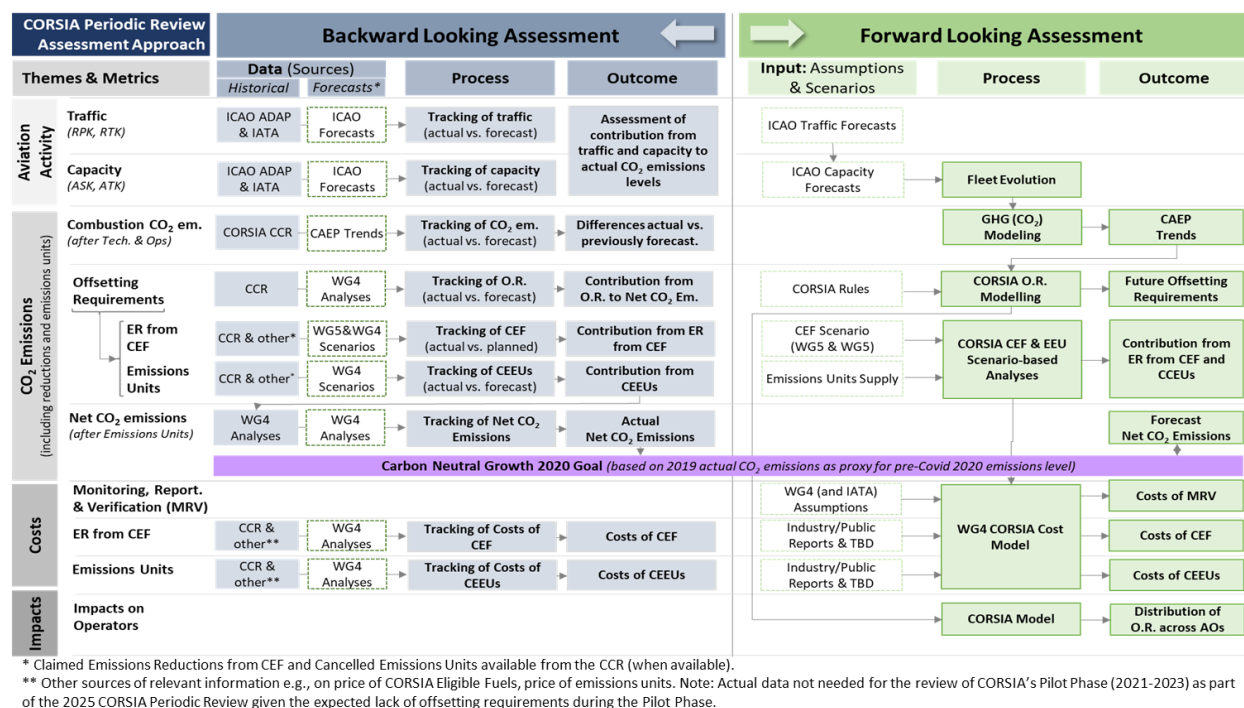


Figure 2 | CORSIA Periodic Review: Assessment Approach

Historical CO₂ emissions are put in context of previous forward-looking assessments (e.g., pre-Assembly 41) to understand differences between actual emissions and previously anticipated. The review of historical versus previously forecast aviation activity (e.g., traffic, capacity) can help explain differences. Based on historical data



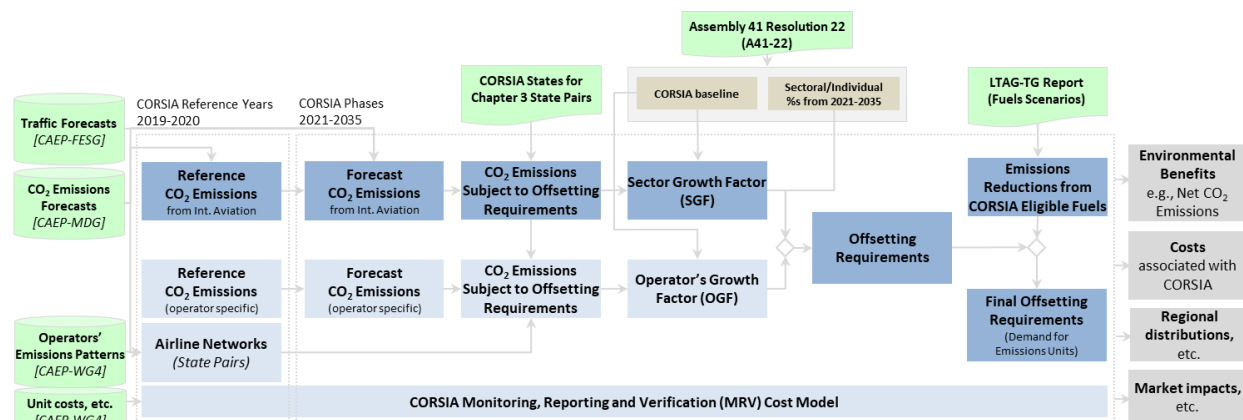
reported through the CORSIA Central Registry (CCR), quantities of emissions reductions from CEF and cancelled emissions units can be tracked to understand how offsetting requirements were met. Such assessment also allows for the tracking of net CO₂ emissions (i.e., emissions reductions from CEF and cancelled emissions units subtracted from combustion emissions) and compared against actual 2019 CO₂ emissions level used as proxy for pre-COVID 2020 emissions level and the Carbon Neutral Growth 2020 Goal. If offsetting requirements result in the claiming of emissions reductions from CEF and cancelled emissions units, the actual costs from those may be estimated and tracked.

Models and Analyses in Support of the CORSIA periodic review

Historically, the CAEP working groups provided technical support towards the development and then implementation of CORSIA. These analyses included assessments of the costs and CO₂ emissions reductions expected to result from CORSIA. To conduct integrated costs and benefits (i.e., emissions reductions), additional modelling steps are required.

COMPASS

The technical assessments and analyses in support of the CORSIA periodic review presented to the Council to date and contained in this document are based on the **CORSIA Model for Parametric Analyses and Stochastics Simulations (COMPASS)**. COMPASS was developed by experts nominated by the United States building on their expertise and experience since 2014 from modeling and assessing options towards the development of CORSIA. As shown on Figure 3, COMPASS integrates a wide array of inputs and assumptions. This tool enables a reconciliation of the various CO₂ emissions forecasts at a level (i.e., Aeroplane Operator-State Pair) required for CORSIA Analyses. The resulting State Pair level emissions forecast is combined with the underlying set of assumptions on the phased implementation of CORSIA (i.e., list of participating States from the pilot phase and first phase and the ICAO 2018 RTK Statistics that define the participation in CORSIA during its second phase). These modelling steps result in the estimation of CO₂ emission reductions from CORSIA (i.e., quantities of offsetting requirements that feed into the CORSIA Cost & Emissions Integration Model along with the output of the COMPASS MRV Cost model). The output to the CORSIA Cost & Emissions Integration Model forms the basis for analyses of offsetting requirements, costs, among other metrics.



* CORSIA Model: Complex stochastic model that captures international aviation level trends and operator specific dynamics ran hundreds of times to support Monte Carlo analyses.

Figure 3 | COMPASS: High Level Architecture

The COMPASS framework integrates CORSIA program parameters, a global capacity growth forecast, historical growth/decline profiles for individual operators, and historical new entrant and subsidiary operator models. The COMPASS framework can be used to evaluate the temporal and integrated impact of parameter and design choices under the CORSIA framework such as baseline definition, operator vs. sectoral growth factor calculation approaches,



and potential offsetting requirements for different categories of operators (e.g., new-entrant and subsidiary operators). The output from COMPASS enables CORSIA impact analyses at several levels of (dis-)aggregation:

- **Operator:** CO₂ from international operations and offsetting requirements by an individual operator,
- **State:** results for operators attributed to a given ICAO member state,
- **Region:** results for operators attributed to States within a particular ICAO region,
- **State-pair:** CO₂ from international operations between two ICAO member states,
- **FESG route group:** CO₂ from international operations between state pairs binned into route groups as defined by the CAEP Forecast and Economic Analysis Support Group (FESG),
- **Operator classification:** CO₂ from international operations attributed to cargo vs. passenger operators, operators that are in the CORSIA scope of applicability during the baseline year(s) and remain in scope through 2035, operators that are in the CORSIA scope of applicability during the baseline year(s) and exit scope prior to 2035, new operators that enter the CORSIA scope of applicability after the baseline year(s) (i.e., new entrant operators), and new operators that enter the CORSIA scope of applicability after the baseline year(s) that are subsidiaries or immediate successors to existing entities (i.e., subsidiary operators), and
- **System:** Aggregate results for international aviation under the various scopes of applicability of CORSIA (e.g., international aviation, international aviation subject to offsetting requirements).

To support these multiple levels of (dis-)aggregation, COMPASS tracks CO₂ emission growth/decline at the operator and state pair levels. Model data (i.e., total emissions, emissions subject to offsetting, and offsetting requirements) may be analyzed at the desired level of aggregation through post-processing of model outputs.

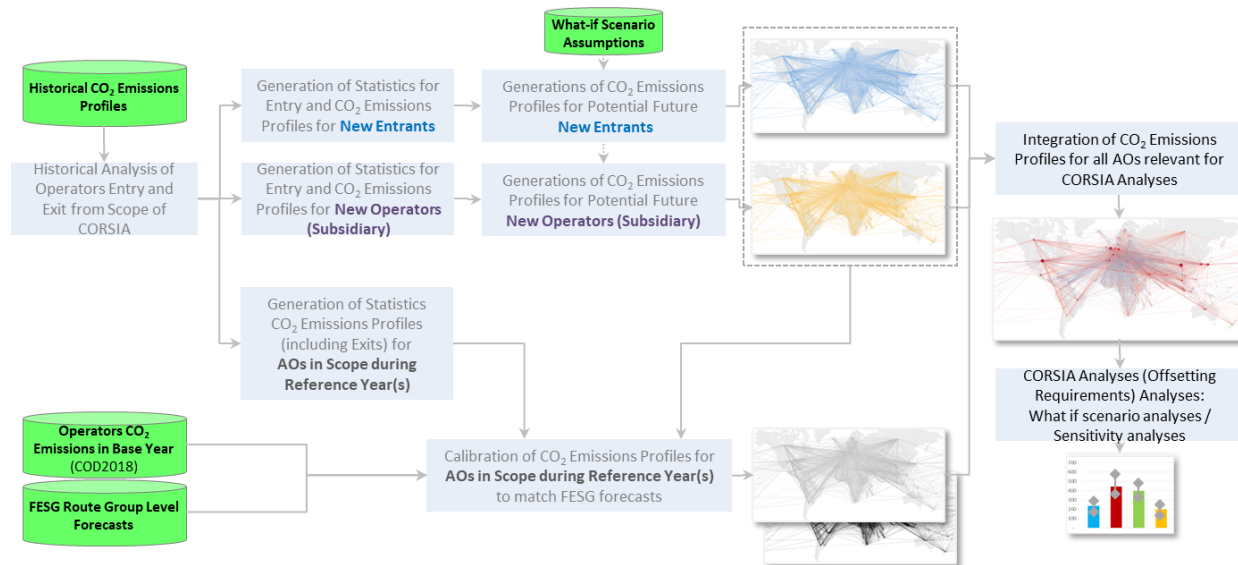


Figure 4 | COMPASS: Approach for integrating aeroplane operators' entries and exits from CORSIA scope

CORSIA's timeline of applicability ranges from 2021-2035, divided into five compliance periods of three years each (2021-2023 i.e., pilot phase, 2024-2026, 2027-2029, 2030-2032, and 2033-2025). ICAO states may elect to participate in CORSIA for the entire period 2021-2035 or to begin participation partway through this period.

COMPASS supports impact assessment for varying state participation, whether an ICAO state elects to begin participating during any year between 2021 and 2035 or not to participate in CORSIA.

Detailed predictions and forecasts for unknown/future operators cannot be developed with a high level of accuracy and confidence due to the fundamental uncertainty associated with such forecasts and level of disaggregation through 2035 (e.g., at the aeroplane operator level). There is uncertainty inherent in both the number of new entrant operators and the ICAO State of attribution expected for those operators. Therefore, a parametric modelling



approach was used to generate scenarios of potential future new entrants' emergence and evolution (calibrated through assumptions and available data) in addition to expected growth/decline in international emissions for operators in scope during the baseline year(s). This parametric modelling approach was combined with fast-time simulation capabilities to enable iterative analyses as new assumptions/data become available, or to enable Monte Carlo analyses. This modelling approach enables analyses to characterize the sensitivity of offsetting requirements across categories of aeroplane operators and the relative magnitude of offsetting requirements across numerous baseline options and/or input assumptions and data. Results may be assessed at the aggregate/stochastic level or for any individual (deterministic) scenario underlying these stochastic results.

AERO-MS CORSIA Module

In 2024, the CAEP WG4 considered the **AERO-MS CORSIA Module (ACM)** developed by experts from the European Union Aviation Safety Agency (es). Below are the main characteristics of the ACM:

- The ACM includes international aviation CO₂ emissions data by State Pairs from the CCR. Currently the CCR contains data for the CORSIA baseline year (2019) and the CORSIA pilot phase years 2021-2023.
- The ACM includes international aviation CO₂ emissions data by State Pairs from the AERO-MS for the remainder of the CORSIA years up to 2035. The data result from the implementation of the CAEP/13 baseline scenarios in the AERO-MS.
- The ACM allows users to specify: i) CORSIA baseline by compliance cycle; ii) sectoral/individual % by compliance cycle; iii) ICAO Member States to join CORSIA by year;
- The ACM takes into account unit costs of CEEUs and CEFs in order to compute the costs for meeting offset requirements.
- The ACM takes into account alternative CEF scenarios in order to compute the contribution of CEFs to meeting offset requirements.
- The ACM uses AERO-MS data on the distribution of CO₂ emissions across operators from 14 world regions considered in the AERO-MS. In the ACM a distribution profile is assigned to each of the State Pairs. The distribution data are used in the ACM to assess the outputs by AERO-MS region, whereby the outputs for each region relate to all aeroplane operators which are based in the region. The results for the 14 AERO-MS regions are aggregated in the ACM at 6 ICAO regions level.

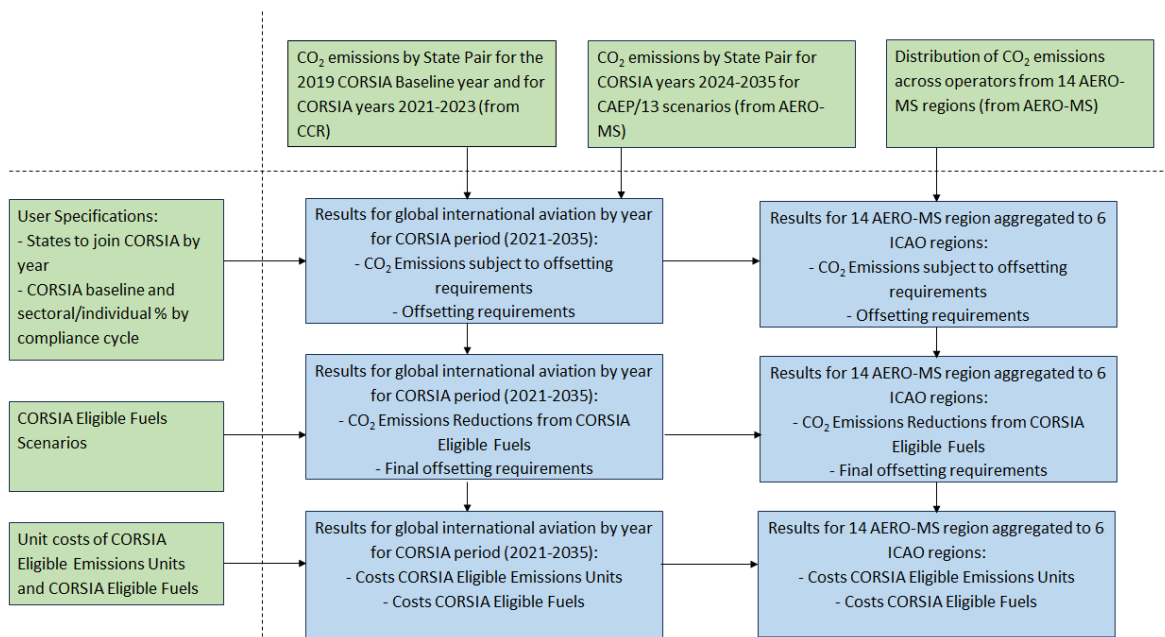


Figure 5 | AERO-MS CORSIA Module: Schematic overview



Figure 5 provides a schematic overview of the ACM including all the inputs to the ACM and the outputs generated in the various computational steps. The outputs are generated per year (2021-2035) and per ICAO region.

Results from both models are based on the latest set of assumptions as described in Appendix B.

The CAEP WG4 CTAG CORSIA Analyses Group has started to conduct a comparison of COMPASS and the ACM. The first comparison conducted as part of the CAEP/13 cycle shows consistency between the results of the two models. The CAEP/14 Work Programme calls for WG4 to continue its comparisons of the models, further document the modelling assumptions and methodologies and to continue the thorough validation of the models.



REVIEW OF CORSIA'S PILOT PHASE (2021-2023)

Actual CO₂ emissions from international aviation in context of previously anticipated projections during the 2022 CORSIA Periodic Review

Actual CO₂ emissions from 2019 to 2023 were collected from the CORSIA Central Registry. Figure 6 shows actual historical CO₂ emissions from international aviation through 2023, in context of previously anticipated CO₂ emissions as of the last (2022) CORSIA periodic review. It was observed that, following the impact of the COVID-19 Global Pandemic on international aviation, actual CO₂ emissions reach levels in 2021 close to the CAEP/12 Low forecast. The international aviation sector exhibited a stronger recovery in 2022 and 2023 where CO₂ emissions reached levels between the Mid and High CAEP/12 trends.

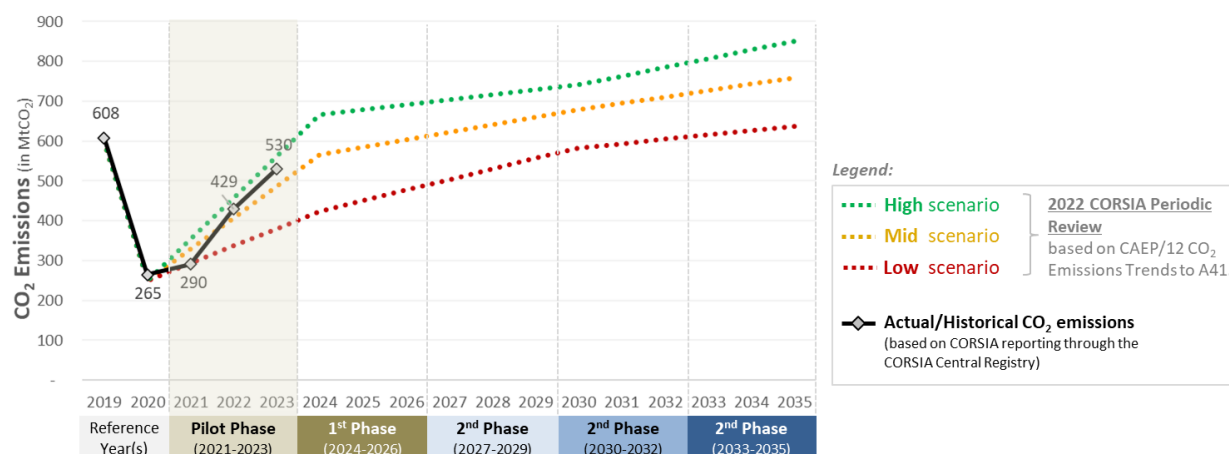


Figure 6 | CO₂ Emissions: Actual/historical versus previously anticipated during the last CORSIA periodic review (in 2022)

Offsetting Requirements during the Pilot Phase of CORSIA

In accordance with the Annex 16 Volume IV on CORSIA, while MRV requirements were applicable from January 1, 2019, the calculation of offsetting requirements was applicable from January 1, 2021 (i.e., start of the pilot phase).

As shown in Figure 7, given the effects of the COVID-19 Global Pandemic on international aviation and despite the recovery since 2020, CO₂ emissions from international aviation subject to offsetting requirements remained below the 2019 CORSIA sector baseline in 2021, 2022 and 2023. As a result, the SGFs were 0% for all three years of the CORSIA Pilot Phase.

Offsetting was therefore not required during the Pilot Phase and there was no demand (triggered by CORSIA) for emissions reductions from CEFs and/or CEEUs.

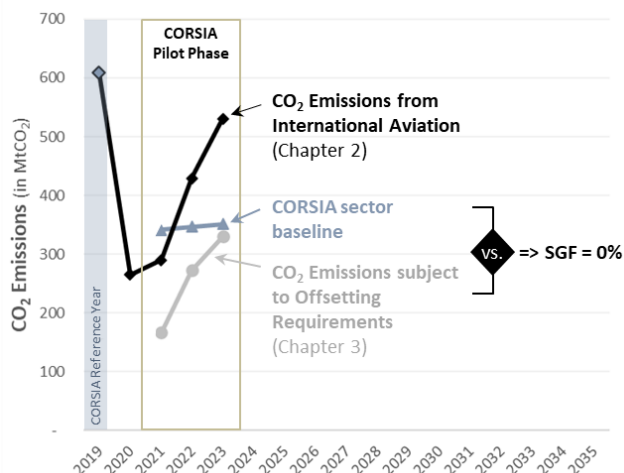


Figure 7 | Offsetting requirements during the pilot phase

Assessment of the Supply of Emissions Reductions from CEF and/or CORSIA Eligible Emissions Units during the Pilot Phase

The absence of demand for emissions reductions from CEF and/or emissions units for CORSIA compliance purposes does not mean that there was no supply, and that the markets did not prepare to meet potential and future demand.

To structure this assessment, the CTAG CORSIA Analyses Group developed a comprehensive framework to assess the potential role of the emissions reductions from CEFs and CEEUs towards meeting offsetting requirements. This part of the CORSIA Analyses is critical to the analyses and observations given the key role of emissions reductions from CEF on demand for CEEUs to meet offsetting requirements in a compliance cycle. Figure 8 shows the key steps from the overall supply of emissions reductions from alternative fuels and emissions units to the subsets that are or could be claimed under CORSIA to address offsetting requirements. As noted on Figure 8, it is conceptual and is not meant to represent actual values or estimations.

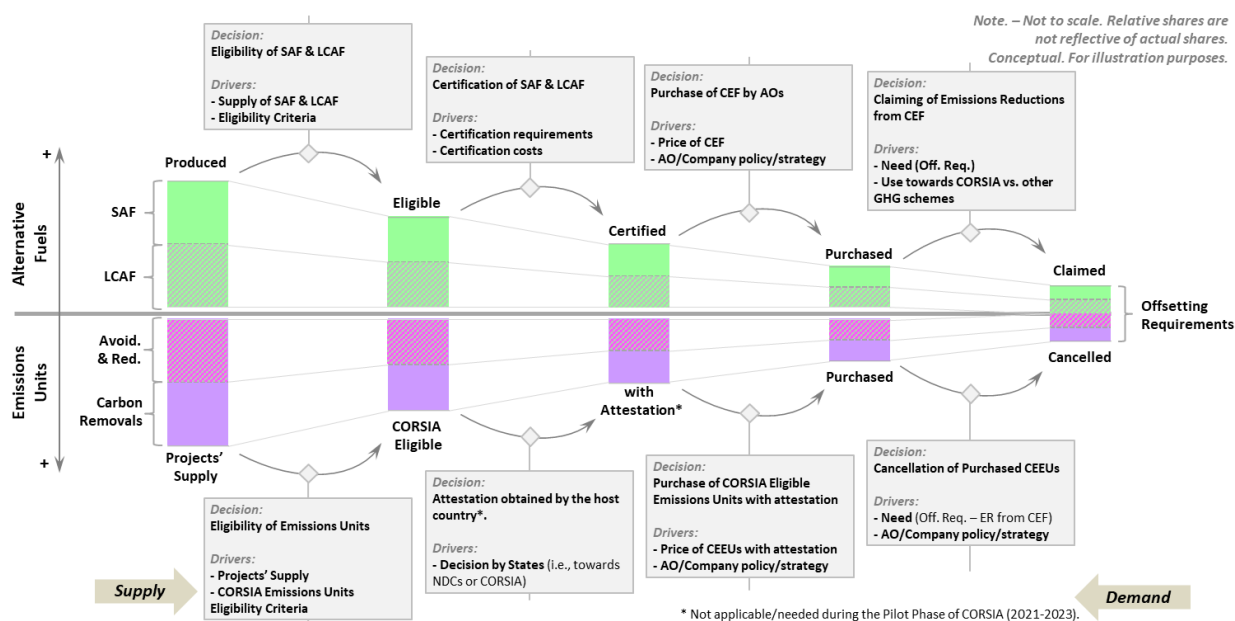


Figure 8 | Framework towards the assessment of the role of emissions reductions from CEF and CEEUs



The upper part of Figure 8 shows the steps for alternative fuels, including SAFs and Lower Carbon Aviation Fuels (LCAF). Starting with the left-hand side, the production of SAF and LCAF bounds the total emissions reductions from SAF that may be claimed by aeroplane operators under CORSIA. A fraction of the total SAF and LCAF produced may meet the “CORSIA Sustainability Criteria for CORSIA Eligible Fuels”. A subset of eligible SAF and LCAF may be certified by a Sustainability Certification Scheme (SCS). A subset may be purchased and used by aeroplane operators. Finally, a fraction may be claimed under CORSIA. Figure 8 also shows the key drivers influencing the relative shares for each step of this process.

