Council — 226th Session

Analyses in Support of the 2022 CORSIA Periodic Review:
Assessment of Additional CORSIA Baseline Options

30 June 2022

Presented by CAEP

Background on Covid19 Impacts on International Aviation and Operators

- COVID-19 had substantial impacts on the international aviation sector with a ≈60% drop in CO_2 emissions in 2020 (compared to 2019).
- However, the impacts have not been felt uniformly across operators:
  - Some operators experienced a 60% drop in CO_2 emissions in 2020 (similar levels as the international aviation sector). Others were even more extreme with 80+ % drop.
  - For some operators, 2020 CO_2 emissions were actually higher (e.g., +10%, +30% or more) than their 2019 emissions.
- Given this wide range of CO_2 emissions in 2020 (compared to 2019), using an Avg. 2019-2020 baseline would result in different impacts on individual operators' offsetting requirements when CORSIA transitions to some individual share (%) in 2030.
- This motivates the exploration of CORSIA baseline options based on 2019 emissions (e.g., x% of 2019).

Questions Requested by Council Session and Addressed by CAEP

In support of the 2022 CORSIA Periodic Review, the Council requested CAEP to present the following inputs:

Excerpt from C-DEC 226/13

[The Council,] building upon the analyses delivered by CAEP during the 225th Session on the impacts of COVID-19 on CORSIA and its baseline (CWP/15326, Appendix A and C-DEC 225/13, refer), agreed to request that CAEP undertake further analyses to estimate the offsetting requirements and the regional breakdown, using the average of 2019 and 2020 emissions as the agreed baseline, in accordance with Assembly Resolution A40-19, as well as the following scenarios for the CORSIA baseline after the pilot phase (2024 to 2035):

i. 2019 emissions only;

ii. a percentage of 2019 emissions, which reflects an equivalent level to the average of 2019 and 2020 emissions; and

iii. the mid-point between the baseline scenarios 1) and 2) above.

New/additional CORSIA baseline options

Definition of Additional Baseline Options

- At the 226th session, the Council requested CAEP to assess a CORSIA Baseline defined as *"a percentage of 2019 emissions, which reflects an equivalent level to the average of 2019 and 2020 emissions".*

- Given that CO_2 emissions in 2020 were approximately 59% below the 2019 level*, the average of 2019 and 2020 emissions is about 29.5% below the 2019 level (i.e., 70.5% of 2019 emissions).

- Rounding for simplicity and ease of communication, CAEP defined this CORSIA baseline option as **70% of 2019.**

- The "mid-point" CORSIA baseline option was defined as **85% of 2019.**

** based on the CAEP/12 Covid19 scenarios used for CORSIA analyses also presented at the 225th session of the Council. Scenarios consistent with CAEP/12 Trends to be presented to Assembly 41.*

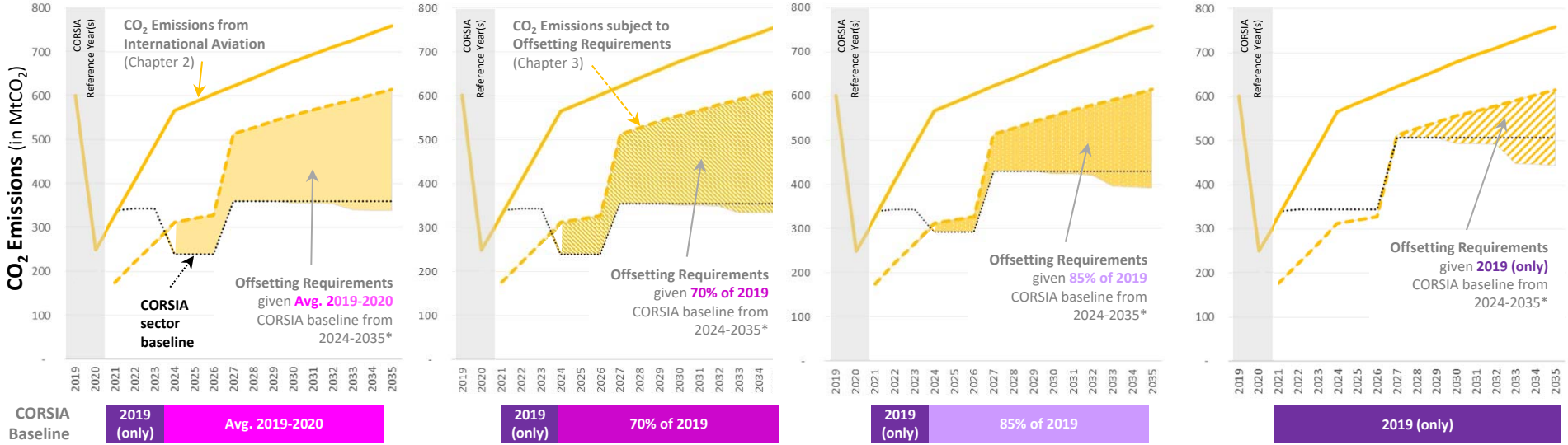
Effects of the CORSIA Baseline on Offsetting Requirements