Similarly, as depicted on the lower part of Figure 8, there is also a “funnel” for emissions units (i.e., from overall emissions units to cancelled CEEUs). Starting with the left-hand side, the total supply of emissions units based on avoidance, reductions and carbon removals bounds the amount that may be cancelled under CORSIA. A subset may meet the “CORSIA Emissions Unit Eligibility Criteria” i.e., CEEUs as decided by the ICAO Council and valid for a CORSIA compliance cycle. A subset of CEEUs may obtain an attestation by the host country. A subset of CEEUs with attestation may be purchased by aeroplane operators and claimed under CORSIA in a given year or compliance cycle to meet final offsetting requirements (i.e., offsetting requirements reduced by the emissions reductions from the use of CEF).

Such a framework can help improve the understanding (a) a posteriori of the supply of emissions reductions from CEF as well as emissions units and the effects of steps in the process that result in how demand (i.e., offsetting requirements) was met; (b) a priori how future supply may meet future demand (see next section for details).

The CAEP (WG4 CTAG) applied the framework described above for its review of the pilot phase of CORSIA. Based on initial and available information and data, Figure 9 summarizes the role of emissions reductions from CEF and CEEUs during the pilot phase of CORSIA.

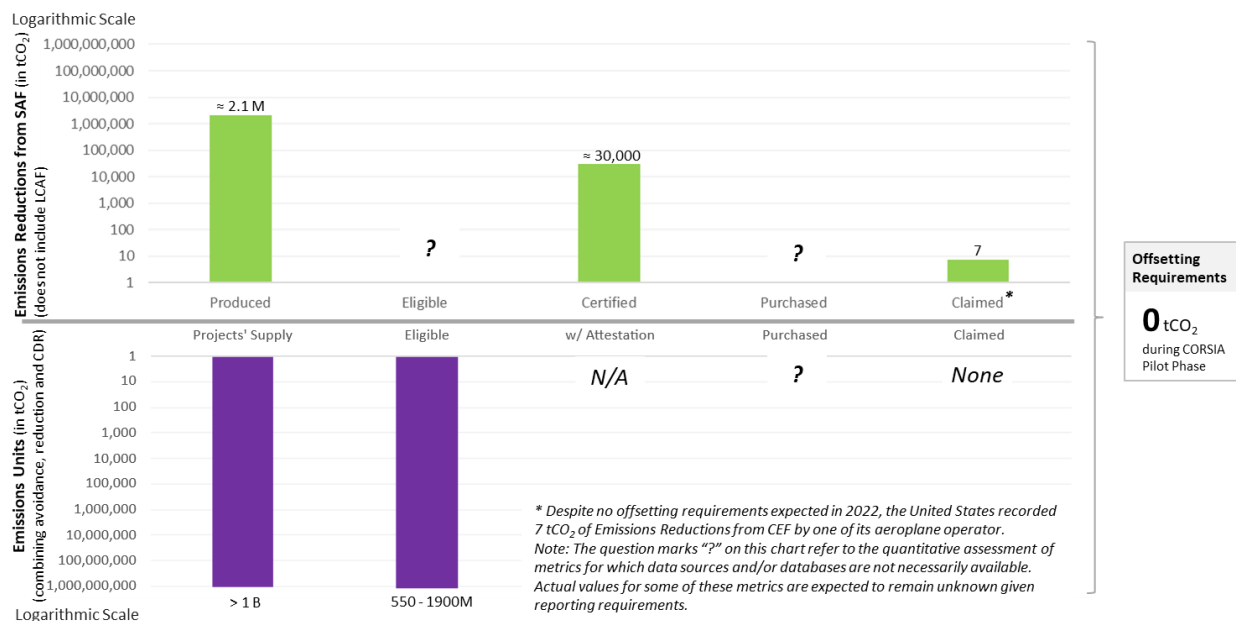


Figure 9 | Assessment of the role of Emissions Reductions from CEF and CEEUs

SAF & LCAF: Production

The production of SAF is tracked at the global aviation level. In other words, it is not segregated for domestic vs. international aviation. In 2023, volumes of produced SAF reached over 600 million liters (0.5 Mt), double the 300 million liters (0.25 Mt) produced in 2022, which tripled compared to the production of 100 million liters in 2021. For the purpose of estimating first order magnitude of emissions reductions associated with the SAF produced in 2021 through 2023, an average Emissions Reductions Factor (ERF) of 80% was used based on CORSIA Default Values for



Tallow and Used Cooking Oil based SAF as 85% of SAF supply over the next five years should be produced from this type of process and feedstock. This assumption is corroborated by the SCS reports described below.

As of April 2025, the CAEP (WG4 CTAG) was not aware of estimates of the production of Low Carbon Aviation Fuels (LCAF) between 2021 and 2023.

SAF & LCAF: Eligible

The CTAG CORSIA Analyses Group noted the absence of comprehensive sources of information or centralized repository where information on SAF produced from 2021 to 2023 that meets the sustainability criteria under CORSIA is available. It should be noted that information is available on the portion of SAF produced that was certified against the CORSIA sustainability criteria (see next section for details).

SAF & LCAF: Certified

The WG4 CORSIA Analyses tracked the portion of SAF produced from 2021 to 2023 that was certified against the CORSIA sustainability and eligibility requirements. Information from the reporting by SCS was leveraged for purposes of historical data collection. The SCSs are responsible every year for reporting the quantities of CEFs that were certified and the associated Greenhouse Gas (GHG) emissions. Reports from the SCSs are available on the ICAO CORSIA SCS webpage. For example, over 1500 and 33 tonnes of SAF that were certified against CORSIA requirements were reported to be produced in 2022 by Roundtable on Sustainable Biomaterials (RSB) and International Sustainability & Carbon Certification (ISCC) respectively. The SCS reports indicate that in 2023 a total of 9740 tonnes of neat SAF was produced and certified towards CORSIA. This corresponds to emissions reductions from CEF of approximately 26000 tCO₂. In total, the emissions reductions from CEF during the Pilot Phase of CORSIA reached approximately 30000 tCO₂. No LCAF production was reported to be certified by the SCSs during the pilot phase of CORSIA (2021-2023).

SAF & LCAF: Purchased

SAF memoranda of understanding (MOU) and purchase contracts are distinct from actual SAF usage by airline operators. To track progress on the use of SAF in a manner that is consistent with the accounting of emissions reductions from SAF, data on SAF volume and CO_{2e} emissions reductions was collected from airlines' Environmental, Social, and Governance (ESG) reports from 2019 to 2023. This data is used for other CORSIA analyses purposes but not reported on Figure 9 as the quantities of SAF reported by operators do not specify the share of CEFs with Certification.

SAF & LCAF: Claimed under CORSIA

Despite the absence of offsetting required in the pilot phase, some emissions reductions from CEFs were reported towards CORSIA. In 2022, the United States has recorded emissions reductions from CEF totaling 7 tCO₂ by one of its aeroplane operators.

In the future, information reported to the CCR would be leveraged to track emissions reductions from CEF claimed under CORSIA.

Emissions Units: Eligible

Historically, information on quantities of CEEUs was provided by the Technical Advisory Body (TAB) to the Council. According to the latest reporting from the TAB to Council (ref. C-WP/15631), the resulting potential total supply of CEEUs for the pilot phase is up to around 550 million – 1.9 billion.

Emissions Units: Host Country Attestation

N/A.



Emissions Units: Purchased

Information and data on emissions units purchased by aeroplane operators may not be easily available as this information is not necessarily reported in a comprehensive manner.

Emissions Units: Claimed under CORSIA

Information reported to the CCR could be leveraged to tracking of CEEUs cancelled under CORSIA. In 2021 through 2023, no CEEUs were cancelled under CORSIA.

Regional Breakdown of the Emissions Reductions from CEF and CEEUs

During its 232nd session, the Council “emphasized the need for further information to be provided on the supply, regional distribution and price of CORSIA Eligible Emissions Units and CORSIA Eligible Fuels, as a key input to the 2025 CORSIA periodic review and to any recommendations that would form part of the report by the Council to the 42nd Session of the Assembly.”

The CAEP (WG4 CTAG) conducted a comprehensive assessment of the regional distribution of key metrics underlying the emissions reductions from CEF as well as emissions units. This assessment is based on the definitions of the ICAO Regions as depicted in Figure 10.

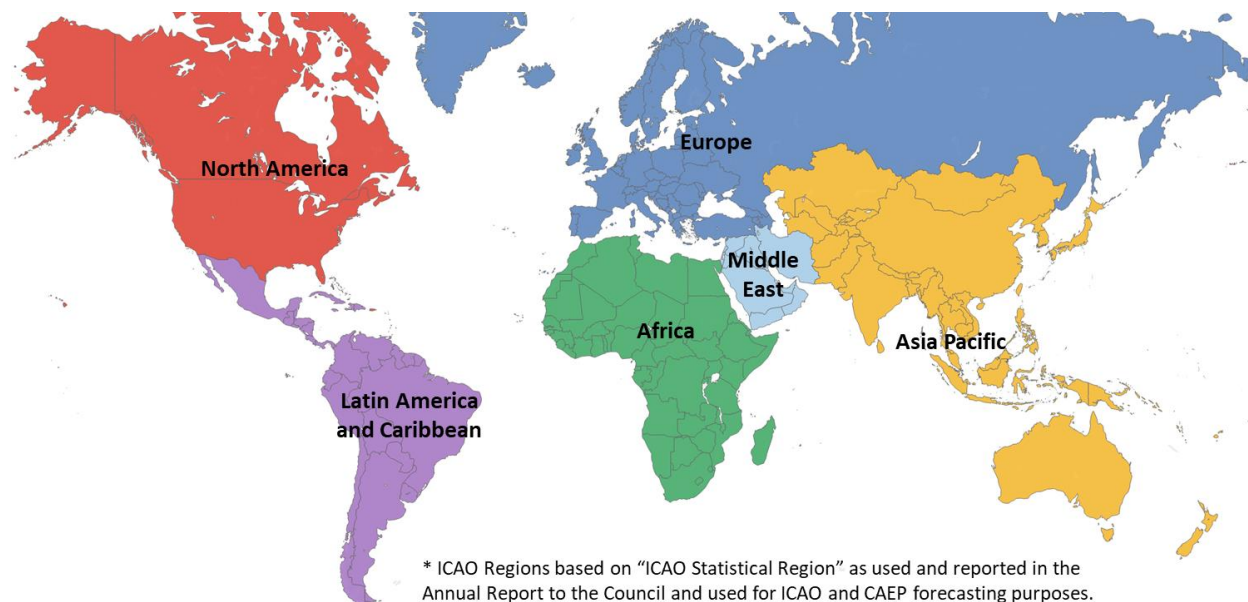


Figure 10 | ICAO Regions Definitions

The CORSIA Analyses task group collected and processed data to break down the estimates of SAF production, certified SAF, and Emissions Reductions from SAF claimed under CORSIA. Similarly, the CEEUs were broken down by ICAO Regions. Figure 11 depicts the regional distributions of emissions reductions from CEF and emissions units.

The regional breakdown of SAF production from 2021 to 2023 is based on the production capacity as reported in the ICAO tracker of SAF Facilities based only on a) in service – producing SAF and b) in service – producing other renewable fuels. The regional distribution of certified SAF is based on the “Production location of the neat CORSIA Eligible fuel” i.e., Field 8.e in the SCS Reports from 2022 and 2023. The regional distribution of Emissions Reductions from CEF claimed under CORSIA is based on the contextual information of the provider of this ad hoc information i.e., United States. The regional distribution of CEEUs is based on information from the TAB report to the 230th session of the Council.

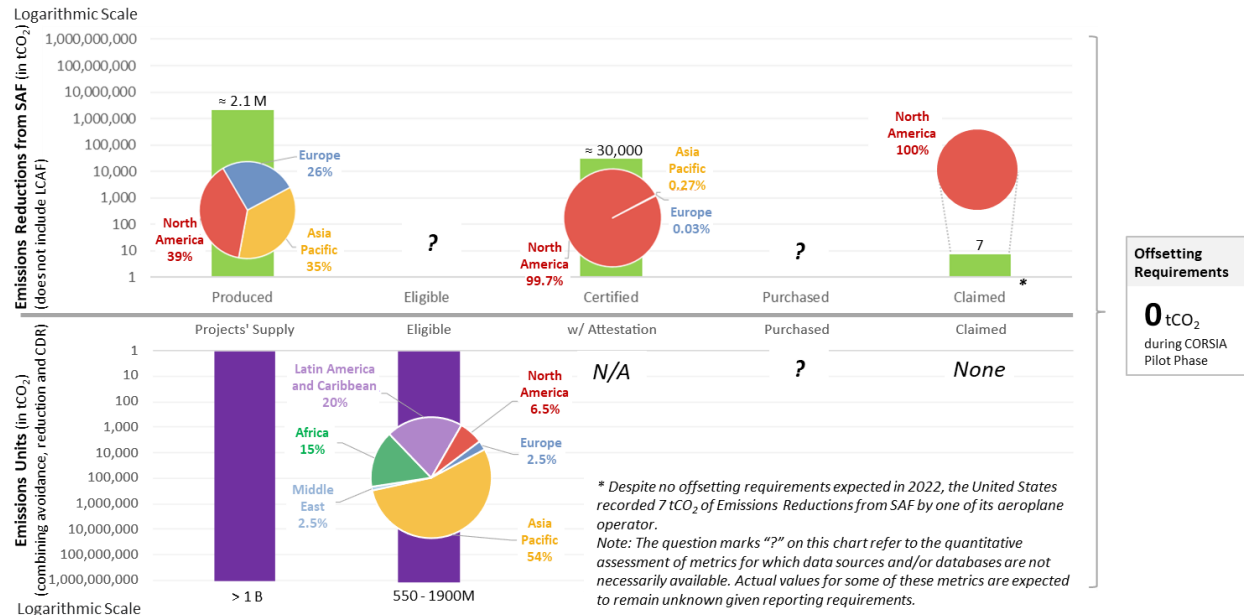


Figure 11 | Regional Breakdown of the Emissions Reductions from CEF and CEEUs

Net CO₂ Emissions in Context of the ICAO Carbon Neutral Growth goal from 2020 (CNG2020)

In 2013, ICAO agreed to a Carbon Neutral Growth goal aimed at achieving carbon neutral growth in international aviation from 2020 onwards (CNG2020). This goal is achieved through a "basket of measures," including technological advancements, operational improvements, SAF, and market-based measure i.e., CORSIA.

The CAEP tracked net CO₂ emissions from international aviation (i.e., after emissions reduction from CEF and cancelled CEEUs). Given reported data through the CCR, net CO₂ emissions remained below their 2019 level. The COVID-19 global pandemic was the primary driver of the decline in international aviation activity and resulting CO₂ emissions. As a result, the international aviation sector met its mid-term goal of "keeping net carbon emissions from 2020 at the same level" (assuming 2019 level as a proxy for pre-COVID 2020 expected emissions).

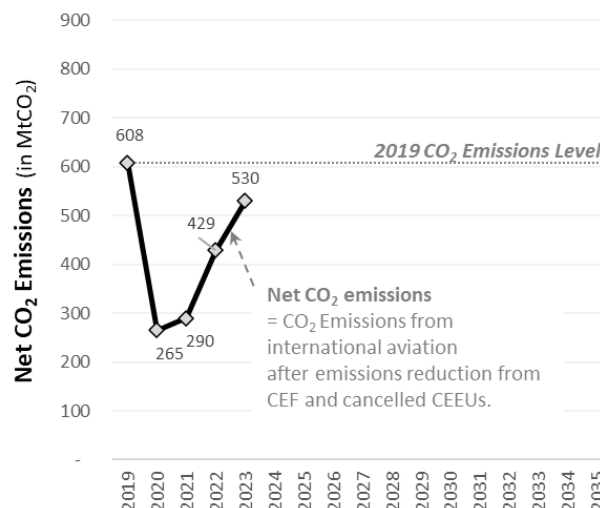


Figure 12 | Evolution of Net CO₂ Emissions in context of Carbon Neutral Growth goal from 2020 (CNG2020)



UPDATED FORWARD LOOKING CORSIA ANALYSES

Using the approach described in the previous chapter, the CAEP (WG4 CTAG) updated its forward-looking assessment in support of the 2025 CORSIA periodic review through 2035 with a focus on the first phase of CORSIA from January 1, 2024, to December 31, 2026.

Potential Evolution of CO₂ emissions from International Aviation from 2024 to 2035

Historically, the CTAG CORSIA Analyses Group has used the CAEP GHG (CO₂) emissions trends as input to its analyses i.e., updated forward looking assessments. Figure 13 shows the CAEP/13 trends of CO₂ emissions from international aviation from 2019 to 2035 adjusted for CORSIA analyses purposes. These trends reflect historical CO₂ emissions from international aviation that are becoming available from the continued MRV under CORSIA. The CCR and resulting documents report these statistics. The CAEP WG4 CTAG adjusted the CAEP/13 CO₂ emissions trends to match the CCR reported data in 2023.

According to the adjusted CAEP/13 CO₂ emissions trends, CO₂ emissions are expected to return to 2019 level by 2026, 2027 and 2029 under the High, Mid and Low CAEP/13 scenarios, respectively.

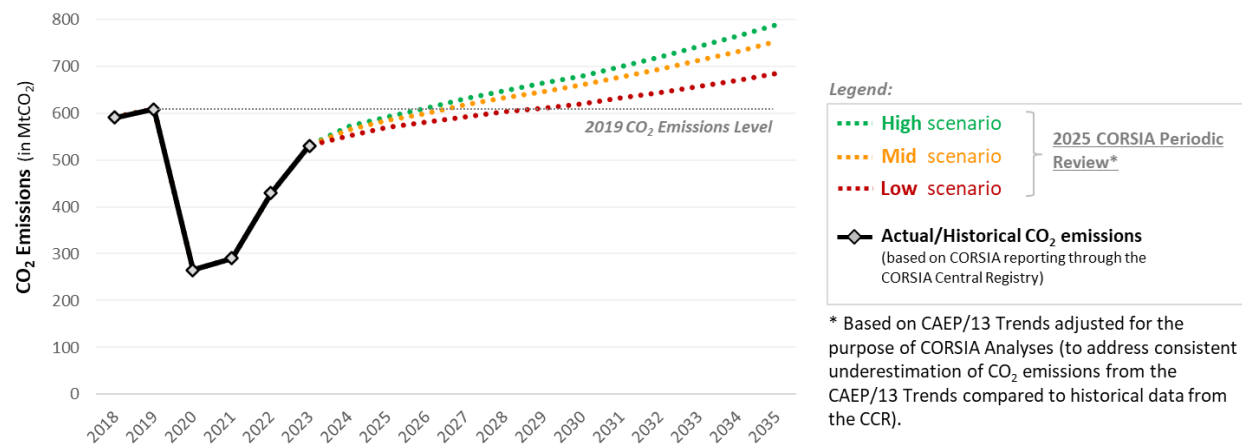


Figure 13 | Updated CO₂ Emissions Projections from CAEP WG4 CTAG

It should be noted that the CAEP/13 Trends are based on the CAEP/13 ICAO/CAEP Traffic Demand Forecasts. These forecasts were developed in 2022-2023 with a base year of 2018 and recommended by CAEP at its 2023 Steering Group meeting (Oct. 2023). As a result, they reflect expectations and long-term trends as of 2023. These forecasts, however, do not take into consideration the current uncertainty and potential effects of changes in trade conditions and the global, regional, and/or national economic dynamics that may affect international aviation traffic demand.



Potential Offsetting Requirements from 2024 to 2035

Total offsetting requirements across the international aviation sector are influenced by the impact of COVID-19 and the rate of recovery across years. Offsetting requirements are expected to start in 2024 under all CAEP/13 scenarios.

Figure 14 shows the offsetting requirements through 2035 under the proxy CAEP/13 trends (i.e., low, mid, and high scenarios). The estimations of offsetting requirements reflect the outcome of the Assembly Resolution A41-22 i.e., 85% of 2019 baseline from 2024 and adjustments to sectoral/individual shares (i.e., 100% sectoral share from 2030-2032 and 85% sectoral share from 2033-2035).

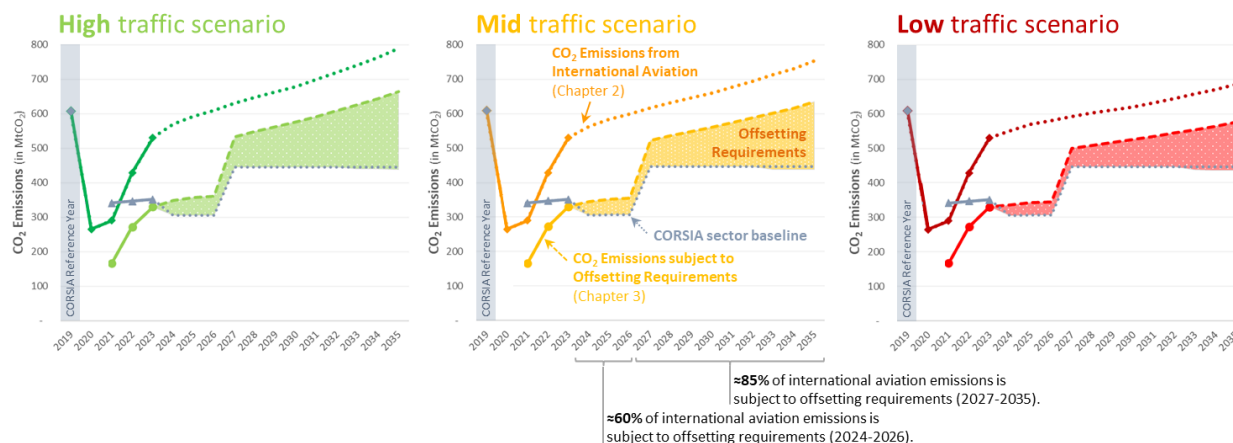


Figure 14 | Estimation of Offsetting Requirements from 2024 to 2035

Figure 15 shows the temporal distribution of offsetting requirements from 2024 to 2035 under the proxy CAEP/13 trends. It takes into account the decisions made at the 41st Session of the ICAO Assembly (as reflected in Assembly Resolution A41-22). Offsetting is expected to start in 2024 under all three traffic forecasts/scenarios.

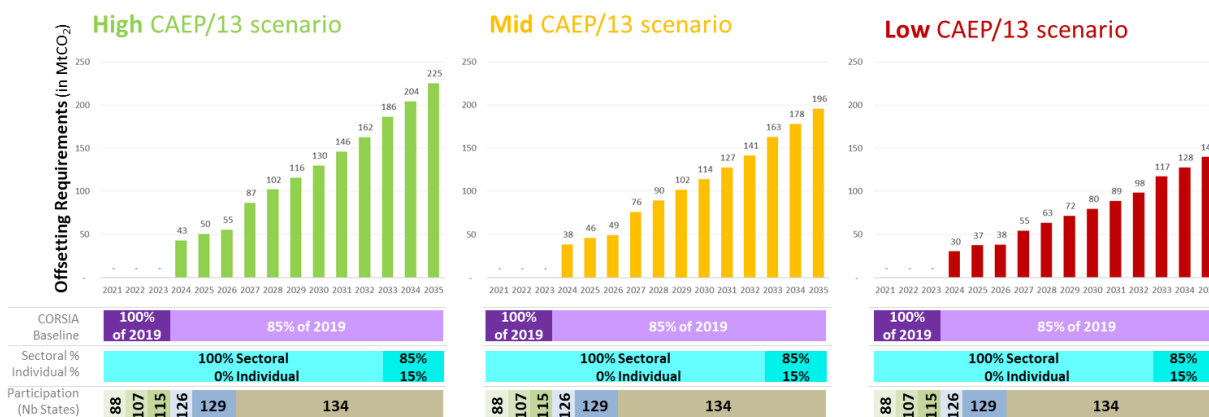


Figure 15 | Offsetting Requirements from 2024 to 2035

Figure 16 shows the cumulative offsetting requirements from 2021 to 2035. Given the ICAO CAEP/13 traffic forecasts and decisions at Assembly 41, cumulative offsetting requirements (O.R.) from 2024 to 2035 could range from 950 to 1500 MtCO₂.

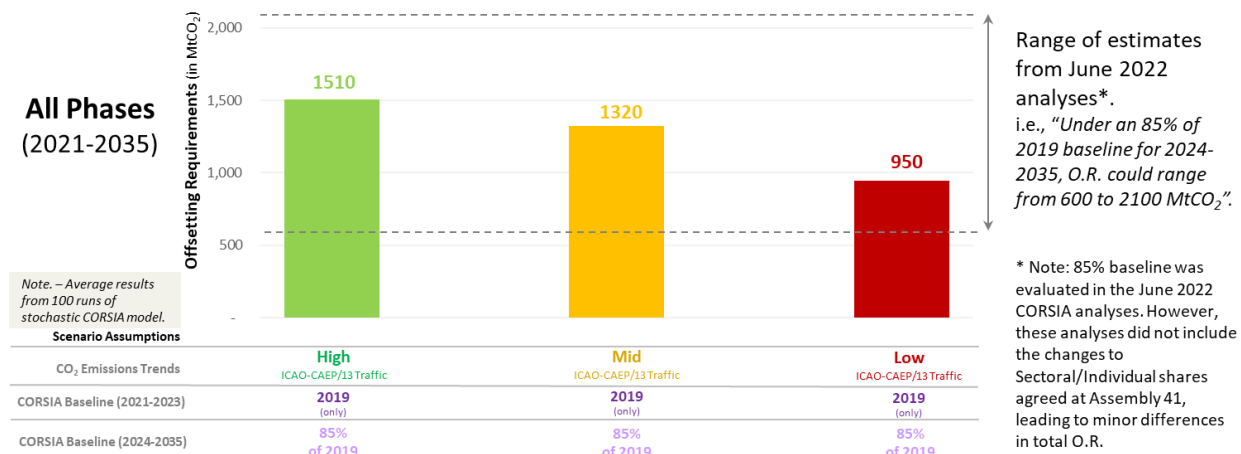


Figure 16 | Cumulative Offsetting Requirements from 2021 to 2035

During its 232nd session the Council “emphasized the need for further information to be provided on the supply, regional distribution and price of CORSIA Eligible Emissions Units and CORSIA Eligible Fuels, as a key input to the 2025 CORSIA periodic review and to any recommendations that would form part of the report by the Council to the 42nd Session of the Assembly.”

The WG4 CORSIA Analyses task group has started to conduct a comprehensive assessment of the regional distribution of key metrics underlying the emissions reductions from CEF as well as emissions units. This assessment is based on the definitions of the ICAO Regions as depicted in Figure 17.

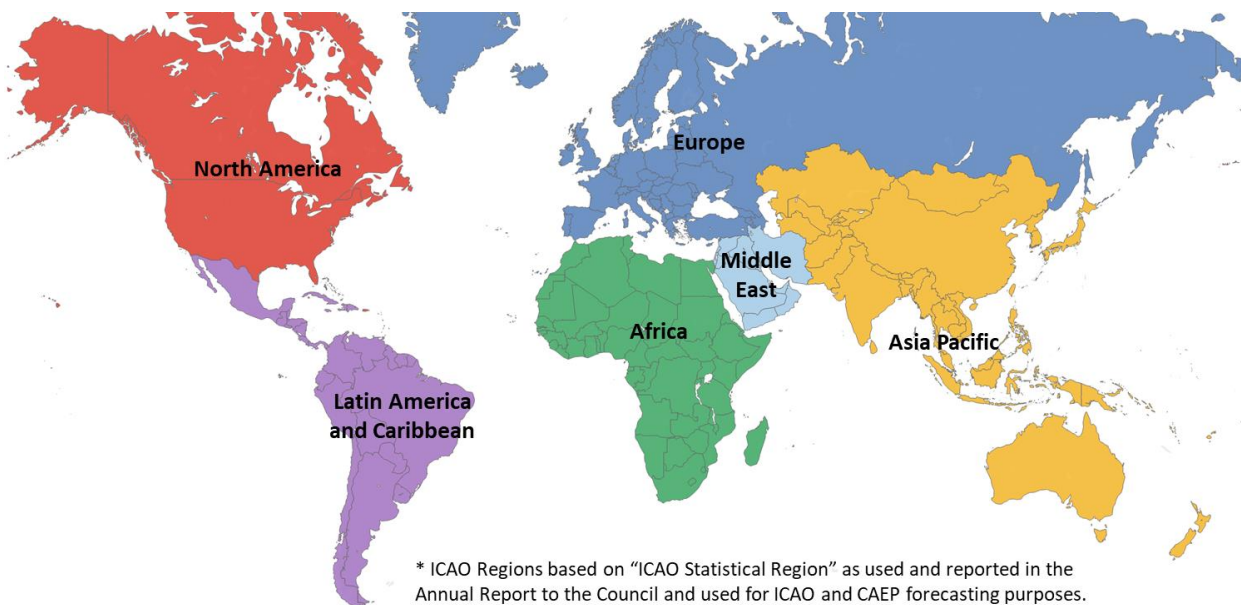


Figure 17 | ICAO Regions Definitions

Figure 18 shows the regional distribution of estimated offsetting requirements from 2024 to 2035 based on the CAEP/13 CO₂ emissions trends and assumptions on the expected implementation of CORSIA through 2035.

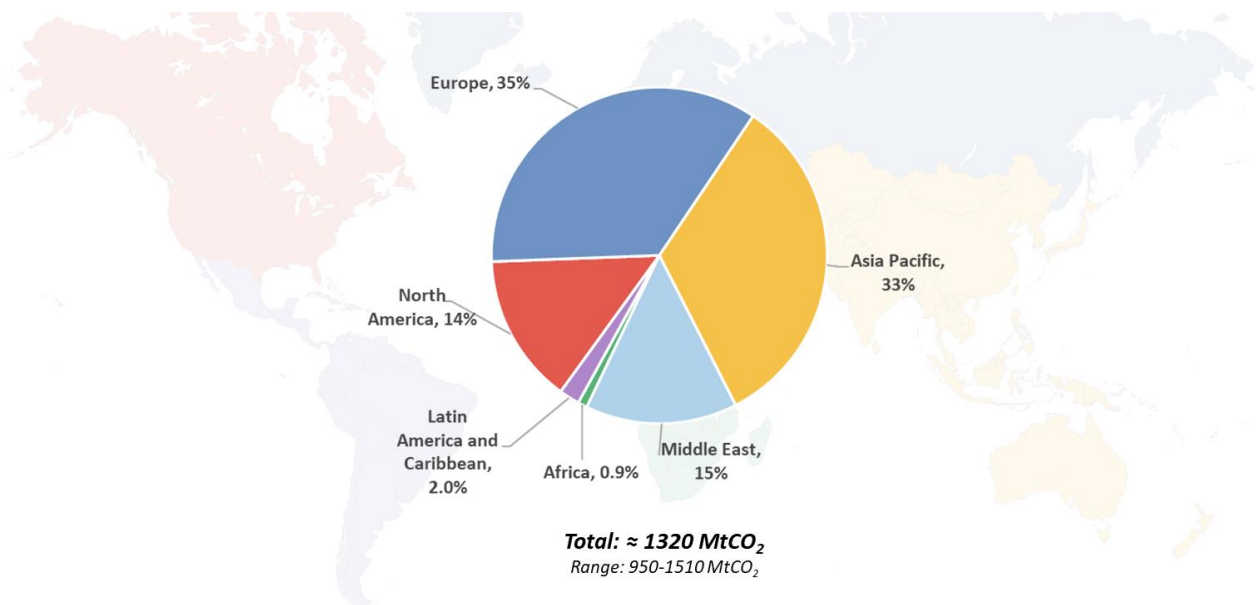


Figure 18 | Regional breakdown of demand i.e., regional distribution of offsetting requirements (2021-2035)

Figure 19 shows the regional breakdown of offsetting requirements by ICAO Regions. Offsetting requirements were then placed in context of CO₂ emissions from international aviation (as displayed in Figure 19 that depicts percent CO₂ emissions to offset divided by CO₂ emissions from international aviation; aka Chapter 2 CO₂ emissions).

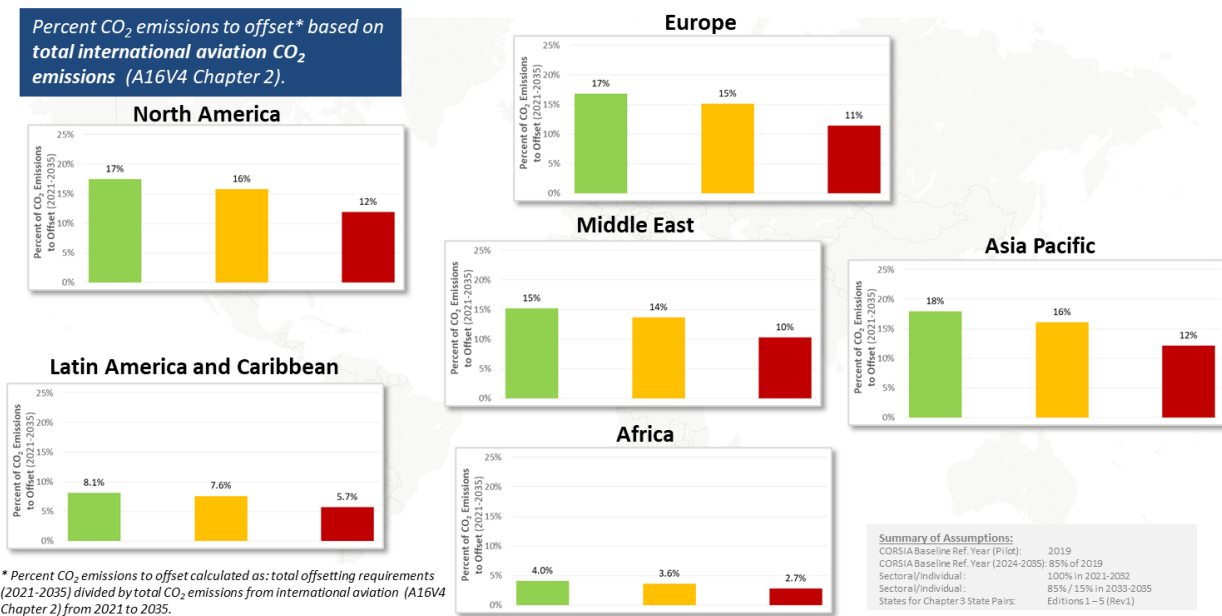


Figure 19 | Regional Distributions of Offsetting Requirements Relative to CO₂ emissions

Figure 20 shows the same estimates of offsetting requirements in context of CO₂ emissions from international aviation subject to offsetting requirements (i.e., Chapter 3 CO₂ emissions).

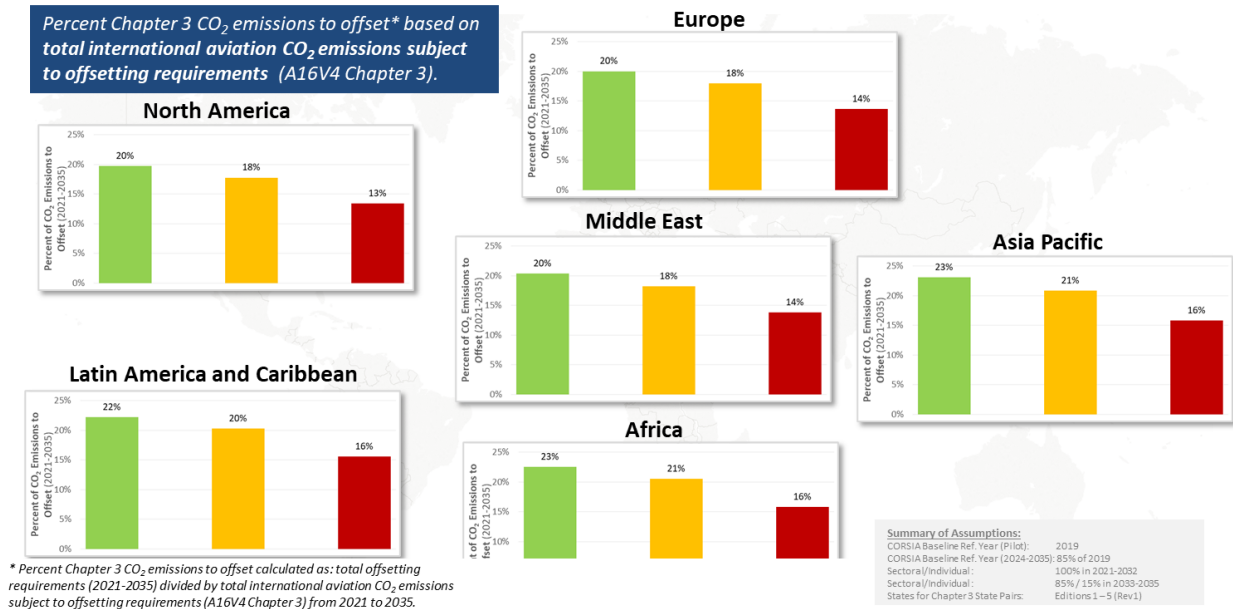


Figure 20 | Regional Distributions of Offsetting Requirements Relative to CO₂ emissions subject to Offsetting Requirements.

All regions show the effect of the COVID-19 global pandemic in a similar manner. The percent of CO₂ emissions offset, which is driven by the participation of States in CORSIA, the CORSIA baseline and the overall growth between 2021 and 2035 on the 40 FESG route groups, is also similar across all regions, except certain regions where there is a relatively higher number of States that are exempted and not voluntarily participating which results in lower percent of CO₂ emissions offset through 2035.

Assessment of offsetting requirements (demand) given the supply of emissions reductions from CEF and CEEUs

The CTAG CORSIA Analyses Group applied the framework described in Figure 21 for its forward-looking assessment of CORSIA offsetting requirements and how they may be met with a focus on the first phase of CORSIA. Based on interim and available information and data, Figure 22 summarizes the role of emissions reductions from CEFs and CEEUs during the first phase of CORSIA.

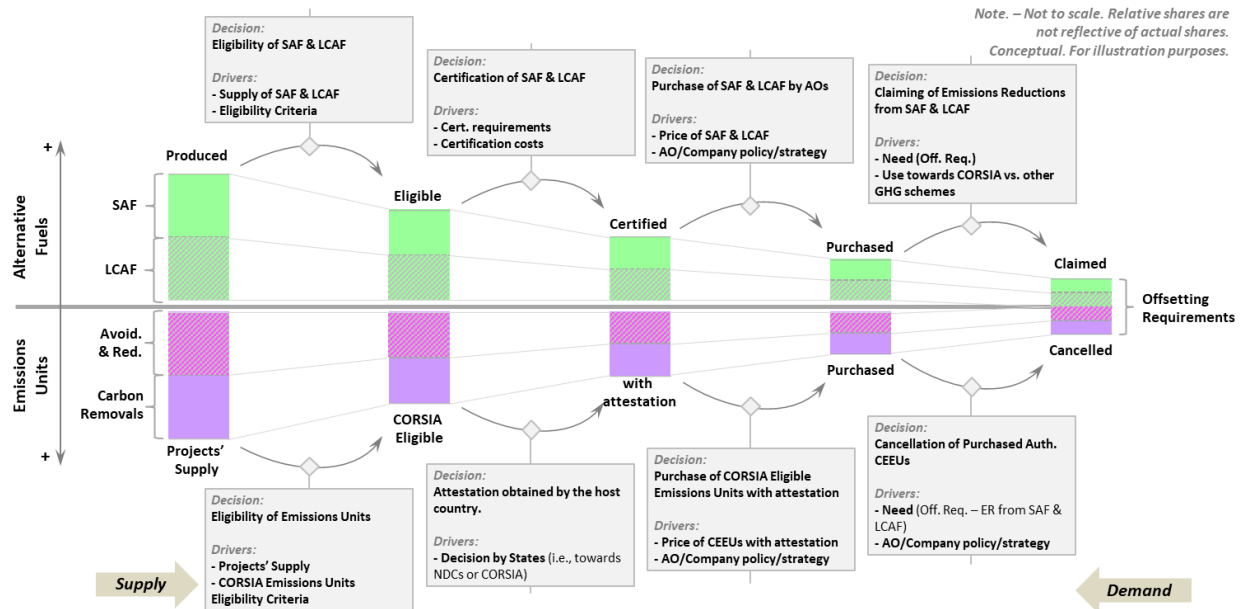


Figure 21 | Framework towards the assessment of the role of Emissions Reductions from CEF and CEEUs

The CORSIA Analyses task group has started to collect and process data to attempt to break down the estimates of SAF production, certified SAF, and Emissions Reductions from SAF claimed under CORSIA. Similarly, the CEEUs were broken down by ICAO Regions. Figure 22 depicts the regional distributions of emissions reductions from SAF and emissions units.

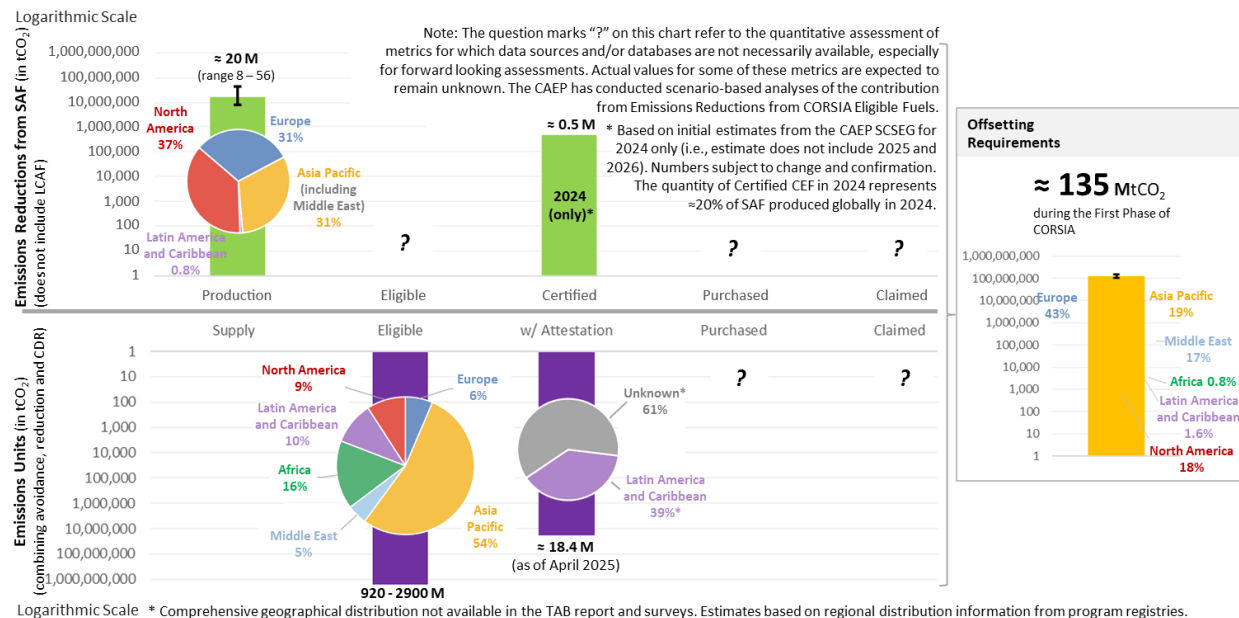


Figure 22 | Assessment of the role of Emissions Reductions from SAF and CEEUs (Focus on 2024-2026)



SAF & LCAF: Production

When estimating the emissions reductions from SAF (i.e., production of SAF regardless of its eligibility towards CORSIA) and as presented in Figure 24, data is based on a combination of International Air Transport Association (IATA) and CAEP WG5 CEF short-term production projection. The CAEP WG5 maintains two databases to meet the varied needs of ICAO:

- *Production Analysis Database* – This database includes announcements and production facilities that fulfill a set of scope and data requirements.
- *Announcements Database* – This database includes announcements including characteristics of the expected SAF production that help assign a maturity level used in assessing the likelihood of future production under various scenarios.

The projection analysis considers a set of four production scenarios: Low, Moderate, High, and High+. The different scenarios are representative of more pessimistic or optimistic expectations on the development of the SAF market in the short term. The CAEP WG5 SAF short-term production projections uses 2024 as the baseline year based on SAF production estimate by IATA of 1 million tonnes of SAF.

As shown in Figure 24, across the four scenarios (Low, Moderate, High, and High+), SAF volumes in the year 2030 range from 2.3 Mt in the Low scenario, to 32.1 Mt in the High+ scenario.

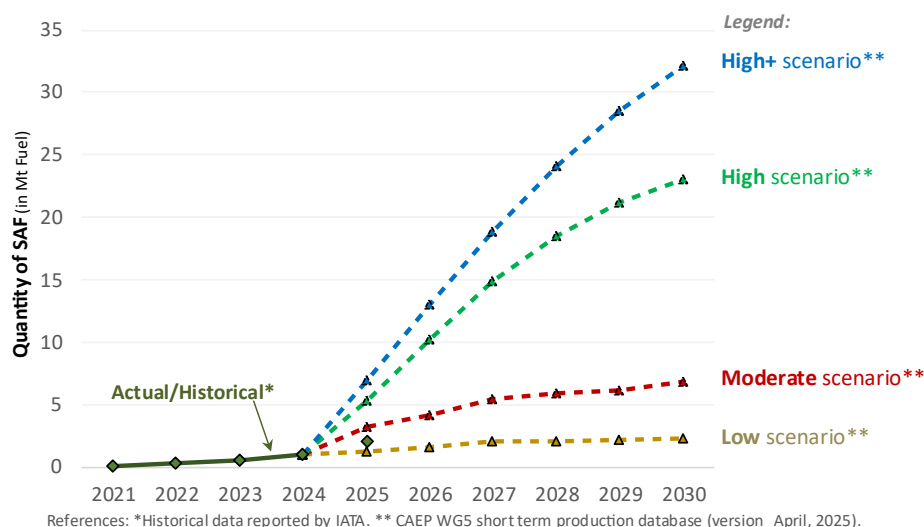


Figure 23 | Scenario-based projections of the production of SAF in million tonnes of fuel

For the purpose of estimating the first order magnitude of emissions reductions associated from SAF produced in 2024 through 2026, an average emissions reduction factor (ERF) of $\approx 75\%$ was assumed with a range from $\approx 65\%$ based on the CAEP Long Term Aspirational Goal (LTAG) F1 scenario and $\approx 85\%$ based on CORSIA Default Values for Tallow and Used Cooking Oil based SAF as 85% of SAF supply over the next five years should be produced from this type of process and feedstock. Figure 24 shows potential emissions reductions associated with the SAF production scenarios and assumptions on emissions reductions factor. Under the moderate scenario, emissions reductions from SAF may reach up to ≈ 20 Mt CO₂.

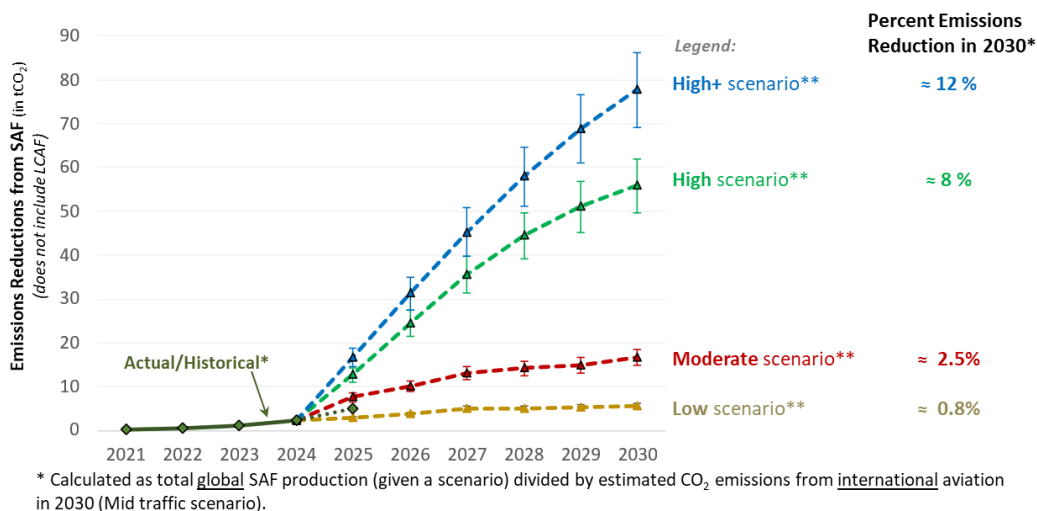


Figure 24 | Scenario-based projections of potential emissions reductions from SAF

While the LTAG-TG assumed a potential role of LCAF starting in 2026, there are currently no details about announcements of the availability of LCAF for CORSIA purposes. Such information is being tracked and will be considered as it becomes available.