- As expected, for all operators combined, the 70% of 2019 is very close to the Avg. 2019-2020 baseline and results in similar distribution and quantities of offsetting requirements.
- Under a Mid Covid19 recovery scenario, the 2019 (only) baseline option results in later start of offsetting (2027) and lower quantities of offsetting requirements.
- Under the same recovery scenario and an 85% of 2019 baseline, offsetting starts in 2024 and volumes of offsetting requirements between 70% of 2019 and 2019 (only).

CORSIA Baseline Option
presented to 225th session of Council

New/Additional CORSIA Baseline Options

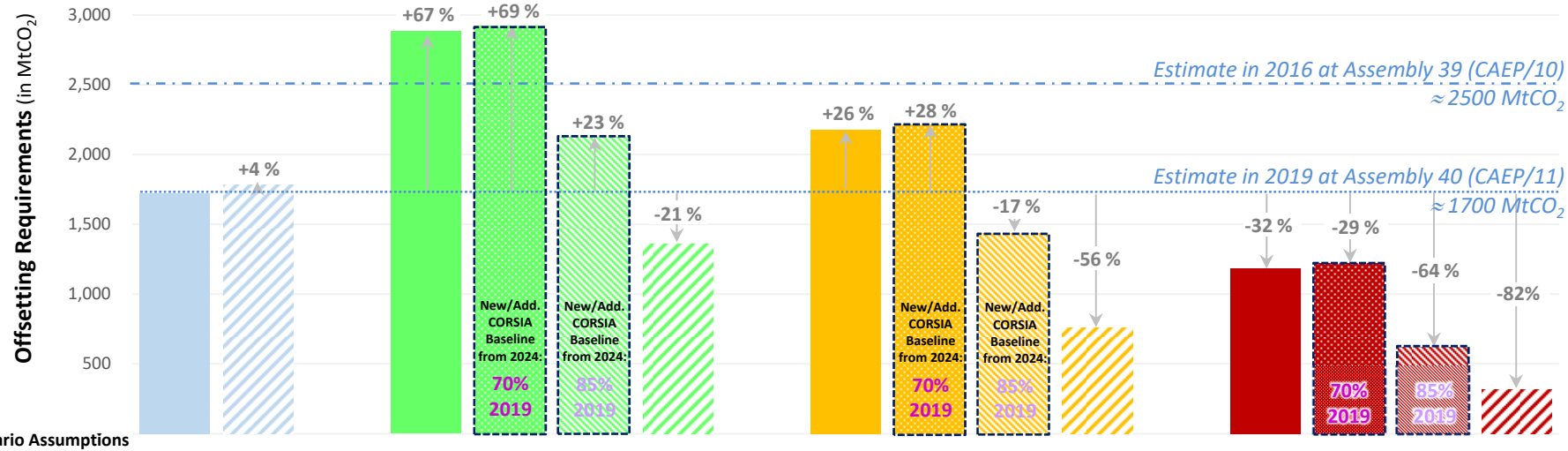
CORSIA Baseline Option
presented to 225th session of Council



* CORSIA baseline from 2021-2023 defined as 2019 (only) based on decision by ICAO Council in June 2020.

Estimation of Offsetting Requirements

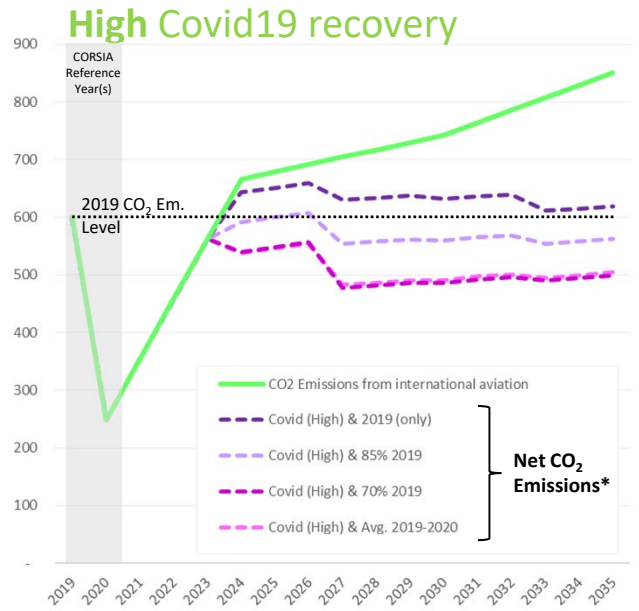
- Under 70% of 2019 baseline for 2024-2035, offsetting requirements (OR) could range from 1200 to 2900 $MtCO_2$ (similar to the 1200 to 2900 $MtCO_2$ for the Avg. 2019-2020 baseline).
- Under an 85% of 2019 baseline for 2024-2035, OR could range from 600 to 2100 $MtCO_2$.
- If the baseline remains at 2019 (only) level for 2024-2035, OR could range from 310 to 1400 $MtCO_2$.