CEF & LCAF: Certified

The SCS reports on Certified CEFs only provided actual/historical data. Initial estimates by the CAEP Sustainability Certification Scheme Evaluation Group (SCSEG) for certified CEF in 2024 were considered. There are no forward-looking projections on how much CEF may be certified in the future.

CEF & LCAF: Purchased

SAF memoranda of understanding (MOU) and purchase contracts are distinct from actual SAF usage by airline operators. Data on SAF volume and CO_{2e} emissions reductions was collected from airline ESG reports from 2019 to 2024 and announcements from 2024 onward. This data is used for other CORSIA analyses purposes but not reported on Figure 22 as the quantities of SAF reported and announced by operators do not specify the share of CEFs with Certification.

CEF & LCAF: Claimed under CORSIA

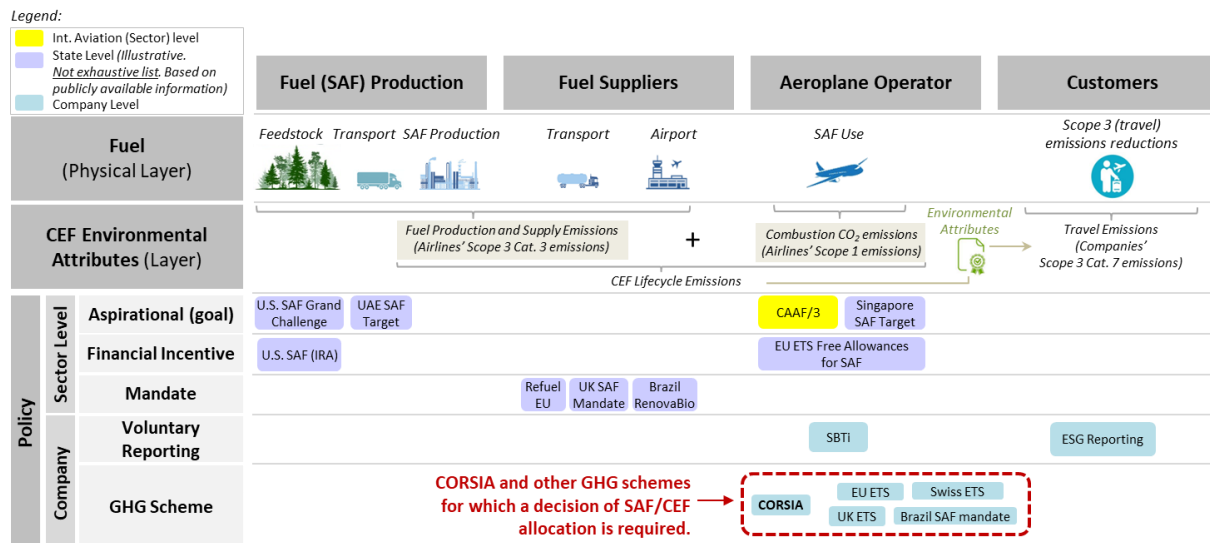
For the purpose of forward-looking assessments and given the uncertainty in the fraction of SAF that may be certified towards CORSIA, purchased and ultimately claimed by operators, the CAEP WG4 (CTAG) developed scenarios that provide an upper bound of the contribution from emissions reductions from CEF based on the scenarios of productions of SAF and a lower bound where no CEF is claimed towards CORSIA.

While CORSIA is the only global market-based measure applying to CO₂ emissions from international aviation, emissions reductions from CEFs may be claimed towards other GHG schemes. The CAEP identified and reviewed other relevant GHG schemes. The CAEP also started to assess the use of SAF/CEF by aeroplane operators and quantify the likelihood of claiming SAF/CEF towards CORSIA in comparison to other schemes.

Figure 25 depicts the SAF supply chain, considering both the physical layer and the environmental attributes layer. On the physical layer, the first step is the production of the SAF which includes the acquisition of feedstock, its transportation and the actual production of the SAF. Once the SAF is produced it is generally transported to a jet fuel blending point that may be at an airport but could also be at a remote location in the jet fuel transportation network. The blended SAF is then used by the global aviation system (not necessarily the operator who purchased



the SAF and would claim its environmental attributes). The CEF Environmental Attributes depict the emissions and emissions reductions associated with the production and use of the CEF. The emissions associated with the fuel production and supply emissions are upstream emissions of the combustion CO₂ emissions by the operator. They are generally referred to as airlines' scope 3 category 3 (upstream) emissions and airlines' scope 1 emissions respectively. Downstream of the aeroplane operator, the customer (i.e., flying public or corporations) may purchase the environmental attributes of the CEF to reduce its "Travel Emissions" (i.e., companies' scope 3 category 7 emissions). The use of environmental attributes of CEF to address companies' scope 3 category 7 emissions (e.g., for ESG reporting purposes) is not considered double claiming given the different emissions accounting frameworks.



* Not an exhaustive list given the ongoing development of national schemes (to address domestic aviation). Subject to updates and future work by CAEP.

Figure 25 | Identification and Review of Other Relevant GHG Schemes

Figure 25 also depicts policies related to SAF incentivization, development support, and accounting of its emissions reductions. At the sector level, various aspirational goals on the production of SAF (e.g., US SAF Grand challenge, UAE SAF Target) were reviewed as well as the operator level CAAF/3 aspirational goal for international aviation. Financial incentive mechanisms may also affect the production of SAF (e.g., US SAF IRA fuel production incentives) along with mandate on the supply of SAF (e.g., Refuel EU). Finally, companies may also have voluntary goals and reporting associated with the use of SAF or CEF (e.g., Science Based Target initiative at the company level and ESG reporting for companies which includes travel emissions). None of these policies and mechanisms are considered "other GHG schemes" from a CEF claiming perspective. In other words, these SAF production and supply incentivization mechanisms can co-exist with CORSIA without risks of double claiming.

From the universe of policies, the following were considered to require a decision with regards to SAF/CEF allocation: EU-ETS, UK-ETS, Swiss ETS, and the Brazil SAF mandate. Each GHG scheme possibly triggering a decision by operators have specific applicability rules and SAF eligibility criteria, including provisions for domestic emissions (not included in the scope of applicability of CORSIA that applies to international aviation only). The main characteristics of each Scheme are shown in Figure 26. It should be noted that the set of other schemes presented in Figure 26 does not represent an exhaustive list given the ongoing development of national schemes (to address domestic aviation). CAEP intends to continue to monitor the development of other relevant schemes and update its analyses accordingly.



Scheme*	Scope	Types of Fuel Eligible	Description
CORSIA	Global	CORSIA Eligible Fuels	Operators may claim emissions reductions from CORSIA Eligible Fuel
EU ETS	Regional	Food/Feed crop-based fuel not allowed	Operators may claim emissions reductions from eligible SAF
UK ETS	National	Food/Feed crop-based fuel not allowed	Operators may claim emissions reductions from eligible SAF
Swiss ETS	National	Food/Feed crop-based fuel not allowed	Operators may claim emissions reductions from eligible SAF.
Brazil SAF Mandate	National	Aligned with CORSIA	Operators should reduce net emissions using SAF

* Not an exhaustive list given the ongoing development of national schemes (to address domestic aviation). Subject to updates and future work by CAEP.

Figure 26 | “Other GHG Schemes” Possibly Triggering a Decision by Operators to Claim SAF/CEF

Demand from CORSIA and other schemes is likely to exceed the supply of SAF/CEF, making it a supply constrained market. The use or allocation of limited emissions reductions from SAF/CEF (towards the least overall cost outcome) will likely be driven by the costs of alternatives e.g., emissions units under CORSIA and carbon permits (allowances) under other GHG schemes. Figure 27 shows a simplified decision tree representing the drivers and the process by which an aeroplane operator may decide to allocate (i.e., claim) CEF towards CORSIA vs. other GHG schemes or not claimed towards any schemes.

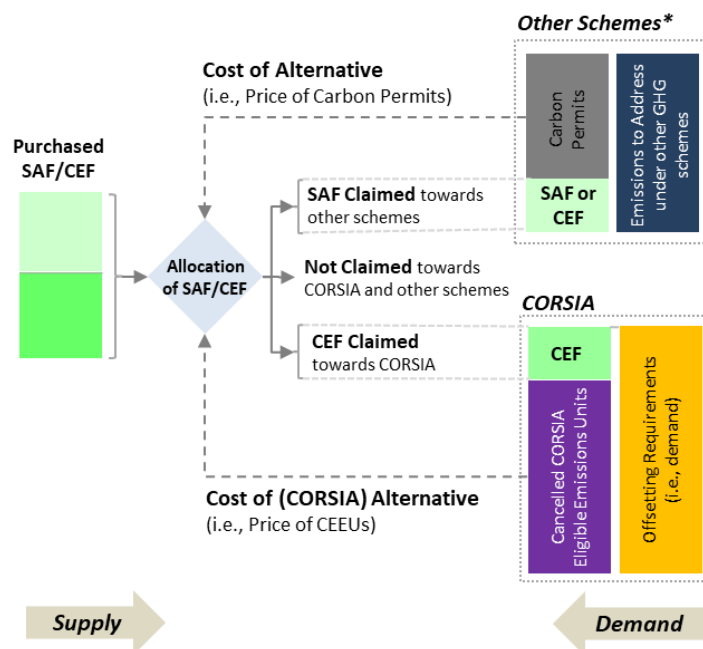


Figure 27 | Assessment of the Potential Allocation of SAF/CEF to CORSIA vs. other GHG Schemes¹

¹ “CORSIA is the only global market-based measure applying to CO₂ emissions from international aviation” (ICAO Resolution A41-22 par. 18). Note: Through C-DEC 232/6 action e), the Council requested CAEP to consider “other [...] GHG schemes”, which requires considering specific country and/or regional schemes for purpose of technical analyses.



If an aeroplane operator has purchased SAF, some of which may be certified CEF, depending on the GHG schemes that are applicable it could need to decide where to allocate the emissions reductions from the SAF/CEF. As shown on Figure 27, CEF could be claimed under CORSIA to meet offsetting requirements in a given compliance cycle. The remainder of the offsetting requirements (i.e., final offsetting requirements) would need to be addressed with CEEUs. Alternatively, the operator may choose to allocate the SAF toward the other GHG schemes to reduce its needs for carbon permits to meet its obligations. All else being equal, the price of the alternatives (i.e., CEEUs or Carbon Permits) may drive and be a factor driving the allocation decision. If the prices of carbon permits are greater than CEEUs, a least cost of compliance approach would indicate that the SAF would be allocated towards the other GHG scheme. It is important to highlight that other factors, such as the cost of certification of CEF, may also play a role in how SAF/CEF may be claimed. Specific provisions of other schemes (affecting the allocation of SAF/CEF) are yet to be accounted for in this initial assessment.

The CAEP has started to implement the assessment approach presented in Figure 27 via independent and complementary analyses.

Assessment based on Operator Reported SAF Use and Uptake Announcements

The use/claiming of emissions reductions from SAF/CEF towards CORSIA or other GHG schemes is inherently an operators' driven decision (considering applicable schemes and alternatives). As such, aeroplane operator data of SAF actual usage and planned/announced usage was collected. Two tiers of data were considered in this analysis. Tier 1 included actual SAF usage as reported by operators, for example through their ESG reports. Tier 2 was based on operators' announcements of SAF uptake. As the announcements include volume of SAF and years of start and end of procurements. The WG5 Moderate scenario uptake rates were used as a proxy to allocate SAF across years. Figure 28 shows an overview of the analysis approach. The operator level data was then aggregated by State of attribution. Given the applicability of GHG schemes, the SAF actual and planned/announced usage was calculated for "CORSIA only" States vs. States with CORSIA and other GHG schemes.

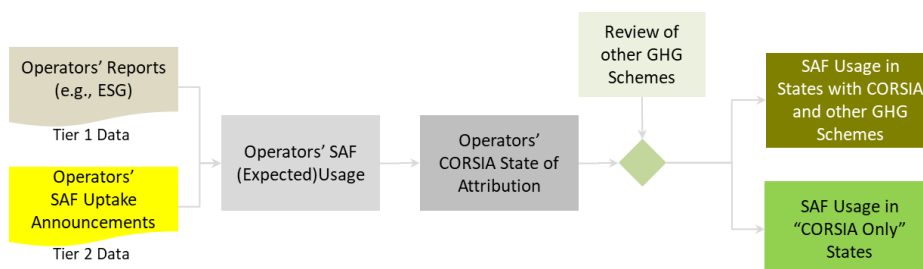


Figure 28 | Approach for collecting data on SAF actual and planned usage and categorization by applicability of CORSIA and other schemes if applicable

Figure 29 shows the State level aggregation of operators' actual and planned SAF usage from 2021 to 2026 with general applicability of schemes.



State of Attribution	2021	2022	2023	2024*	2025*	2026*	Applicability of other GHG Schemes
Australia	-	2,535	6,807	7,993	10,265	13,503	CORSIA Only
China	3	450	1,085	11,144	14,660	19,195	CORSIA Only
Finland	-	-	2,266	4,855	5,132	6,751	CORSIA & Other GHG Scheme(s)
France	-	44,400	88,799	115,799	239,261	314,738	CORSIA & Other GHG Scheme(s)
Germany	-	13,000	88,903	95,000	384,564	473,047	CORSIA & Other GHG Scheme(s)
Hungary	-	-	-	-	34	-	CORSIA & Other GHG Scheme(s)
Ireland	-	-	-	1,000	-	-	CORSIA & Other GHG Scheme(s)
Japan	4	125	351	-	-	-	CORSIA Only
New Zealand	-	-	-	-	-	24,000	CORSIA Only
Norway	-	1,777	1,759	-	-	-	CORSIA & Other GHG Scheme(s)
Qatar	-	-	3,120	-	-	-	CORSIA Only
Singapore	-	1,000	-	1,000	1,000	-	CORSIA Only
Sweden	-	3,083	6,049	11,000	15,140	15,140	CORSIA & Other GHG Scheme(s)
United Arab Emirates	-	153	179	9,084	-	-	CORSIA Only
United Kingdom	-	1,952	55,671	172,106	68,717	80,842	CORSIA & Other GHG Scheme(s)
United States	13,488	24,218	48,489	145,327	650,625	1,044,265	CORSIA Only
Total SAF (in tonnes of Fuel)	13,495	92,692	303,478	574,309	1,389,398	1,991,481	

* Planned/Announced.

Figure 29 | State level aggregation of operators' actual and planned SAF usage from 2021 to 2026 with general applicability of schemes

As shown on Figure 30, based on partial data reported by operators for 2024 and estimates based on announcements through 2026, approximately 49% of the global SAF usage from 2024-2026 may be by operators attributed to States where only CORSIA is applicable. It should be noted that this analysis does not include the allocation of crop-based SAF (not eligible under the EU ETS, UK ETS and Swiss ETS) that may be used towards CORSIA (if any). It also does not include specific obligations from individual operators regarding other GHG schemes (beyond CORSIA). Finally, it assumes that all the CEF possibly claimed towards CORSIA would be certified.

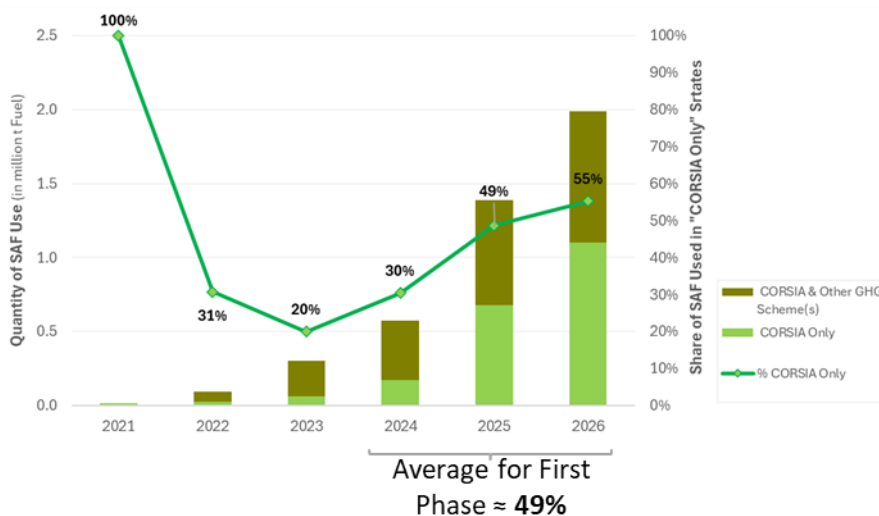


Figure 30 | Summary of results on operators' actual and planned SAF usage from 2021 to 2026 given the applicability of schemes

Multi-Factor Assessment of the Potential Allocation of SAF

To assess the potential SAF/CEF allocation on CORSIA and Other Schemes across all CORSIA phases, an analysis of **SAF distribution** and **allocation decision**, given the characteristics of the various GHG schemes, was conducted. Figure 31 shows the approach considered for the SAF allocation decision.

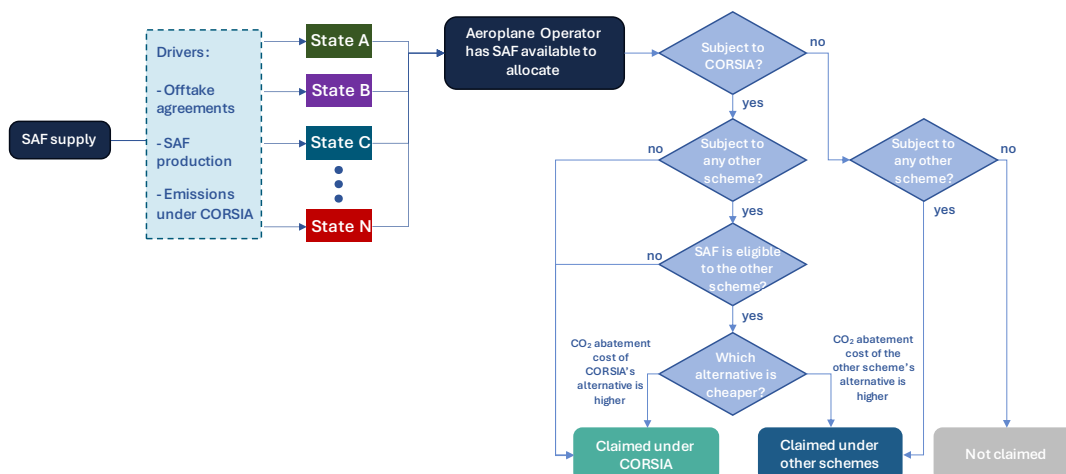


Figure 31 | Assessment of the SAF Allocation decision

The first part of the analysis consists of distributing SAF to operators and States. The total SAF supply considers the average Moderate scenario of total emissions reductions from SAF shown in Figure 24. This part of the analysis takes into consideration three factors as contributors to SAF distribution: (1) the commitment of operators to buy SAF through off-take agreements, (2) the geographic location of the SAF production facilities in place and announced to start operations in the coming years, and (3) the level of operators' emissions covered by CORSIA Chapter 2 emissions.

- **Off-take Agreements:** This factor reflects the share of SAF allocated to operators that have entered into off-take agreements with SAF producers, demonstrating their commitment and interest in purchasing SAF.
- **Location of SAF Facilities:** This factor captures the impact of SAF distribution logistics and acknowledges that States expected to host SAF production facilities are introducing policies to support both SAF production and use.
- **CO₂ Emissions:** This factor accounts for the greater capacity of larger aeroplane operators to invest in SAF, as well as their increased need for emissions offsetting due to higher overall emissions.

Once SAF is distributed to the States, each State's SAF share is allocated based on the specific rules of any applicable GHG Schemes, i.e., according to the information summarized Figure 26. The CO₂ abatement cost for the SAF claim alternative under each Scheme was determined using historical pricing data. If an alternative is not available or not yet defined for a particular Scheme, it is assumed to be more expensive than CORSIA Emissions Units. It was also not considered possible pricing differences concerning the certification process under each scheme.

In the first phase of CORSIA (2024–2026), off-take agreements should play a more prominent role in the distribution of SAF among operators than other factors. Given the limited SAF supply, only a subset of operators will have access to it. Additionally, many state-level policies are set to come into effect during or after this initial phase. Therefore, for the first phase, only the off-take agreements factor was considered. For the second phase, the average of the three factors was used.

The share of crop-based SAF available is determinant to the results, since this kind of feedstock is restricted in some of the Other GHG Schemes. The LTAG Report on Fuels² estimates a roughly 40% share of crop-based fuel in 2035. However, from the SCS reports available so far, limited SAF has been certified using this kind of feedstock. It is expected that this share will increase as new SAF facilities start to operate, and more feedstock is needed. The analysis considered a 0% share of crop-based SAF for the first phase of CORSIA and both 0% and 40% scenarios for the other compliance cycles.

² ICAO, "ICAO Report on the feasibility of a long-term aspirational goal (LTAG) for international civil aviation CO₂ emission reductions - SAF production projections and associated GHG emissions reductions", Available at: https://www.icao.int/environmental-protection/LTAG/Documents/ICAO_LTAG_Report_AppendixM5_AttachmentB.pdf



Figure 32 shows the assessment results based on the assumptions outlined above. During CORSIA's First Phase, a total of 48% of the available SAF would be allocated under the scheme. Within this phase, the proportion of SAF claimed under CORSIA is projected to be lower in 2024 compared to 2025 and 2026, due to a larger share being directed to States operating Other GHG Schemes. For the second phase, when CORSIA becomes mandatory, the share of SAF claimed under CORSIA may increase to a range between 58 and 70%, depending on the proportion of crop-based SAF available in the market.

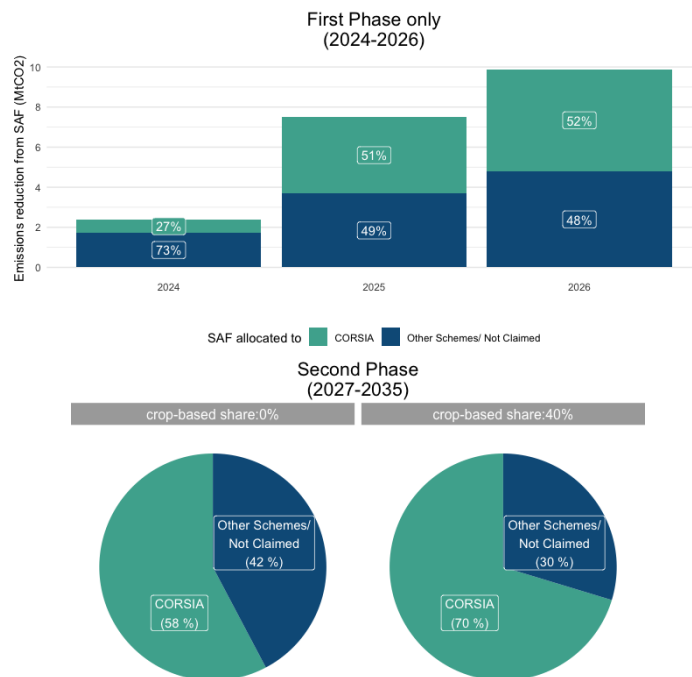


Figure 32 | Assessment of the Potential Allocation of SAF/CEF to CORSIA vs. other GHG Schemes

As presented in the two subsections above, the CAEP conducted two complementary assessments of the historical, current and expected use of SAF/CEF including:

- Operator based analyses using operator reported SAF usage (Tier 1 data), announcements of SAF uptake (Tier 2 data).
- Multi-factor assessment including: SAF announcements, SAF production across States and emissions distribution.

Figure 33 shows the summary of results of the assessments of the potential allocation of SAF/CEF to CORSIA vs. other schemes. First order assessments indicate that $\approx$ 48-50% of CEF SAF, produced globally, may be claimed towards CORSIA (the remainder towards other schemes or not claimed). This percentage may increase with increasing fractions of crop-based CEF, however the share of crop-based CEF is likely to remain limited during the first phase of CORSIA.

For the purpose scenario-based analyses, a 50% fraction was assumed. It should be noted that this analysis does not include a constraint on the share of CEF certified in 2024 (pending confirmation by SCSEG). Such constraints will be added in future CAEP assessments. In addition, additional tracking and work is needed and expected to further refine future assessments.

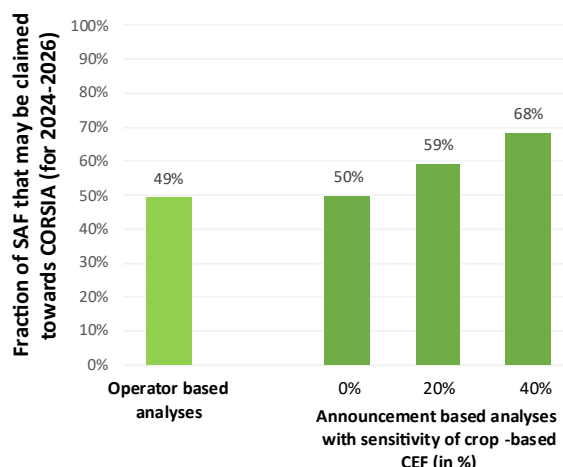


Figure 33 | Summary of Results of Assessment of the Potential Allocation of SAF/CEF to CORSIA vs. other Schemes

Given the uncertainty in how aeroplane operators may choose to address offsetting requirements (i.e., mix of ER from CEF and/or Emissions Units), a scenario-based assessment was conducted. Figure 34 shows the scenarios capturing the range of options for claiming emissions reductions from CEF and/or CEEUs to address offsetting requirements during the First Phase of CORSIA (2024-2026). As depicted on Figure 15, under a mid-traffic scenario, offsetting requirements during the First Phase may reach approximately 135 MtCO₂. As shown on the far-left bar of Figure 15, these offsetting requirements may be addressed with emissions reductions from CEF according to (Moderate CEF scenario) assuming that all the CEF produced would be claimed under CORSIA. The remainder of the offsetting requirements (i.e., final offsetting requirements) would be addressed using CEEUs. As shown on the second bar and considering the results of the assessments summarized above (i.e., Figure 33) a fraction (e.g., 50%) of the emissions reductions from CEF according to (Moderate CEF scenario) could be claimed towards CORSIA with the other half being claimed towards other GHG schemes or not claimed at all. As with the previous scenario, the remainder of the offsetting requirements (i.e., final offsetting requirements) would be addressed using CEEUs. Finally, as a bounding scenario, if none of the CEF is claimed towards CORSIA, the entirety of the offsetting requirements could be addressed using CEEUs only.

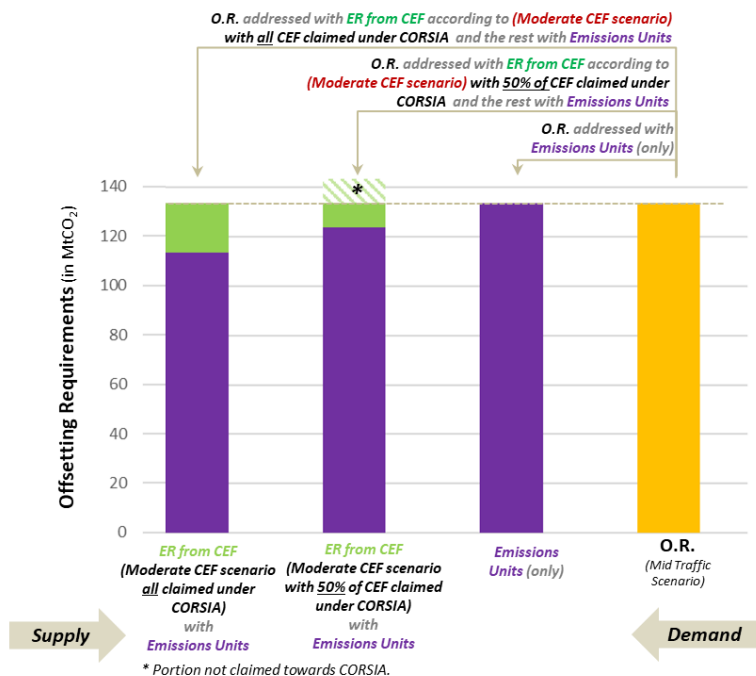
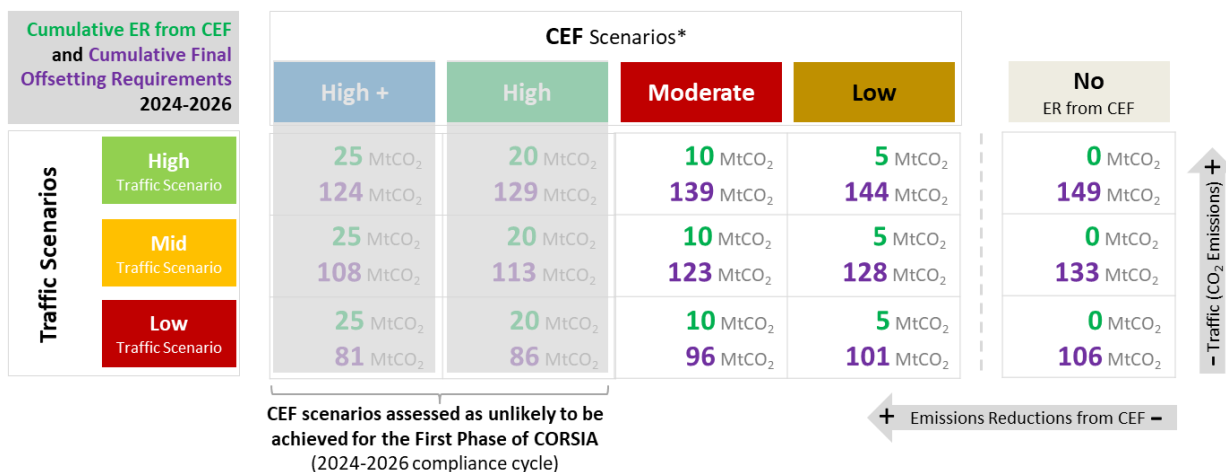


Figure 34 | Scenarios capturing the range of options for claiming emissions reductions from CEF and/or CEEUs to address offsetting requirements during the First Phase of CORSIA (2024-2026)

Cumulative Final Offsetting Requirements (i.e., demand for emissions units) during the First Phase (2024-2026) would vary depending on traffic and emissions reductions from CEF scenarios. Figure 35 shows the summary results of the splits between cumulative emissions reductions from CEF and cumulative final offsetting requirements during the First Phase (2024-2026) across traffic scenarios and CEF scenarios.



* References and assumptions: Emissions Reductions from CEF based on 2025 CAEP Short Term SAF Production projections and partial allocation (50% split) of CEF towards CORSIA.

Figure 35 | Summary of potential claiming of emissions reductions from CEF and/or CEEUs across traffic forecasts and CEF scenarios (illustration for 50% allocation towards CORSIA vs. other schemes)

As noted in the subsection on “SAF/CEF: Production” the CAEP WG5 High and High+ CEF Scenarios were assessed as unlikely to be achieved for the First Phase of CORSIA (2024-2026 compliance cycle). Depending on the traffic forecasts and the amount of SAF produced in the coming years, emissions reductions from CEF may range from 0 to 20 MtCO₂ (10 MtCO₂ if only half is claimed towards CORSIA). A total of 86 to 149 million CEEUs may be required to address final offsetting requirements during the first phase of CORSIA.



Emissions Units: Eligible

The data provided by TAB's most recent supply analysis (September 2023) finds that the two Council-approved programmes to supply units for CORSIA's first phase (2024 – 2026), ACR and ART, have the potential to issue up to around 270 – 320 million CEEUs for mitigation years 2021-2026.

For the first phase (2024-2026 compliance period), based on data collected in TAB's survey of June 2023 indicate that, the "eight conditionally approved programmes would have the potential to issue 1 to 2 billion emissions units for mitigation years 2021-2026".

Emissions Units: Host Country Attestation

On February 28, 2024, the Government of Guyana's announced the authorization of carbon units for use in the CORSIA for the 2024-2026 compliance period. Under the ICAO Council approved Architecture for REDD+ Transactions (ART) programme, 4.64 million CORSIA-eligible units have been issued and authorized by Guyana, now accessible to aircraft operators for meeting offsetting obligations. This decision applies the provisions of Article 6 of the Paris Agreement within the framework of the United Nations Framework Convention on Climate Change (UNFCCC). Guyana's host-country authorization ensures the environmental integrity of these carbon units, emphasizing the prevention of double-claiming between CORSIA and other national environmental purposes.

As of April 2025, the known supply of CORSIA EEUs with attestation reached approximately 18.4 million units.

The CTAG CORSIA Analyses Group intends to continue to track the availability of information and data on CEEUs with host country attestation.

As shown in Figure 36, after taking into account the potentiation contribution from emissions reductions from CEF, there is a gap in the supply of CORSIA EEUs with attestation of ≈ 95 -115 million units (range across traffic forecasts and CEF scenarios: 70-130 MtCO₂). It is expected that the supply of CORSIA EEUs with attestation will increase in the coming year(s). It is critical to ensure that aeroplane operators can address their offsetting requirements under CORSIA during the first phase, where emissions units have to be cancelled no later than February 2028.

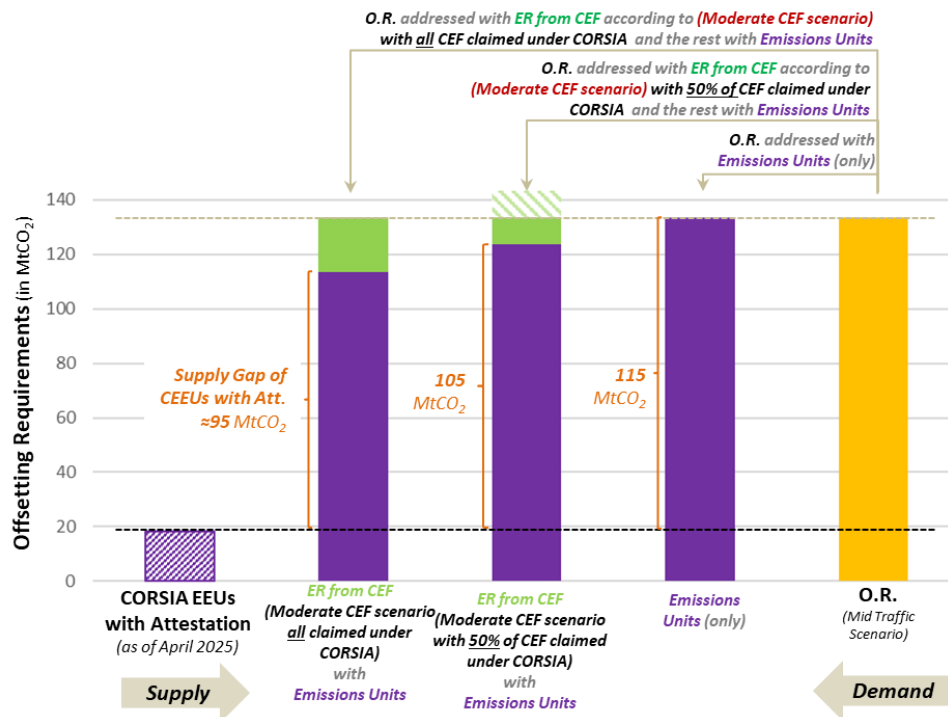


Figure 36 | Gap in CEEUs with attestation for compliance during the First Phase of CORSIA



Emissions Units: Purchased

Information and data on emissions units purchased by aeroplane operators may not be easily available as this information is not necessarily reported in a comprehensive manner.

Emissions Units: Cancelled towards CORSIA

For the purpose of analyses, Figure 37 shows the scenarios capturing the range of options for claiming emissions reductions from CEF and/or CEEUs to address offsetting requirements during the First Phase of CORSIA (2024-2026). These scenarios are then used to estimate the potential costs of compliance during the first phase of CORSIA.

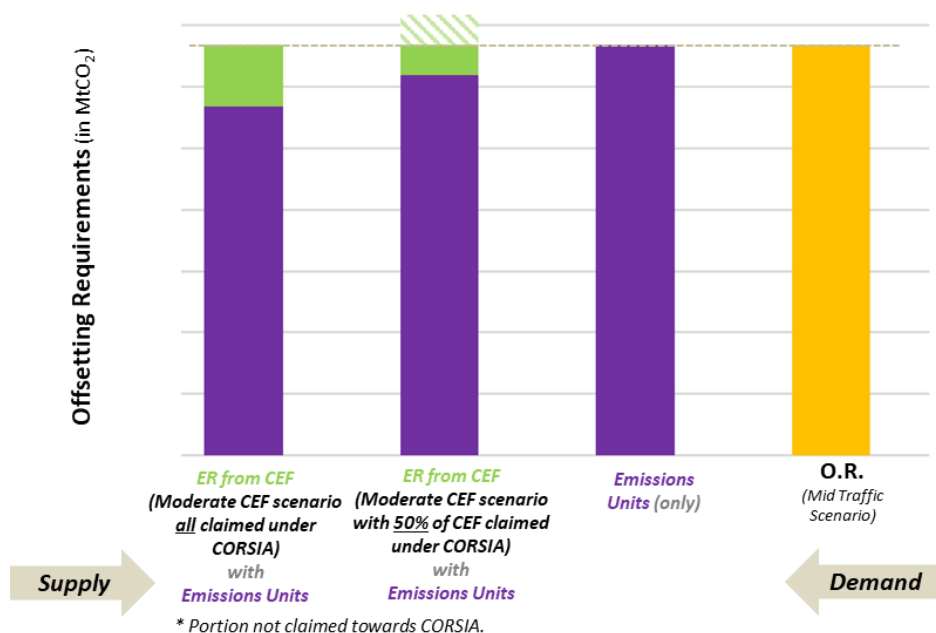


Figure 37 | Scenarios capturing the range of options for claiming emissions reductions from CEF and/or CEEUs to address offsetting requirements during the First Phase of CORSIA (2024-2026)

Potential costs of compliance (focus on the First Phase of CORSIA 2024-2026)

Cost of compliance with CORSIA Standards and Recommended Practices (SARPs), captured in Annex 16 Volume IV, include costs from CEEUs and emissions reductions from CEF as well as administrative costs associated with the CORSIA MRV processes as well as registry related costs. Figure 38 shows the scope of key functions and processes associated with CORSIA and identification of costs, emissions reductions and co-benefits.

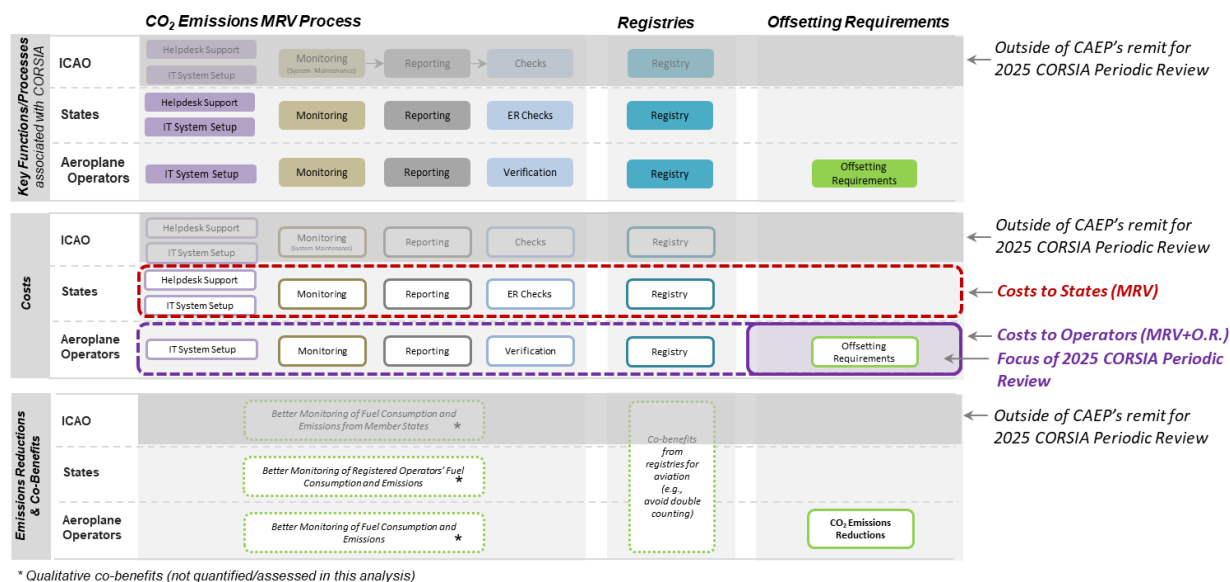


Figure 38 | Scope of key functions and processes associated with CORSIA and identification of costs, emissions reductions and co-benefits

As noted as part of the technical assessments in support of the 2022 CORSIA periodic review, the costs to operators are largely driven by offsetting requirements, and to a lesser extent MRV. The costs to the States are solely from MRV. It was found that total MRV and Registry costs for all Aeroplane Operators and States could be approximately \$430 million from 2018 – 2035 (ranging from \$170 to 700 million). Aeroplane operators bear most of the total MRV costs (63% to 78%). Mid- and large-size aeroplane operators account for approximately 70% of total MRV and Registry costs for operators, with verification and monitoring the dominant costs. Verification is the dominant cost for aeroplane operators eligible to use simplified procedures.

Given the relative limited share of administrative costs to total costs and that the scope of applicability of CORSIA has not fundamentally changed since the 2022 CORSIA periodic review, the updated cost assessments have focused on the costs associated with from CEEUs and emissions reductions from CEF for the 2025 CORSIA periodic review.

Summary of Jet Fuel Unit Prices

Figure 39 shows the prices of SAF in context of prices of conventional jet fuel. From 2021 to 2023, the price of conventional jet fuel ranged from \$0.49 to \$0.87 per liter. As of December 2024, IATA estimated that conventional jet fuel prices averaged \$0.64 per liter for 2024 and could be approximately \$0.67 in 2025. It should be noted that as of April 2025, the price of conventional jet fuel has declined to approximately \$0.53 per liter.

The unit price of SAF was approximately \$2.1 per liter in 2023 and ranged from \$1.8 to \$2.3 in 2024 representing $\approx$ 3 times the price of conventional jet fuel.

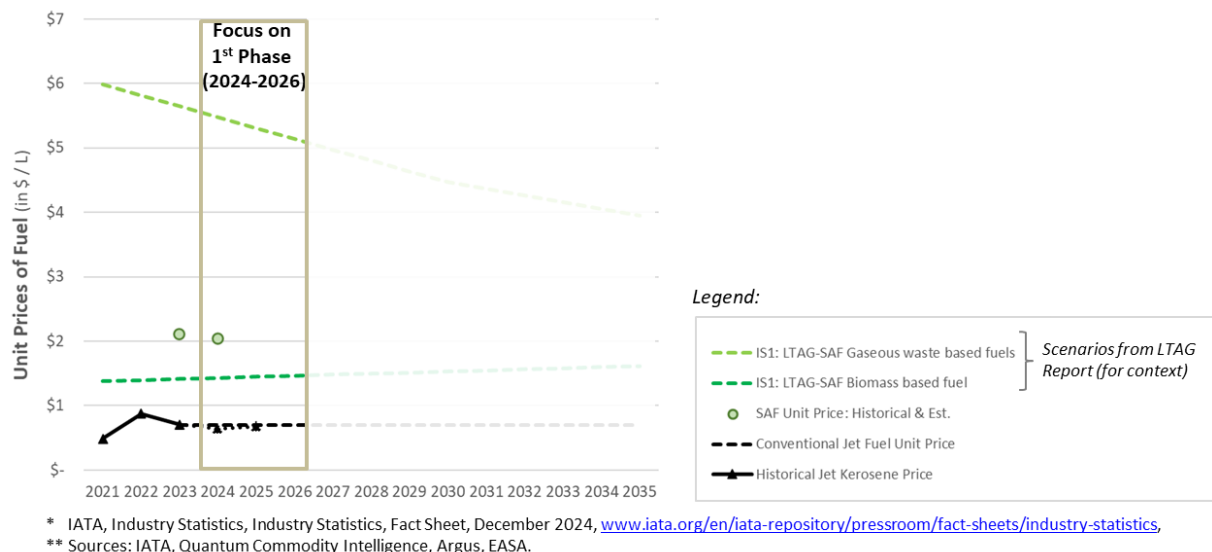


Figure 39 | Summary of estimates of price of SAF in context of the price of conventional jet fuel

Summary of Estimates of Price of Emissions Units

The CAEP WG4 Supply, Demand and Price task group considered the latest available information and data on prices of emissions units.

New data and external analysis on the price of CORSIA eligible emission units (CEEU) has emerged since the scenario-based price analysis was updated in May of 2024. This includes two CORSIA Phase 1 EEU procurement events held by IATA, market reports from Quantum Intelligence and MSCI, and transactions in the voluntary carbon market. Taken together, CTAG-SDP has updated its pricing analysis to reflect the most up-to-date information in this nascent market.

CTAG-SDP estimated a price band of \$10 to \$40 per tCO_{2e} for Phase 1 (2024-2026) CEEUs. The lower end is informed by the voluntary carbon market while the upper bound is the rounded average of external market forecasts. Actual transactions have not exceeded \$23 per tCO_{2e}, and based on typical carbon market pricing behaviours, prices are expected to come down as volume comes online. However, groups like MSCI project potentially higher prices based on supply constraint risks. As such, the \$10-\$40 price range includes both actual and projected pricing data and reflects large uncertainties in the market. As more market information becomes available, such as supply volumes and CEEU transactions, pricing analysis will become more precise. Because data is still very limited, this analysis should not be considered final or determinative for future CEEU price trends.

The first large-scale purchase of Phase 1 CEEUs occurred in November 2024, supported by IATA in partnership with the Government of Guyana, Mercuria, and Xpansiv. CEEUs were sold at a fixed price of \$21.70 per tCO_{2e}. A second procurement event was held in March 2025, where CEEUs sold for \$22.25 per tCO_{2e}. In both events, The Government of Guyana made 1 million units available for sale. IATA intends to host quarterly procurement events for airlines through 2025.

Quantum Intelligence expects lower prices and larger volumes in the near term. In December 2024, Quantum Intelligence forecasted Phase 1 CEEUs will cost between \$15 and \$25 per tCO_{2e}, recognizing that work remains to narrow the figure and that the price band could move in the future. This mirrors trends observed in the futures market, where the Abaxx CP1 futures curve is in steep backwardation— usually a sign of tight supply, high demand, or both, with 2025 delivery starting at above \$24/ tCO_{2e}, while December 2027 falls to \$14.95/ tCO_{2e}.

MSCI forecasts a wider price range. In November 2024, MSCI reported Phase 1 CEEUs will fall anywhere between \$18 and \$51 per tCO_{2e}. The range is largely influenced by modelled uncertainty around supply volumes, which depends on countries' ability to authorize emission units for use towards CORSIA. If countries can provide attestation



and the supply of CEEUs become available to meet demand, prices will be lower. If supply continues to be constrained, prices will be higher. Other market uncertainties, such as fluctuations in demand, will also impact the price of Phase 1 CEEUs.

The voluntary carbon market (VCM) may function as an implicit price floor, in that the transaction cost of selling to a voluntary private buyer is lower than selling to an airline for use towards CORSIA or to a sovereign state for use towards its Nationally Determined Contribution (NDC). If a voluntary buyer and an airline are offering the same terms (price, volume, and structure), but the airline requires attestation of the outcomes, the seller is likely to prefer the voluntary buyer. Thus, an airline would need to exceed the highest price a voluntary buyer is willing to pay. Moreover, voluntary buyer coalitions such as the LEAF Coalition (Lowering Emissions by Accelerating Forest Finance) have committed to a price floor of \$10 per tCO_{2e}. With that benchmark, it is unlikely emission units with attestation would sell at a lower cost.

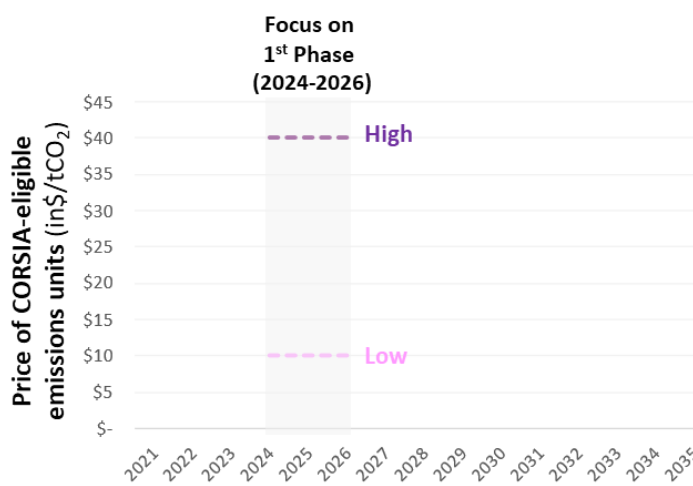


Figure 40 | Summary of estimates of price of CEEUs for the first phase of CORSIA

Several caveats apply to the range of prices of emissions units used for the purpose of the 2025 CORSIA periodic review. Although new data is beginning to emerge, accurate market information is still very limited. Previously, CTAG-SDP looked to the voluntary carbon market to forecast CEEU price scenarios. While the VCM remains an important indicator and helps to inform the price floor of CEEUs, voluntarily traded units do not reflect the price premium of attestation required for use towards CORSIA. At the same time, transaction data on CORSIA-eligible units with attestation remains extremely low. Operators have until January 31, 2028, to fulfil their CORSIA Phase 1 offsetting obligations for the period 2024-2026.

The CEEUs purchased by airlines in late 2024 and early 2025 were Jurisdictional REDD+ ART TREES credits as part of a fixed-price auction. The transaction price of around \$22 reflects both the novelty of the transaction and today's supply constraint, where the first auctions took place in a situation of monopoly by the seller and the sales were of a novel project type. In addition to being the first (and only) sales of CORSIA Phase 1 emission units, they were the first sales of jurisdictional ART TREES emission units with attestation. Other factors that put upward pressure on the transaction price of these units include the transaction structure, the low volume of units traded, the low number of seller(s), and the type of seller.

Generally, the price of new project types trends downward over time as they become mainstream and other project types enter the market to compete. There often is a misconception that the cost of carbon credit markets goes up over time because the quality goes up. The only context within which the price of carbon credits reliably increases over time is if they are linked to an emissions trading scheme where supply is being intentionally ratcheted down on a regular basis, which is not the case with CORSIA.

While analysts expect prices for authorized units to come down as the rate and type of transactions increase and the private sector enters the market, some developments could moderate this downward trend over time. These include the introduction of national regulatory carbon prices (emissions allowances, levies) where regulators allow



emitters to surrender CORSIA carbon credits in lieu of paying the tax or surrendering permits. In such instances, emissions unit prices could be influenced by the cost of compliance alternatives, i.e., may fall just below a regulatory carbon price, which is typically higher than unregulated or over-the-counter emissions unit prices. Currently, only a few such systems are operational or planned, such as Singapore’s national carbon tax—and their price impact is foreseen to be limited, both geographically and in terms of total demand volume.

Unknown supply volume is a major source of market uncertainty. Operators must purchase emission units that meet ICAO criteria, including corresponding adjustments that prevent double counting of emissions reductions towards a country’s NDC. This requires countries to provide a Letter of Attestation (LoA) that authorizes the use of emission units towards CORSIA compliance. Host countries—where emission units are generated—are often developing countries that lack the infrastructure to issue LoAs. If this continues to be the case, the supply of CEEUs with attestation will remain constrained through the end of Phase 1. Capacity-building initiatives exist to address this, including Global Green Growth Institute, Article 6 Implementation Partnership, UN-REDD Programme, and more. Support for host countries to authorize the use of EEUs towards CORSIA will ease supply constraints and help to mitigate the cost associated therein.

There is also uncertainty around the demand for CEEUs. As captured in the technical assessments of offsetting requirements (i.e., demand for emissions reductions from CEF and/or CEEUs) conducted by the CAEP WG4 CTAG CORSIA Analyses group, a range from Low, Mid to High traffic forecasts was considered. These traffic forecasts were based on the CAEP/13 ICAO/CAEP traffic forecasts finalized in 2022/2023. They do not necessary reflect the potential impacts of recent/ongoing developments in global trades and the economy. Also, additional sources of demand for carbon offsets are expected in the years to come, including from Parties to the Paris Agreement that may use carbon markets to help achieve their NDCs, as well as from private companies.

Summary of Unit Prices

As shown on Figure 41, the cost abatement from the emissions reductions from CEF, defined as the CEF Premium divided by CO₂ emissions abated is assumed to range from ≈ \$ 600 to \$ 800 per tCO₂ during the first phase of CORSIA. The average unit prices of emissions units may range from ≈ \$10 to \$40 per tCO₂ during the first phase of CORSIA (2024-2026).

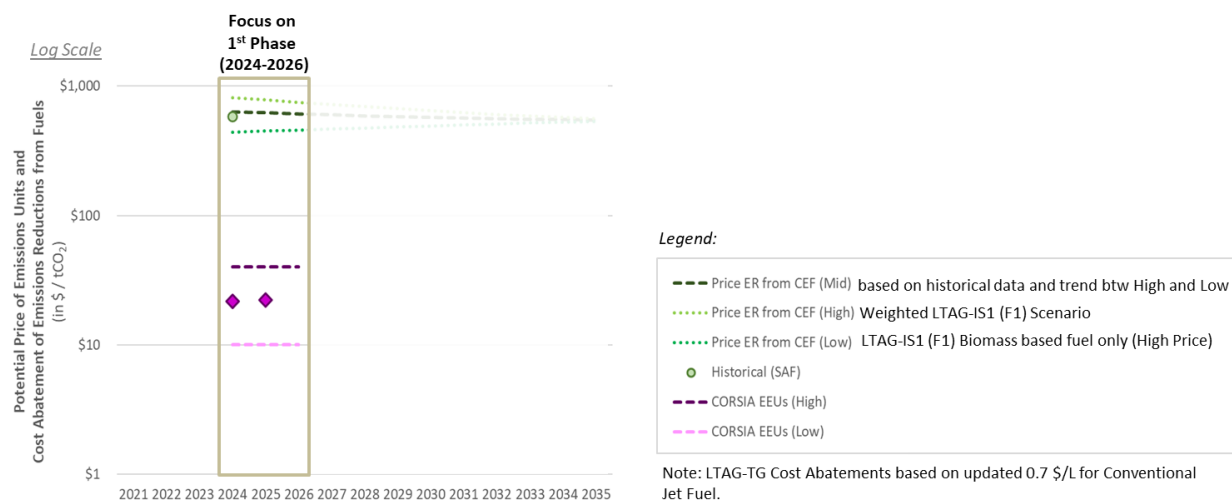


Figure 41 | Summary of Unit Prices of CEFs and Emissions Units

Costs of Addressing Offsetting Requirements during the First Phase of CORSIA

Figure 27 shows the scenarios for addressing offsetting requirements during the first phase of CORSIA with cost implications. Costs associated with addressing offsetting requirements from 2024 to 2026 could range from:



- ≈ \$1 to 5 billion using Emissions Units only,
- ≈ \$6 to 13 billion using a mix of Emissions Units and ER from CEF assuming that 50% of the CEF according to the latest CAEP Moderate scenario are claimed towards CORSIA, or
- ≈ \$10 to 20 billion using a mix of Emissions Units and ER from CEF assuming that all the CEF according to the latest CAEP Moderate scenario are claimed towards CORSIA. These costs are lower than those anticipated in 2016 before CORSIA was agreed.

In 2016, the CAEP estimated the costs from a global market-based mechanism (MBM) to range from \$2.2 to \$6.2 billion (in 2025 alone). References: CAEP analysis presented at EAG/15 (January 2016); and IATA, “Comments on the Cost Impact of a Global Carbon Offsetting Mechanism”³.

It should be noted that (1) the total cost abatement from CEF may not be fully attributable to CORSIA as airlines/operators have purchased and used SAF towards other decarbonization efforts (in the absence of CORSIA compliance requirements); (2) where States will implement SAF blending mandates (e.g., ReFuelEU Aviation regulation for EU Member States) the related abatement costs are more logically attributed to the blending mandate regulation instead of CORSIA; and (3) the actual cost of emissions reductions from CEF is expected to be lower than estimated in this analysis due to States’ support (e.g., tax credits, subsidies) that reduce the effective (net) abatement cost.

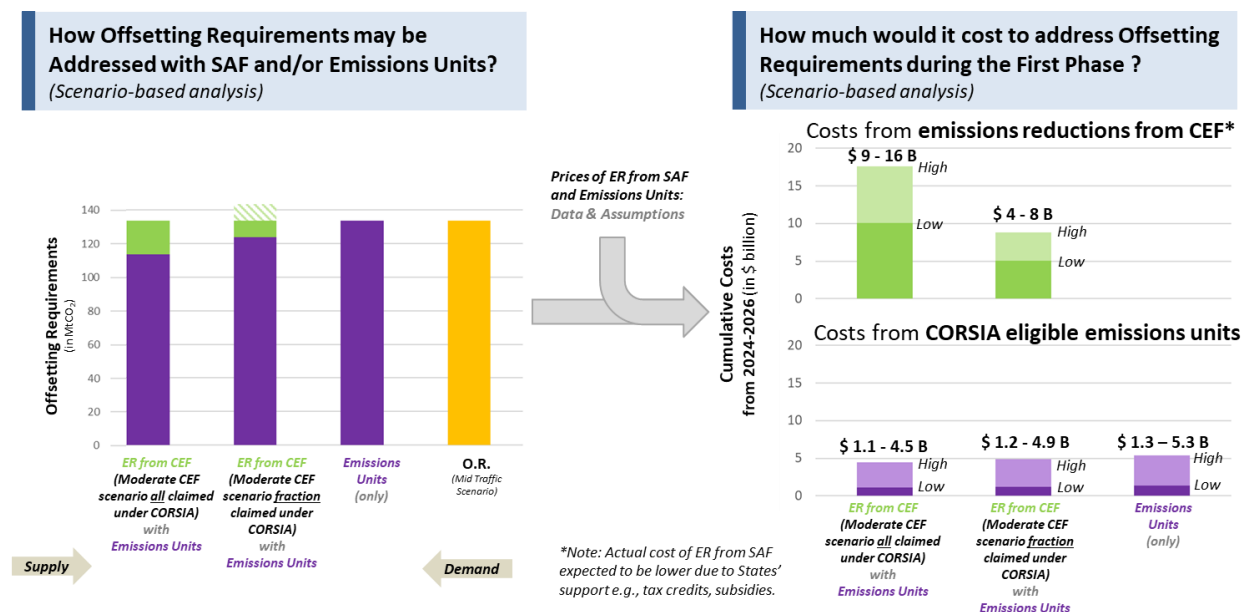


Figure 42 | Addressing Offsetting Requirements during the First Phase of CORSIA with Cost Implications

Figure 43 presents the total costs associated with addressing offsetting requirements in context of the estimated revenue and profits of the international aviation industry. IATA estimated global aviation industry revenues of \$ 965 billion with projected revenues for 2025 at \$1007 billion⁴. Extrapolating for 2026 and assuming a 60% ratio for international aviation, cumulative revenues from international aviation were estimated to be approx. \$ 1800 billion.

The total costs associated with addressing offsetting requirements could represent ≈ 0.07% to 1.1% of international aviation revenue from 2024 to 2026 or ≈ 2% to 32% of net profits from 2024 to 2026.

³ ICAO, Assembly 39th session, A39-WP/153, “Comments on the Cost Impact of a Global Carbon Offsetting Mechanism”, available at: https://www.icao.int/Meetings/a39/Documents/WP/wp_153_rev1_en.pdf

⁴ References: IATA, Industry Statistics, December 2024, Fact Sheet, <https://www.iata.org/en/iata-repository/pressroom/fact-sheets/industry-statistics/> and Global Outlook for Air Transport <https://www.iata.org/en/iata-repository/publications/economic-reports/global-outlook-for-air-transport-december-2024/>.

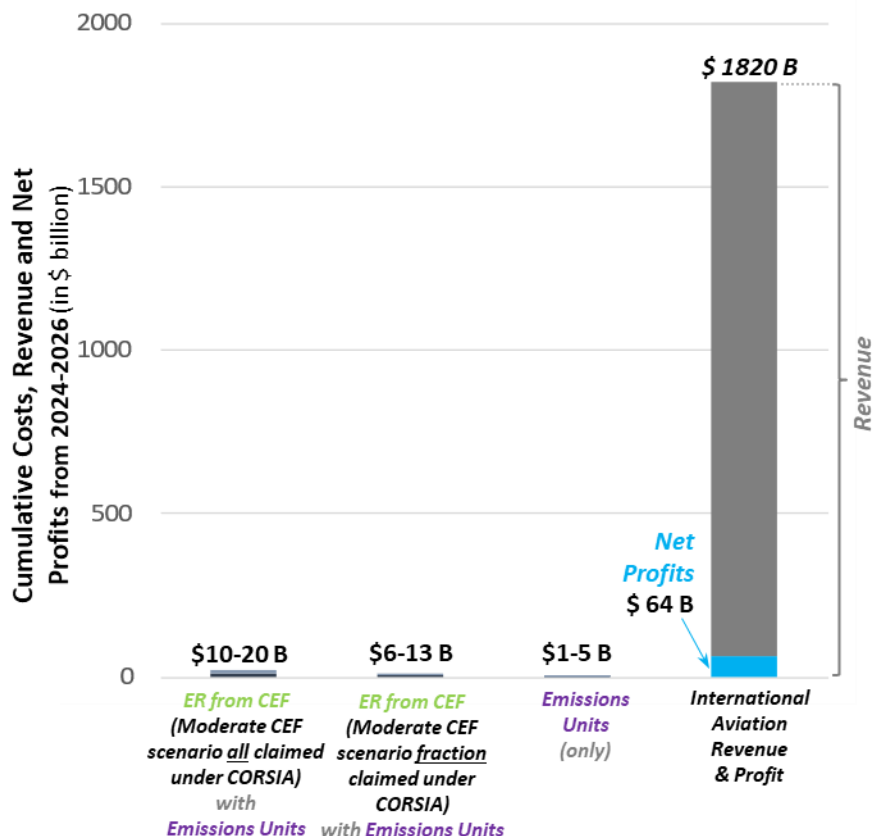


Figure 43 | Costs of Addressing Offsetting Requirements during the First Phase in Context of Industry's Revenue

Potential Offsetting Requirements at Operator Level

Offsetting requirements (and differences across operators) evolve over time and are driven by (1) phased implementation of CORSIA (i.e., States' participation), (2) Sector Growth Factor (e.g., CORSIA baseline) and (3) transition to individual approach from 2033.

To evaluate the impact of CORSIA on aeroplane operators, a scenario-based analysis was undertaken on different types of operators including (1) those that are in scope during the reference year(s) 2019-2020; (2) new entrants and (3) new operators (subsidiaries) who were operators not in scope during the reference years and do not meet the definition of new entrants. Operators that are in scope during the reference years and subsequently remained in scope throughout the 2021 to 2035 period contribute to 89% of total emissions, while operators that dropped out of scope contributed to 2.5% of total emissions. Likewise, new entrants and new operators (subsidiaries) contributed 5.2% and 1.3% respectively, while those that dropped out of scope represented 1.4% and 0.4% respectively.

The offsetting requirements of aeroplane operators with various characteristics were modelled in the context of their individual total CO₂ emissions, their individual growth rate and the % CO₂ emissions to offset as a proportion of their total CO₂ emissions from international aviation (aka Chapter 2) during 2021 to 2035.

Total offsetting requirements and differences across aeroplane operators evolve over time and are driven by (1) the phased implementation of CORSIA (i.e., changes in States participation throughout), (2) the SGF (e.g., emissions forecasts, CORSIA baseline from 2024) and (3) the transition to the individual approach from 2033.

Figure 44 shows the effects of decisions contained in Assembly Resolution A41-22 on the evolution of the offsetting requirements at the operator level for each CORSIA compliance phase assuming a mid-COVID scenario. Each chart depicts the percentage of CO₂ emissions to offset as a proportion of their total CO₂ emissions from international



aviation (aka Chapter 2) vs. average individual year-over-year growth rate from 2021 to 2035. Each bubble represents an individual operator, and the size of the bubble is proportional to the operator's CO₂ emissions from international aviation (aka Chapter 2) from 2021 to 2035.

During the pilot phase (2021-2023), all operators offset 0% as the SGF is expected to be 0. This phase could represent 14% of CO₂ emissions and 0% of offsetting requirements from 2021-2035.

During the first phase (2024 to 2026), where the SGF becomes positive, operators offset 0 to 10% of their CO₂ emissions. The range reflects the 100% sectoral approach and State participation, with higher percentage offset by operators with more flights on participating routes. New entrants benefit from a three-year grace period. This phase could represent 19% of CO₂ emissions and 8% of offsetting requirements from 2021-2035.

During the second phase (2027-2029), overall offsetting increases due to higher SGF and more participating states. Operators with no flights between participating States still offset zero. This compliance cycle could represent 21% of CO₂ emissions and 23% of offsetting requirements from 2021-2035.

During the second compliance cycle of the second phase (2030-2032), overall offsetting increases due to higher SGF. This compliance cycle could represent 22% of CO₂ emissions and 30% of offsetting requirements from 2021-2035. During the last compliance cycle of the second phase (2033-2035), the influence of individual approach on operators starts to be seen with a pivot point at an individual growth rate of 2%. Operators with high growth rates start to have a higher relative increase in offsetting requirements. This compliance cycle could represent 24% of CO₂ emissions and 39% of offsetting requirements from 2021-2035.

Figure 45 shows the effects of decisions contained in Assembly Resolution A41-22 on the evolution of the offsetting requirements at the operator level for each CORSIA compliance phase assuming a mid-COVID scenario. Unlike Figure 44 that normalized offsetting requirements as a proportion of total CO₂ emissions from international aviation (aka Chapter 2 CO₂ emissions) this Figure 45 presents offsetting requirements as a proportion of CO₂ emissions from international aviation subject to offsetting requirements (aka Chapter 3 CO₂ emissions). Chapter 3 emissions represent the subset of total CO₂ emissions from international aviation on State pairs between States that participate in CORSIA in the given year. As shown in Figure 45, the vertical spread of percent of CO₂ emissions to offset is reduced (compared to Figure 44) as normalizing with Chapter 3 emissions removes the effects of participation in CORSIA.

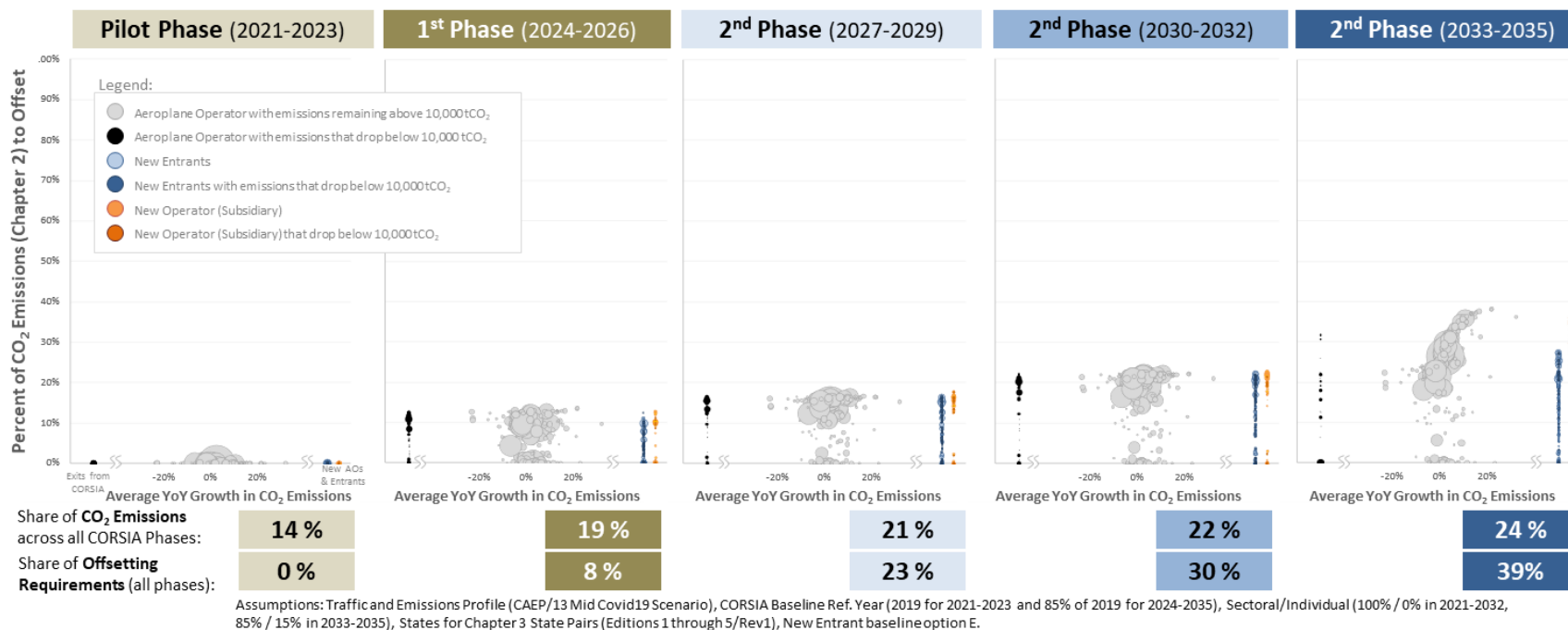


Figure 44 | Assessment of CORSIA's impact on Aeroplane Operators: Offsetting requirements in context of CO₂ emissions from international aviation

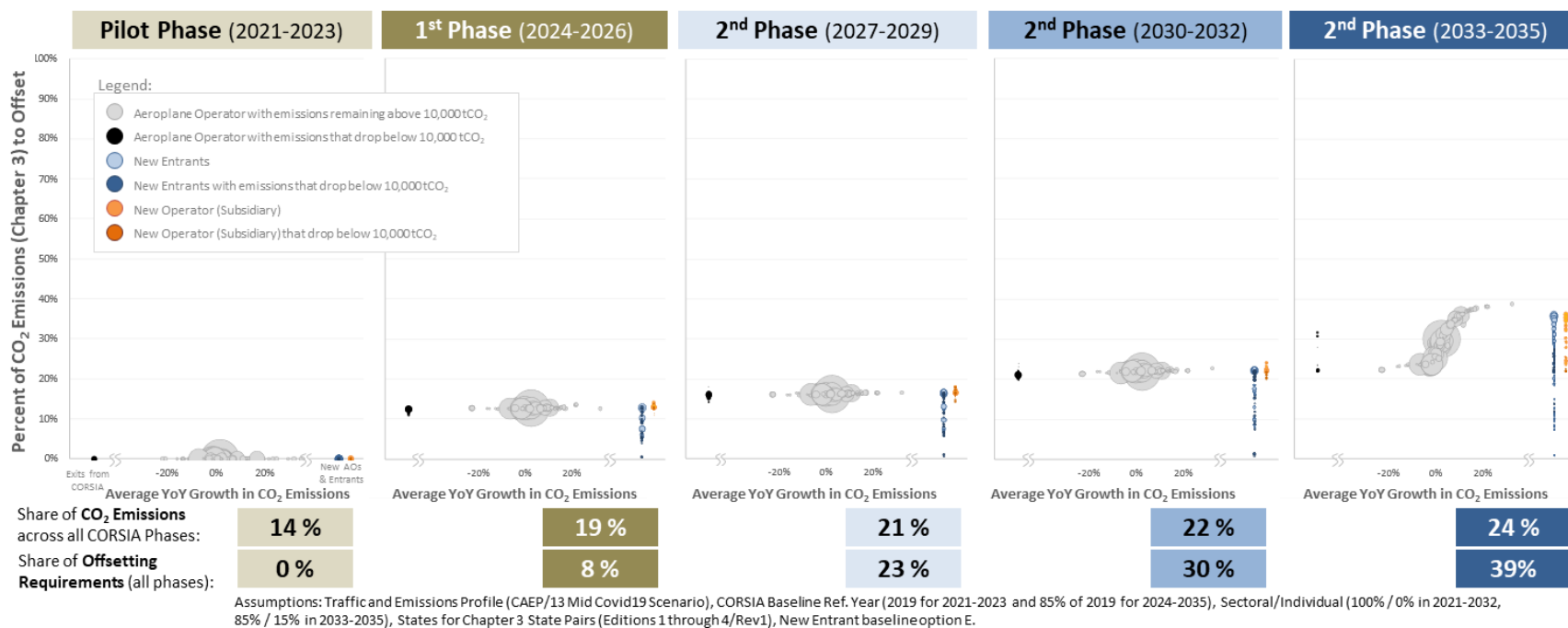


Figure 45 | Assessment of CORSIA's impact on Aeroplane Operators: Offsetting requirements in context of CO₂ emissions from international aviation subject to offsetting requirements



Potential Evolution of CO₂ Emissions from International Aviation in Context of Carbon Neutral Growth goal from 2020 (CNG2020)

As shown in Figure 46, net CO₂ emissions may be ≈550 to 560 MtCO₂ in 2035 (≈ -7.4% to -10.2% below the 2019 level). Given scenarios of expected CORSIA implementation, international aviation sector would meet its mid-term goal of “keeping net carbon emissions from 2020 at the same level” (assuming 2019 CO₂ emissions level as a proxy for 2020 emissions expected prior to the COVID-19 global pandemic impact on international aviation).

It should be noted that net CO₂ emissions are not expected to stabilize at 85% of 2019 emissions level due to partial participation in CORSIA (i.e., announcements of intention to voluntarily participate in CORSIA as reported in the ICAO document titled: “States for Chapter 3 State Pairs”).

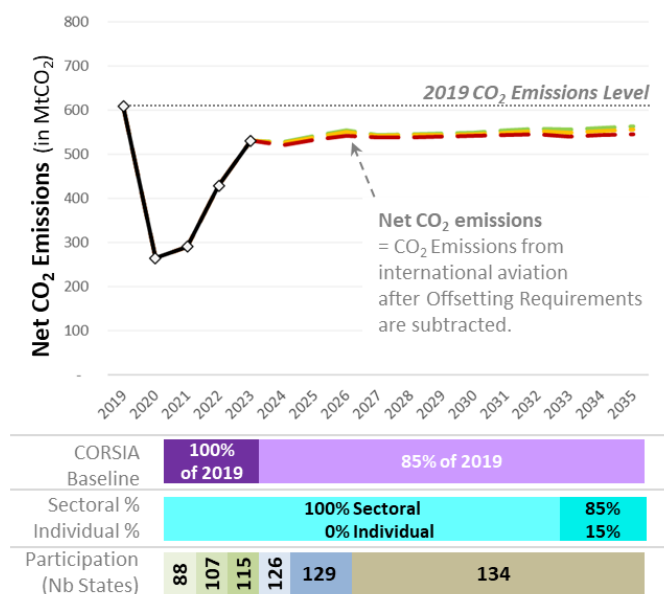


Figure 46 | Projections of Net CO₂ Emissions through 2035



OBSERVATIONS & CONCLUSIONS

Review of CORSIA's Pilot Phase

The CAEP continued its analyses in support of the 2025 CORSIA Periodic Review. Based on interim review and assessment of CORSIA's Pilot Phase (2021-2023), the CAEP:

- observed that due to the decline in CO₂ emissions during the COVID-19 global pandemic coupled with a CORSIA baseline based on 2019 emissions, there was no offsetting required during the Pilot Phase.
- noted that despite the lack of offsetting requirements, markets started to develop and prepare to meet potential and future demand for emissions reductions from CEF and CORSIA emissions units.
- identified the need to develop possible approaches to access data on price information for CORSIA eligible units and CORSIA Eligible Fuels.

Updated Forward Looking CORSIA Analyses

Based on its updated forward-looking assessments through 2035 with focus on the First Phase (2024-2026), the CAEP noted that:

- Given amended CO₂ emissions forecasts and 85% of 2019 CORSIA baseline, offsetting requirements are expected to start in 2024 under all traffic scenarios.
- Cumulative offsetting requirements could range from 950 to 1500 MtCO₂ from 2024 to 2035 and 105 to 150 MtCO₂ during the First Phase (2024-2026).
- Emissions reduction from CEF may address up to ≈15 % of offsetting requirements during the First Phase of CORSIA.
- Costs associated with addressing offsetting requirements from 2024-2026 could range from:
 - ≈ \$1 to 5 billion using Emissions Units only,
 - ≈ \$6 to 13 billion using a mix of Emissions Units and ER from CEF assuming that 50% of the CEF according to the latest CAEP Moderate scenario are claimed towards CORSIA, or
 - ≈ \$10 to 20 billion using a mix of Emissions Units and ER from CEF assuming that all the CEF according to the latest CAEP Moderate scenario are claimed towards CORSIA.
- Net CO₂ emissions may be 550 to 560 MtCO₂ in 2035 (-7.4% to -10.2% below the 2019 level) which would result in the international aviation sector meeting its mid-term goal of "keeping net carbon emissions from 2020 at the same level" (assuming 2019 level as a proxy for pre-COVID 2020 expected emissions).



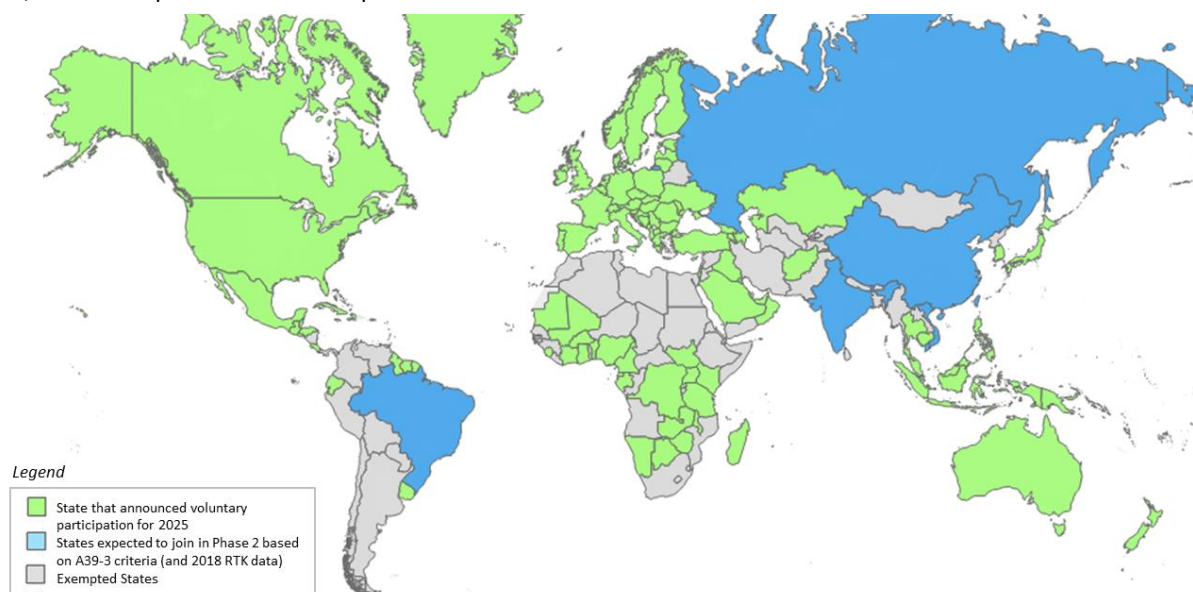
GLOSSARY OF TERMS

ACM	AERO-MS CORSIA Module
CAEP	Committee on Aviation Environmental Protection
CAGR	Compound annual growth rate
CCR	CORSIA Central Registry
C-DEC	Council (Summary of) Decisions
CEEU	CORSIA Eligible Emissions Unit
CEF	CORSIA Eligible Fuels
CNG	Carbon Neutral Growth
CO ₂	Carbon dioxide
COMPASS	CORSIA Model for Parametric Analyses and Stochastics Assessments
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
COD	Common Operations Database
CTAG	CORSIA Tools and Analysis Group
C-WP	Council Working Paper
EASA	European Union Aviation Safety Agency
ESG	Environmental, Social, and Governance
FESG	Forecast and Economic Analysis Support Group
GHG	Greenhouse Gas
IATA	International Air Transport Association
ISCC	International Sustainability & Carbon Certification
LCAF	Lower Carbon Aviation Fuel
LTAG	Long Term Aspirational Goal
MDG	Modelling and Database Group
MRV	Monitoring, Reporting and Verification
OR	Offsetting Requirement
RPK	Revenue Passenger Kilometre
RSB	Roundtable on Sustainable Biomaterials
RTK	Revenue Tonne Kilometre
SAF	Sustainable Aviation Fuel
SARP	Standards and Recommended Practice
SCS	Sustainability Certification Scheme
SCSEG	Sustainability Certification Scheme Evaluation Group
SG	Steering Group
SGF	Sector Growth Factor
V&V	Verification and Validation

APPENDIX A: ADDITIONAL INFORMATION ON CORSIA MODELLING

Assumptions on participation in CORSIA

As illustrated on Figure 47, this document includes the list of 129 States that participate in CORSIA from 1 January 2025. The CORSIA Analyses also reflect the States expected to join CORSIA during the second phase based on Annex 16, Volume IV provisions and the published 2018 RTK statistics.



* Edition 5/Rev1 based on list of States that announced intention to voluntarily participate for 2024 and announcements. ICAO CORSIA Document “CORSIA States for Chapter 3 State Pairs”, Details available at: www.icao.int/environmental-protection/CORSIA/Pages/state-pairs.aspx, with 2018 RTK data from ICAO.

Figure 47 | CORSIA States for Chapter 3 State Pairs (Edition 5, rev1)



APPENDIX B: SUPPORTING INFORMATION AND DATA

Summary of Results from COMPASS

Traffic Scenario	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
High	0.0%	0.0%	0.0%	12.3%	14.2%	15.3%	16.3%	18.6%	20.6%	22.5%	24.6%	26.7%	29.8%	31.7%	33.9%
Mid	0.0%	0.0%	0.0%	11.1%	13.0%	13.9%	14.6%	16.7%	18.6%	20.3%	22.2%	24.1%	27.1%	28.9%	30.9%
Low	0.0%	0.0%	0.0%	9.1%	10.9%	11.1%	10.9%	12.4%	13.8%	15.1%	16.6%	18.1%	21.1%	22.6%	24.3%

Figure 48 | Summary of Sector Growth Factors (SGF)

Note: When the Sector Growth Factor (SGF) was negative for a given year, it is set at zero percent per Annex 16 Volume IV standards.



	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total (2021-2035)
High CAEP/13 scenario																			
CO ₂ emissions international aviation (chapter 2)	Mt	608.1	265.2	290.4	429.0	530.4	571.2	592.6	610.6	630.3	647.7	663.7	679.6	699.4	720.0	741.6	763.5	788.9	9,358.8
CO ₂ emissions subject to offsetting requirement (chapter 3)	Mt			167.1	272.4	330.2	348.6	356.6	361.5	532.8	548.1	561.9	575.9	591.8	608.5	625.7	643.5	664.5	7,189.2
Share of CO ₂ emissions subject to offsetting requirements	%			57.6%	63.5%	62.3%	61.0%	60.2%	59.2%	84.5%	84.6%	84.7%	84.7%	84.6%	84.5%	84.4%	84.3%	84.2%	76.8%
Offsetting requirements	Mt			0.0	0.0	0.0	42.9	50.5	55.4	86.7	102.0	115.8	129.8	145.7	162.4	186.2	204.2	225.2	1,507.1
Offsetting requirements / chapter 2 emissions	%			0.0%	0.0%	0.0%	7.5%	8.5%	9.1%	13.8%	15.8%	17.5%	19.1%	20.8%	22.6%	25.1%	26.7%	28.5%	16.1%
Offsetting requirements / chapter 3 emissions	%			0.0%	0.0%	0.0%	12.3%	14.2%	15.3%	16.3%	18.6%	20.6%	22.5%	24.6%	26.7%	29.8%	31.7%	33.9%	21.0%
Mid CAEP/13 scenario																			
CO ₂ emissions international aviation (chapter 2)	Mt	608.1	265.2	290.4	429.0	530.4	563.6	584.5	600.1	617.2	632.4	646.3	660.2	676.9	694.3	712.5	731.1	752.6	9,121.3
CO ₂ emissions subject to offsetting requirement (chapter 3)	Mt			167.1	272.4	330.2	344.0	351.9	355.5	522.2	535.6	547.8	560.0	573.5	587.5	601.8	616.5	633.8	6,999.8
Share of CO ₂ emissions subject to offsetting requirements	%			57.6%	63.5%	62.3%	61.0%	60.2%	59.2%	84.6%	84.7%	84.8%	84.8%	84.7%	84.6%	84.5%	84.3%	84.2%	76.7%
Offsetting requirements	Mt			0.0	0.0	0.0	38.3	45.8	49.4	76.1	89.5	101.7	113.9	127.5	141.4	163.1	178.1	195.6	1,320.4
Offsetting requirements / chapter 2 emissions	%			0.0%	0.0%	0.0%	6.8%	7.8%	8.2%	12.3%	14.2%	15.7%	17.3%	18.8%	20.4%	22.9%	24.4%	26.0%	14.5%
Offsetting requirements / chapter 3 emissions	%			0.0%	0.0%	0.0%	11.1%	13.0%	13.9%	14.6%	16.7%	18.6%	20.3%	22.2%	24.1%	27.1%	28.9%	30.9%	18.9%
Low CAEP/13 scenario																			
CO ₂ emissions international aviation (chapter 2)	Mt	608.1	265.2	290.4	429.0	530.4	550.4	570.4	580.8	592.2	602.2	611.4	620.7	632.4	644.7	657.4	670.5	685.5	8,668.5
CO ₂ emissions subject to offsetting requirement (chapter 3)	Mt			167.1	272.4	330.2	336.1	343.6	344.3	500.6	509.5	517.6	525.7	534.8	544.4	554.4	564.5	576.3	6,621.4
Share of CO ₂ emissions subject to offsetting requirements	%			57.6%	63.5%	62.3%	61.1%	60.2%	59.3%	84.5%	84.6%	84.7%	84.7%	84.6%	84.4%	84.3%	84.2%	84.1%	76.4%
Offsetting requirements	Mt			0.0	0.0	0.0	30.4	37.5	38.2	54.5	63.4	71.5	79.6	88.7	98.3	117.2	127.5	139.8	946.7
Offsetting requirements / chapter 2 emissions	%			0.0%	0.0%	0.0%	5.5%	6.6%	6.6%	9.2%	10.5%	11.7%	12.8%	14.0%	15.3%	17.8%	19.0%	20.4%	10.9%
Offsetting requirements / chapter 3 emissions	%			0.0%	0.0%	0.0%	9.1%	10.9%	11.1%	10.9%	12.4%	13.8%	15.1%	16.6%	18.1%	21.1%	22.6%	24.3%	14.3%

Figure 49 | Summary of results for key CORSIA metrics (average across 100 model runs of stochastic model)



Summary of Results from AERO-MS ACM

	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total (2021-2035)
High CAEP/13 scenario																			
CO ₂ emissions international aviation (chapter 2)	Mt	608.1	265.2	290.4	429.0	530.4	570.4	592.0	609.8	628.1	647.0	662.7	678.9	699.2	720.2	742.0	764.6	788.0	9,352.7
CO ₂ emissions subject to offsetting requirement (chapter 3)	Mt			167.1	272.4	330.2	348.4	354.5	359.1	537.2	553.1	565.9	579.1	595.8	613.1	630.9	649.3	668.4	7,224.6
Share of CO ₂ emissions subject to offsetting requirements	%			57.6%	63.5%	62.3%	61.1%	59.9%	58.9%	85.5%	85.5%	85.4%	85.3%	85.2%	85.1%	85.0%	84.9%	84.8%	77.2%
Offsetting requirements	Mt			0.0	0.0	0.0	42.9	48.6	53.3	91.2	107.1	120.0	133.2	149.9	167.1	185.2	203.6	222.6	1,524.6
Offsetting requirements / chapter 2 emissions	%			0.0%	0.0%	0.0%	7.5%	8.2%	8.7%	14.5%	16.6%	18.1%	19.6%	21.4%	23.2%	25.0%	26.6%	28.3%	16.3%
Offsetting requirements / chapter 3 emissions	%			0.0%	0.0%	0.0%	12.3%	13.7%	14.8%	17.0%	19.4%	21.2%	23.0%	25.2%	27.3%	29.4%	31.4%	33.3%	21.1%
Mid CAEP/13 scenario																			
CO ₂ emissions international aviation (chapter 2)	Mt	608.1	265.2	290.4	429.0	530.4	563.5	583.8	599.2	615.0	631.3	645.0	659.1	676.4	694.2	712.6	731.7	751.3	9,112.9
CO ₂ emissions subject to offsetting requirement (chapter 3)	Mt			167.1	272.4	330.2	345.3	350.2	353.6	526.4	540.2	551.4	562.8	577.0	591.6	606.6	622.1	638.1	7,034.9
Share of CO ₂ emissions subject to offsetting requirements	%			57.6%	63.5%	62.3%	61.3%	60.0%	59.0%	85.6%	85.6%	85.5%	85.4%	85.3%	85.2%	85.1%	85.0%	84.9%	77.2%
Offsetting requirements	Mt			0.0	0.0	0.0	39.8	44.3	47.7	80.4	94.2	105.4	116.9	131.0	145.6	161.0	176.5	192.4	1,335.2
Offsetting requirements / chapter 2 emissions	%			0.0%	0.0%	0.0%	7.1%	7.6%	8.0%	13.1%	14.9%	16.3%	17.7%	19.4%	21.0%	22.6%	24.1%	25.6%	14.7%
Offsetting requirements / chapter 3 emissions	%			0.0%	0.0%	0.0%	11.5%	12.6%	13.5%	15.3%	17.4%	19.1%	20.8%	22.7%	24.6%	26.5%	28.4%	30.2%	19.0%
Low CAEP/13 scenario																			
CO ₂ emissions international aviation (chapter 2)	Mt	608.1	265.2	290.4	429.0	530.4	550.1	570.3	580.4	590.6	601.0	610.2	619.6	631.6	644.0	656.7	669.8	683.2	8,657.2
CO ₂ emissions subject to offsetting requirement (chapter 3)	Mt			167.1	272.4	330.2	340.5	343.6	344.9	505.8	514.6	521.9	529.4	539.2	549.2	559.4	569.9	580.7	6,668.8
Share of CO ₂ emissions subject to offsetting requirements	%			57.6%	63.5%	62.3%	61.9%	60.2%	59.4%	85.6%	85.6%	85.5%	85.5%	85.4%	85.3%	85.2%	85.1%	85.0%	77.0%
Offsetting requirements	Mt			0.0	0.0	0.0	35.0	37.7	39.0	59.8	68.6	76.0	83.5	93.2	103.2	113.9	124.4	135.1	969.5
Offsetting requirements / chapter 2 emissions	%			0.0%	0.0%	0.0%	6.4%	6.6%	6.7%	10.1%	11.4%	12.5%	13.5%	14.8%	16.0%	17.3%	18.6%	19.8%	11.2%
Offsetting requirements / chapter 3 emissions	%			0.0%	0.0%	0.0%	10.3%	11.0%	11.3%	11.8%	13.3%	14.6%	15.8%	17.3%	18.8%	20.4%	21.8%	23.3%	14.5%

Figure 50 | Summary of results for key CORSIA metrics



Summary of Results across CORSIA Models

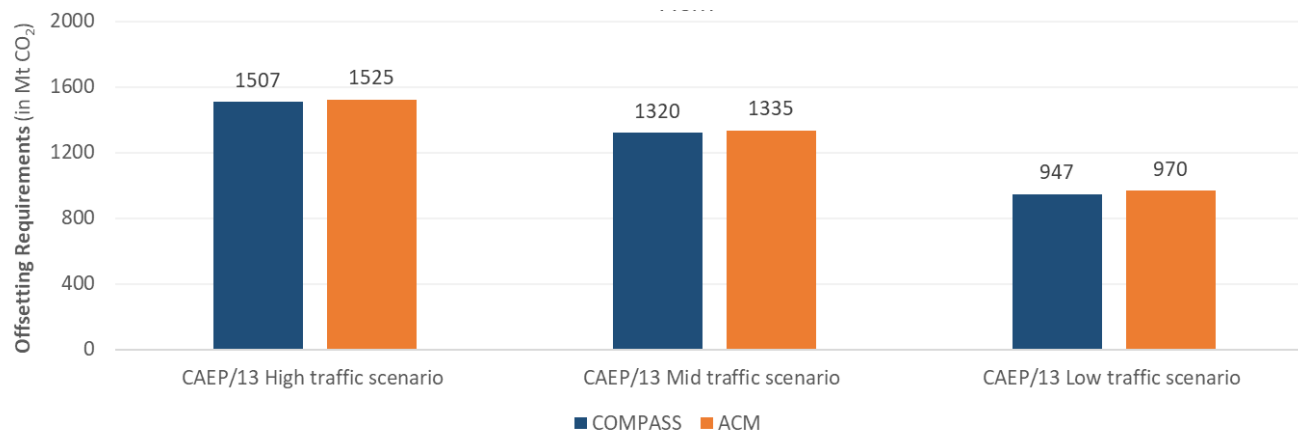


Figure 51 | Offsetting requirements for all phases (2021-2035) for CAEP/13 scenarios

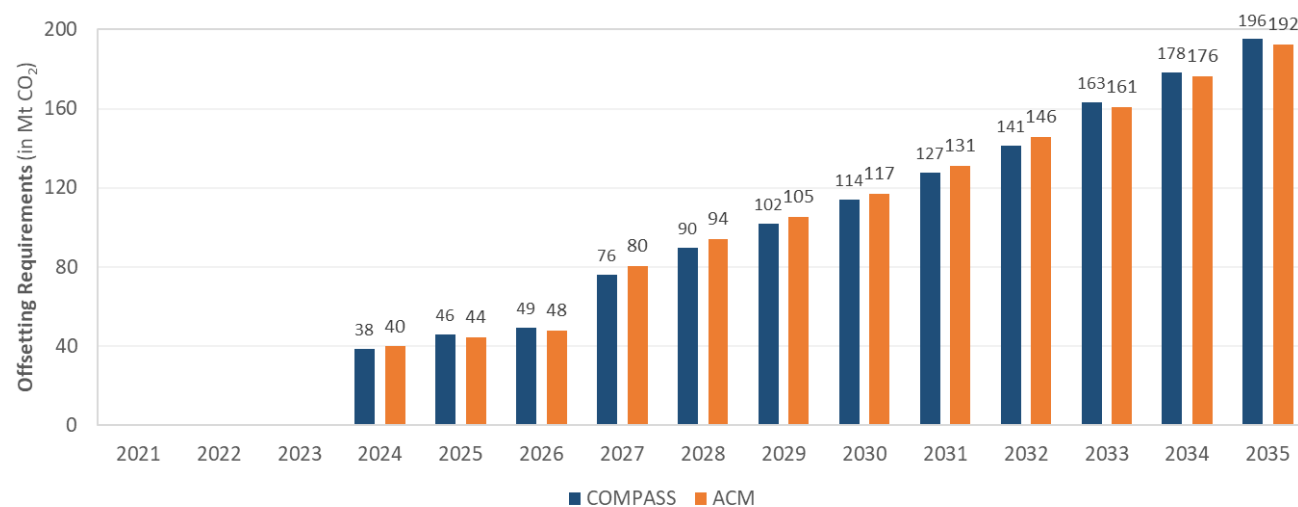


Figure 52 | Offsetting requirements by year for CAEP/13 Mid traffic scenario

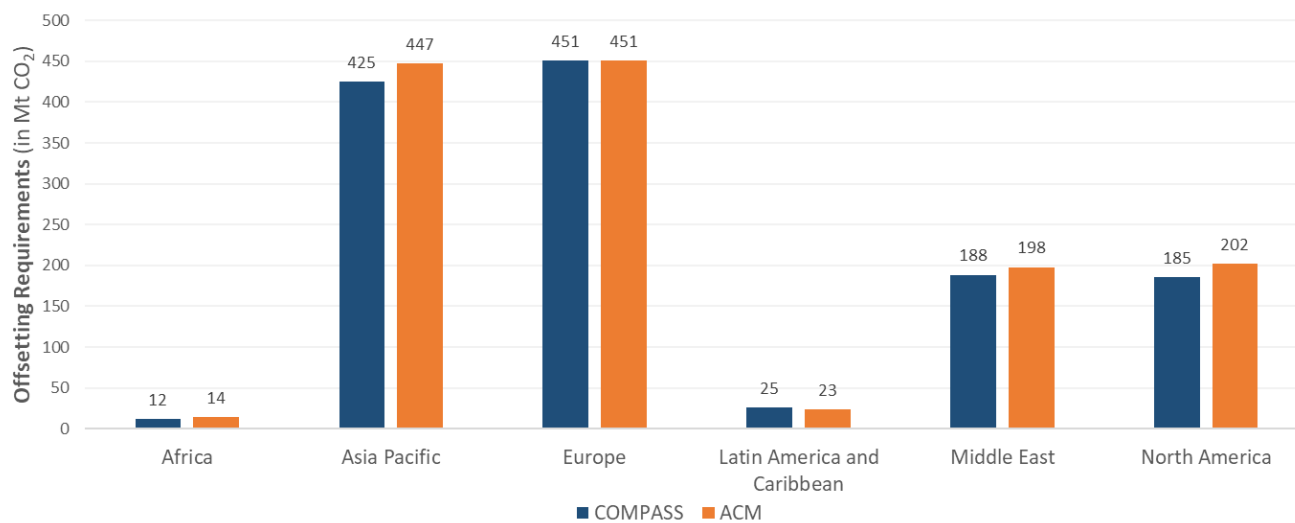


Figure 53 | Offsetting requirements all phases (2021-2035) by ICAO region for CAEP/13 Mid traffic scenario

APPENDICE C

Résolution **Exposé récapitulatif de la politique permanente et des pratiques de l'OACI**
A42-xxA41-22 : **dans le domaine de la protection de l'environnement — Régime de**
compensation et de réduction de carbone pour l'aviation internationale
(CORSIA)

L'Assemblée,

Considérant que, par sa résolution A38-18, elle a décidé d'élaborer un régime mondial de mesures basées sur le marché (GMBM) pour l'aviation internationale, en vue d'une décision à prendre à sa 39^e session,

Rappelant que la résolution A38-18 de l'Assemblée demandait au Conseil, avec l'appui des États membres, de déterminer les principales questions et principaux problèmes qui se posent, y compris pour les États membres, et de recommander un régime GMBM qui y remédie adéquatement et des éléments de conception clés, dont un moyen de tenir compte des circonstances particulières et des capacités respectives, et des mécanismes de mise en œuvre du régime à compter de 2020 en tant qu'éléments d'un panier de mesures comprenant aussi des technologies, des améliorations de l'exploitation et des carburants alternatifs durables pour atteindre les objectifs ambitieux mondiaux de l'OACI,

Considérant que, par sa résolution A39-3, elle a décidé de mettre en œuvre un régime GMBM sous la forme du Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA) en tant qu'élément d'un panier de mesures comprenant aussi des technologies, des améliorations de l'exploitation et des carburants d'aviation durables pour atteindre les objectifs ambitieux mondiaux de l'OACI,

Reconnaissant que l'OACI est l'organe compétent pour traiter des émissions de l'aviation internationale, et le travail considérable accompli par le Conseil, son Comité du climat et de l'environnement (CEC), son Organe consultatif technique (TAB), et son Comité de la protection de l'environnement en aviation (CAEP) afin de soutenir la mise en œuvre du CORSIA,

Accueillant avec satisfaction l'adoption de la ~~deuxième~~ ~~première~~ édition de l'Annexe 16 — *Protection de l'environnement*, Volume IV — *Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA)*, qui contient des dispositions relatives aux procédures de suivi, de compte rendu et de vérification (MRV) du CORSIA,

Accueillant également avec satisfaction la publication de la ~~troisième~~ ~~deuxième~~ édition du *Manuel technique environnemental* (Doc 9501), Volume IV — *Procédures de démonstration de conformité au Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA)*,

Se félicitant des progrès réalisés en vue de l'élaboration et de l'actualisation des éléments de l'OACI relatifs à la mise en œuvre du CORSIA, qui sont pris en compte dans quatorze documents de l'OACI auxquels l'Annexe 16, volume IV, renvoie directement, qui contiennent des éléments que le Conseil a approuvés et qui sont indispensables à la mise en œuvre du CORSIA,

Se félicitant également de la création par le Conseil de l'Organe consultatif technique (TAB), qui a pour mandat de faire des recommandations au Conseil sur les unités d'émissions admissibles CORSIA,

Reconnaissant l'importance d'une approche coordonnée pour les activités de l'OACI et de ses États membres en matière de renforcement des capacités, en coopération avec le secteur de l'aviation, pour soutenir la mise en œuvre du CORSIA, notamment par le truchement du Programme d'assistance, de renforcement des capacités et de formation pour le CORSIA (AGIR pour le CORSIA) de l'OACI,

qui comprend l'organisation de séminaires, l'élaboration d'éléments de sensibilisation et l'établissement de partenariats CORSIA entre les États, qui ont été déterminants pour la mise en œuvre réussie des exigences MRV par les États et pour la communication des émissions annuelles de CO₂ au Registre central du CORSIA,

Se félicitant que de plus en plus d'États membres font part de leur intention de participer volontairement au CORSIA durant la phase pilote, à compter de 2021, que 88 États ont de fait participé volontairement en 2021, 107 États en 2022, et 115 États en 2023, 126 États en 2024, 129 États en 2025 et 130 États en 2026,

Reconnaissant que de robustes activités de renforcement des capacités peuvent faciliter la décision des États membres de participer volontairement au CORSIA,

Rappelant la décision du Conseil (juin 2020) relative à l'utilisation des émissions de 2019 au lieu de celles de 2020 pour la mise en œuvre des éléments de conception pertinents pendant la phase pilote (à savoir le niveau de référence du CORSIA, l'année de référence pour le calcul des obligations de compensation d'un exploitant d'avions, et seuil pour les nouveaux venus), pour tenir compte de la pandémie de COVID-19 et éviter qu'un poids économique indu ne pèse sur les exploitants d'avions,

Rappelant *Constatant* que le Conseil a achevé l'examen périodique 2022 du CORSIA avec le concours technique du CAEP, y compris les analyses relatives à l'incidence de la pandémie de COVID-19 et des scénarios de relance CO₂ sur la demande, l'offre et le coût des obligations du CORSIA en matière de compensation ; et l'adoption subséquente de la résolution A41-22 de l'Assemblée et des modifications des éléments de conception du CORSIA appropriés, comme le niveau de référence du CORSIA et le calcul des obligations de compensation des exploitants d'aéronefs durant et au-delà de la phase pilote,

Notant l'appui de l'industrie de l'aviation au CORSIA en tant que programme mondial unique de compensation de carbone, par opposition à un ensemble disparate de MBM nationales et régionales, comme mesure efficace par rapport à ses coûts, qui compléterait un ensemble plus large de mesures, en particulier de mesures concernant la technologie, l'exploitation et l'infrastructure,

Reconnaissant qu'il ne devrait pas y avoir de double emploi entre les MBM, et que les émissions de CO₂ de l'aviation internationale ne devraient être prises en compte qu'une seule fois,

Soulignant que la décision qu'elle a prise à sa 39^e session de mettre en œuvre le CORSIA traduit le fait que les États membres appuient résolument une solution mondiale applicable à l'aviation internationale, par opposition à un ensemble disparate de MBM nationales et régionales,

Réaffirmant la préoccupation que cause l'utilisation de l'aviation civile internationale comme source potentielle de mobilisation de recettes pour le financement des activités d'autres secteurs concernant le climat, et que les MBM devraient assurer le traitement équitable du secteur de l'aviation internationale par rapport à d'autres secteurs,

Rappelant la Convention-cadre des Nations Unies sur les changements climatiques (CCNUCC) et l'Accord de Paris et *reconnaissant* le principe des responsabilités communes mais différenciées et des capacités respectives des États à la lumière des différentes circonstances nationales,

Reconnaissant également les principes de non-discrimination et de possibilités égales et équitables de développement pour l'aviation internationale prévus dans la Convention de Chicago,

Reconnaissant que les travaux relatifs au CORSIA et à sa mise en œuvre contribueront à la réalisation des objectifs établis dans l'Accord de Paris dans le cadre de la CCNUCC,

Considérant que la CCNUCC et son Protocole de Kyoto, ainsi que l'Accord de Paris prévoient des mécanismes, comme le mécanisme de développement propre (MDP) du Protocole de Kyoto et ~~un nouveau mécanisme de marché dans le cadre du~~ mécanisme d'attribution de crédits de l'Accord de Paris, pour contribuer à l'atténuation des émissions de GES en vue d'un développement durable, qui profitent particulièrement aux États en développement,

~~*Se félicitant de la coopération entre la CCNUCC et l'OACI en matière de développement de méthodologies MDP pour l'aviation,*~~

Reconnaissant que la présente résolution ne crée pas de précédent pour les négociations dans le cadre de la CCNUCC, de l'Accord de Paris ou d'autres accords internationaux ni ne préjuge des résultats de ces négociations, et qu'elle ne représente pas non plus la position des Parties à la CCNUCC, à l'Accord de Paris ou à d'autres accords internationaux,

1. *Décide* que cette résolution, combinée à la résolution ~~A42-xx~~ ~~A41-20~~ : *Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement — Dispositions générales, bruit et qualité de l'air locale* et à la résolution ~~A42-xx~~ ~~A41-21~~ : *Exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement — Changements climatiques*, remplace les résolutions ~~A41-20~~, ~~A41-21~~ et ~~A41-22~~ ~~A40-17~~, ~~A40-18~~ et ~~A40-19~~ et constitue l'exposé récapitulatif de la politique permanente et des pratiques de l'OACI dans le domaine de la protection de l'environnement ;

2. *Reconnaît* les progrès accomplis sur tous les éléments du panier de mesures disponibles pour gérer les émissions de CO₂ de l'aviation internationale, notamment les technologies aéronautiques, l'amélioration de l'exploitation, les carburants d'aviation durables et le CORSIA, et *affirme* sa préférence pour l'utilisation de technologies aéronautiques, d'améliorations de l'exploitation et de carburants d'aviation durables qui offrent des avantages sur le plan de l'environnement pour le secteur de l'aviation ;

3. *Reconnaît également* qu'en dépit de ces progrès, les avantages environnementaux procurés par les technologies aéronautiques, l'amélioration de l'exploitation et les carburants d'aviation durables ne seront peut-être pas suffisants pour assurer des réductions des émissions de CO₂ correspondant à la croissance prévue du trafic aérien international dans des délais permettant d'atteindre l'objectif ambitieux mondial de maintenir au même niveau les émissions mondiales nettes de CO₂ de l'aviation internationale à partir de 2020 ;

4. *Souligne* le rôle du CORSIA pour compléter un plus large panier de mesures permettant d'atteindre l'objectif ambitieux mondial sans imposer un fardeau économique excessif à l'aviation internationale ;

5. *Rappelle* la décision qu'elle a prise à sa 39^e session de mettre en œuvre un régime GMBM sous la forme du Régime de compensation et de réduction de carbone pour l'aviation internationale (CORSIA), pour faire face à toute augmentation annuelle du total des émissions de CO₂ de l'aviation civile internationale (c.-à-d. des vols d'aviation civile qui partent d'un pays pour aboutir dans un pays différent) au-delà des niveaux de 2020, compte tenu des circonstances spéciales et des capacités respectives des États.

6. *Demande* au Conseil de continuer à veiller à ce que les États membres déploient tous les efforts pour poursuivre les progrès en matière de technologies aéronautiques, d'amélioration de l'exploitation et de carburants admissibles CORSIA (à savoir des carburants d'aviation durables CORSIA et des carburants d'aviation CORSIA à moindre émission de carbone) et en tiennent compte dans leurs plans d'action portant sur les émissions de CO₂ de l'aviation internationale, et de suivre et de rendre compte des progrès de la mise en œuvre des plans d'action, et qu'une méthodologie soit élaborée pour faire en sorte que les exigences de compensation d'un exploitant d'avions dans le cadre du régime pour une année donnée puissent être

réduites au moyen de l'utilisation de carburants admissibles CORSIA, de façon à ce que soient inclus tous les éléments du panier de mesures ;

7. *Demande* au Conseil de surveiller en permanence la mise en œuvre de tous les éléments du panier de mesures, et d'examiner les politiques et mesures nécessaires pour veiller à ce que des progrès soient réalisés de façon équilibrée dans tous les éléments, un pourcentage croissant de réduction des émissions découlant avec le temps des mesures autres que les MBM ;

8. *Reconnaît* les circonstances spéciales et les capacités respectives des États, en particulier des États en développement, sur le plan de leur vulnérabilité aux incidences des changements climatiques, de leurs niveaux de développement économique et de leurs contributions aux émissions de l'aviation internationale, entre autres, tout en réduisant au minimum la distorsion du marché ;

9. *Rappelle* la décision qu'elle a prise à sa 39^e session en ce qui concerne la mise en œuvre par étapes du CORSIA pour tenir compte des circonstances particulières et des capacités respectives des États, en particulier des États en développement, tout en réduisant au minimum la distorsion du marché, comme suit :

- a) la phase pilote s'applique de 2021 à 2023 aux États qui se sont portés volontaires pour participer au régime. Les États qui participent à cette phase peuvent déterminer la base des exigences de compensation de leur exploitant d'avions en se fondant sur les indications du § 11, alinéa e), sous-alinéa 1), ci-dessous ;
- b) la première phase s'applique de 2024 à 2026 aux États qui participent volontairement à la phase pilote, ainsi qu'à tout autre État qui se porte volontaire pour participer à cette phase, avec le calcul des exigences de compensation indiqué au § 11, alinéa a), ci-dessous ;
- c) tous les États sont vivement encouragés à participer volontairement à la phase pilote et à la première phase, en notant que des pays développés, qui se sont déjà portés volontaires, ouvrent la voie, et que plusieurs autres États se sont également portés volontaires ;
- d) le Secrétariat publiera sur le site web de l'OACI des renseignements à jour sur les États qui se sont portés volontaires pour participer à la phase pilote et à la première phase ;
- e) la deuxième phase s'applique de 2027 à 2035 à tous les États dont la part individuelle des activités de l'aviation internationale en tonnes-kilomètres payantes (TKP) pour l'année 2018 est supérieure à 0,5 % du total des TKP ou dont la part cumulative dans la liste en ordre décroissant des États représente 90 % du total mondial des TKP, sauf les pays les moins développés (PLM), les petits États insulaires en développement (PEID) et les pays en développement sans littoral (PDSL), à moins qu'ils ne se portent volontaires pour participer à cette phase ;
- f) les États qui sont exemptés ou qui n'ont pas encore participé sont vivement encouragés à participer volontairement dès que possible au régime, en particulier s'ils sont membres d'une organisation d'intégration économique régionale. Les États qui décident de participer volontairement au régime, ou qui décident de mettre fin à leur participation volontaire au régime, ne peuvent le faire qu'à partir du 1^{er} janvier de toute année donnée et notifieront leur décision à l'OACI au plus tard le 30 juin de l'année précédente ;
- g) à partir de 2022, le Conseil examinera tous les trois ans la mise en œuvre du CORSIA, y compris son incidence sur la croissance de l'aviation internationale, qui constitue une base importante pour permettre au Conseil d'examiner s'il est nécessaire d'apporter des ajustements

à la phase suivante ou au cycle de conformité, et, s'il y a lieu, de recommander de tels ajustements à l'Assemblée pour décision ;

10. *Rappelle* la décision qu'elle a prise à sa 39^e session, selon laquelle le CORSIA s'appliquera à tous les exploitants d'avions volant sur les mêmes routes entre des États afin de réduire au minimum la distorsion du marché, comme suit :

- a) tous les vols internationaux effectués sur des routes reliant des États qui sont tous deux inclus dans le CORSIA, selon le § 9 ci-dessus, sont visés par les exigences de compensation du CORSIA ;
- b) tous les vols internationaux effectués sur des routes reliant un État qui est inclus dans le CORSIA à un autre qui ne l'est pas, selon le § 9 ci-dessus, sont exemptés des exigences de compensation du CORSIA, tout en continuant à bénéficier des exigences de compte rendu simplifié ;
- c) tous les vols internationaux effectués sur des routes reliant des États qui ne sont pas inclus dans le CORSIA selon le § 9 ci-dessus, sont exemptés des exigences de compensation du CORSIA, tout en continuant à bénéficier des exigences de compte rendu simplifié ;

11. *Rappelle* les décisions qu'elle a prises à ses 39^e et 41^e sessions, à savoir ~~décide en outre~~ que les quantités d'émissions de CO₂ qu'un exploitant d'avions doit compenser pour une année donnée à partir de 2021 seront calculées annuellement selon les formules suivantes :

- a) obligation de compensation d'un exploitant d'avions = [% sectoriel × (émissions de l'exploitant visées par le CORSIA sur une année donnée × facteur de croissance du secteur au cours de ladite année)] + [% individuel × (émissions de l'exploitant visées par le CORSIA sur une année donnée × facteur de croissance de cet exploitant au cours de ladite année)] ;
- b) où le facteur de croissance du secteur de 2021 à 2023 = (total des émissions visées par le CORSIA au cours de l'année donnée – total des émissions visées par le CORSIA en 2019)/total des émissions visées par le CORSIA au cours de l'année donnée, et où le facteur de croissance du secteur de 2024 à 2035 = (total des émissions visées par le CORSIA au cours de l'année donnée – 85 % du total des émissions visées par le CORSIA en 2019)/total des émissions visées par le CORSIA au cours de l'année donnée ;
- c) où le facteur de croissance de l'exploitant d'avions de 2021 à 2035 = (émissions de l'exploitant visées par le CORSIA au cours de l'année donnée – 85 % des émissions de l'exploitant visées par le CORSIA en 2019) / émissions de l'exploitant visées par le CORSIA au cours de l'année donnée ;
- d) où le % sectoriel = (100 % – % individuel) ;
- e) où le % sectoriel et le % individuel seront appliqués comme suit :
 - 1) de 2021 à 2023, 100 % sectoriel et 0 % individuel, bien que chaque État participant puisse choisir lors de cette phase s'il souhaite appliquer cette formule :
 - a) aux émissions d'un exploitant d'avions visées par le CORSIA au cours d'une année donnée, comme il est indiqué ci-dessus ; ou
 - b) aux émissions d'un exploitant d'avions visées par le CORSIA en 2019 ;

- 2) de 2024 à 2026, 100 % sectoriel et 0 % individuel ;
 - 3) de 2027 à 2029, 100 % sectoriel et 0 % individuel ;
 - 4) de 2030 à 2032, 100 % sectoriel et 0 % individuel ;
 - 5) de 2033 à 2035, 85 % sectoriel et 15 % individuel ;
- f) les émissions de l'exploitant et le total des émissions visées par le CORSIA au cours de l'année donnée ne comprennent pas les émissions exemptées du régime pour l'année en question ;
- g) les émissions visées au paragraphe 11, alinéas b) et c) ci-dessus, seront recalculées au début de chaque année pour tenir compte des routes à destination et en provenance de tous les États qui seront ajoutées étant donné leur participation volontaire ou le début d'une nouvelle phase ou d'un nouveau cycle de conformité ;
12. *Rappelle* les décisions qu'elle a prises à ses 39^e et 41^e sessions, à savoir ~~décide en outre~~ que les nouveaux venus⁹ sont exemptés de l'application du CORSIA pendant trois ans ou jusqu'à l'année au cours de laquelle leurs émissions annuelles dépassent 0,1 % du total des émissions enregistrées en 2019, selon la première condition remplie. Pour les années ultérieures, ils seront inclus dans le régime et traités de la même manière que les autres exploitants ;
13. *Rappelle* la décision qu'elle a prise à sa 39^e session, selon laquelle, nonobstant les dispositions ci-dessus, le CORSIA ne s'applique pas aux exploitants à faible niveau d'activité de l'aviation internationale afin d'éviter d'imposer un fardeau administratif : les exploitants d'avions émettant par an moins de 10 000 tonnes métriques de CO₂ de l'aviation internationale ; les avions de moins de 5 700 kg de masse maximale au décollage (MTOM) ; ou les avions participant à des opérations humanitaires, médicales et de lutte contre l'incendie ;
14. *Rappelle* la décision qu'elle a prise à sa 39^e session, selon laquelle les émissions qui ne sont pas visées par le régime en vertu de la mise en œuvre par étapes et des exemptions ne donneront pas lieu à des exigences de compensation pour les exploitants d'avions inclus dans le régime ;
15. *Rappelle* la décision qu'elle a prise à sa 39^e session d'instaurer un cycle de conformité de trois ans — le premier cycle couvrant les années 2021 à 2023 — au cours duquel les exploitants d'avions doivent remplir leurs exigences de compensation au titre du régime, pendant qu'ils communiquent annuellement les données nécessaires à l'autorité désignée par l'État d'immatriculation ;
16. *Rappelle* la décision qu'elle a prise à sa 39^e session, selon laquelle le CORSIA doit prévoir des mesures de sauvegarde pour assurer le développement durable du secteur de l'aviation internationale et éviter que l'aviation internationale ait à supporter un fardeau économique inapproprié et *demande* au Conseil de décider de la base et des critères pour déclencher ces mesures, et de déterminer des moyens possibles de faire face à ces problèmes ;
17. *Rappelle* la décision qu'elle a prise à sa 39^e session, selon laquelle le Conseil entreprendra tous les trois ans à partir de 2022 un examen périodique du CORSIA, avec la contribution technique du CAEP, qui sera soumis à l'Assemblée, dans le but indiqué au § 9, alinéa g), ci-dessus, et afin de contribuer au développement durable du secteur de l'aviation internationale et à l'efficacité du régime, et *demande* au

⁹ Un nouveau venu est défini comme étant un exploitant d'avions qui débute une activité aéronautique entrant dans le cadre de l'Annexe 16, volume IV, lors de son entrée en vigueur ou ultérieurement, et dont l'activité ne constitue pas, en totalité ou en partie, la poursuite d'une activité aéronautique assurée antérieurement par un autre exploitant d'avions.

Conseil d'élaborer une méthodologie et un calendrier relatifs à la tenue de ces examens, qui porteront, entre autres, sur les points suivants :

- a) évaluation des progrès accomplis en vue d'atteindre l'objectif ambitieux mondial de l'OACI ; du marché du régime et de l'incidence du point de vue des coûts pour les États, les exploitants d'avions et l'aviation internationale ; et du fonctionnement des éléments de conception du régime ;
- b) examen des améliorations du régime qui appuieraient l'objectif de l'Accord de Paris, en particulier ses objectifs à long terme en matière de température ; et mettre à jour les éléments de conception du régime pour améliorer la mise en œuvre, augmenter l'efficacité et réduire au minimum la distorsion du marché, compte tenu des incidences corrélatives de la modification des éléments de conception du régime, par exemple en fonction des exigences MRV ;
- c) un examen spécial, à réaliser d'ici la fin de 2032, sur la cessation du régime, son prolongement ou toute autre amélioration au-delà de 2035, y compris l'examen de la contribution des technologies d'aéronefs, des améliorations opérationnelles et des carburants d'aviation durables à la réalisation des objectifs environnementaux de l'OACI ;

18. *Détermine* que le CORSIA est la seule mesure mondiale basée sur le marché qui s'applique aux émissions de CO₂ de l'aviation internationale afin d'éviter un ensemble disparate éventuel de MBM nationales et régionales qui feraient double emploi, et pour faire en sorte que les émissions de CO₂ de l'aviation internationale ne soient prises en compte qu'une seule fois ;

19. *Demande* que les mesures suivantes soient prises en vue de la mise en œuvre du CORSIA :

- a) le Conseil, avec la contribution technique du CAEP, mettra à jour l'Annexe 16, volume IV, et le *Manuel technique environnemental* (ETM), volume IV, selon qu'il convient ;
- b) le Conseil, avec la contribution technique du CAEP, continuera d'élaborer et de mettre à jour les documents du CORSIA de l'OACI cités dans l'Annexe 16, volume IV, qui ont trait à l'outil d'estimation et de déclaration des émissions de CO₂ ; aux carburants admissibles du CORSIA ; aux critères des unités d'émissions (EUC) du CORSIA et au Registre central du CORSIA, selon qu'il convient ;
- c) le Conseil élaborera et actualisera le document du CORSIA de l'OACI cité dans l'Annexe 16, volume IV, qui porte sur les unités d'émissions admissibles pour utilisation par le CORSIA, en tenant compte des recommandations du TAB ;
- d) le Conseil tiendra à jour le Registre central du CORSIA, sous les auspices de l'OACI, afin de permettre la communication des informations pertinentes des États membres à l'OACI ;
- e) le Conseil continuera de suivre la mise en œuvre du CORSIA, avec le soutien du CEC et du CAEP, selon qu'il convient ;
- f) les États membres prendront les mesures nécessaires pour établir un cadre national de politiques et de réglementation destiné à assurer la conformité au CORSIA et sa mise en œuvre, conformément à l'échéancier établi dans l'Annexe 16, volume IV ;

20. *Rappelle* la décision qu'elle a prise à sa 39^e session, selon laquelle les unités d'émissions produites par des mécanismes établis dans le cadre de la CCNUCC et de son Protocole de Kyoto, ainsi que du mécanisme d'attribution de crédits de l'Accord de Paris, sont admissibles aux fins du CORSIA, à condition qu'elles s'alignent sur les décisions prises par le Conseil, avec la contribution technique du TAB

et du CAEP, notamment sur l'évitement du double comptage et pour la période de référence et les échéanciers admissibles ;

21. *Décide* que l'OACI et les États membres prendront toutes les mesures nécessaires pour assurer le renforcement des capacités, l'assistance et l'établissement de partenariats en vue de la mise en œuvre du CORSIA conformément à l'échéancier établi dans l'Annexe 16, volume IV, y compris par le truchement du Programme d'assistance, de renforcement des capacités et de formation pour le CORSIA (AGIR pour le CORSIA) de l'OACI, qui comprend l'organisation de séminaires, l'élaboration d'éléments de sensibilisation et l'établissement de partenariats CORSIA entre les États, tout en insistant sur l'importance d'une approche coordonnée sous l'égide de l'OACI pour l'exécution des activités de renforcement des capacités et d'assistance ;

22. *Rappelle* la décision qu'elle a prise à sa 39^e session, selon laquelle le CORSIA utilisera des unités d'émissions qui répondent aux critères des unités d'émissions (EUC) dont il est question au § 19 ci-dessus ;

23. *Demande* au Conseil de promouvoir l'utilisation des unités d'émissions produites qui profitent aux États en développement, et *encourage* les États à développer des projets liés à l'aviation intérieure ;

24. *Demande* au Conseil d'explorer plus avant des méthodologies liées à l'aviation à utiliser dans les programmes de compensation, y compris des mécanismes ou d'autres programmes sous l'égide de l'Accord de Paris, et *encourage* les États à utiliser ces méthodologies dans leurs mesures de réduction des émissions de CO₂ de l'aviation, ce qui pourrait permettre l'utilisation des crédits engendrés par la mise en œuvre de tels programmes dans le cadre du CORSIA, sans double comptage des réductions d'émissions.