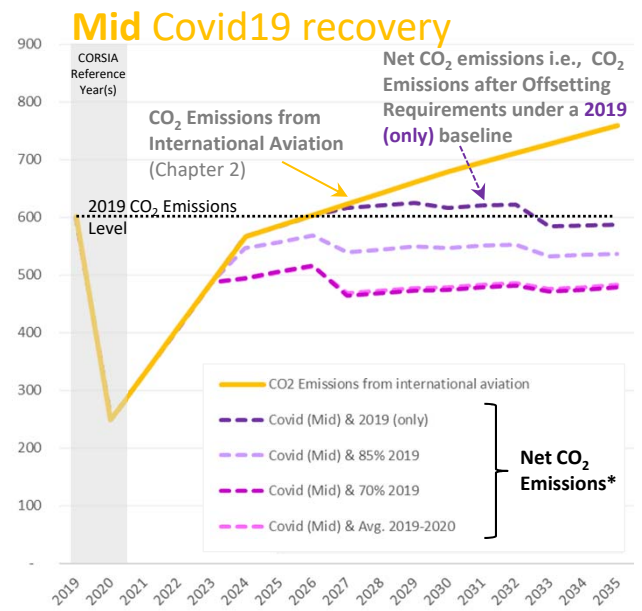


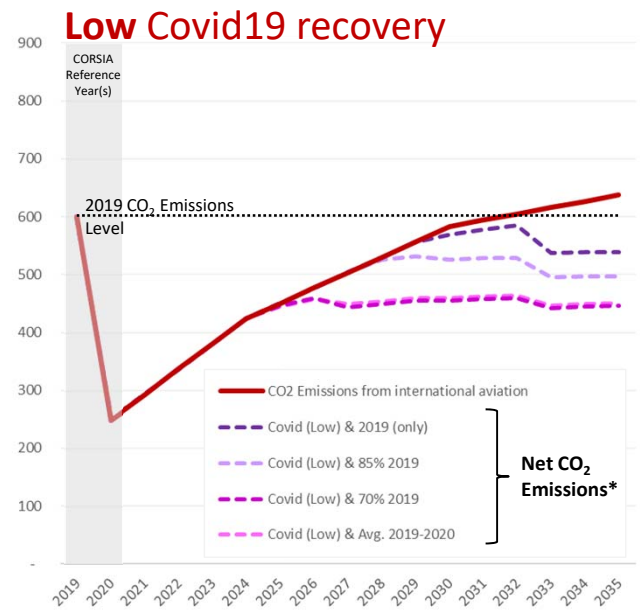
Scenario Assumptions																
CO_2 Emissions Trends	Base (CAEP/11 ref. 2015) No Covid19 Scenario		High Covid19 Recovery Scenario				Mid Covid19 Recovery Scenario				Low Covid19 Recovery Scenario					
CORSIA Baseline (2021-2023)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)
CORSIA Baseline (2024-2035)	Avg 2019 -2020	2019 (only)	Avg 2019 -2020	70% 2019	85% 2019	2019 (only)	Avg 2019 -2020	70% 2019	85% 2019	2019 (only)	Avg 2019 -2020	70% 2019	85% 2019	2019 (only)		
				New/Additional CORSIA Baseline Options				New/Additional CORSIA Baseline Options				New/Additional CORSIA Baseline Options				

Effects of Estimated Offsetting Requirements

- **Under a 2019 (only) baseline from 2024, CO_2 emissions after offsetting requirements (i.e., net CO_2 emissions*) could exceed 2019 emissions level.**
- **Under Avg. 2019-2020, 70% of 2019 and 85% of 2019 baselines, net CO_2 emissions could remain below a 2019 emissions level (as proxy of pre-COVID emissions level) in the majority of scenarios and years.**



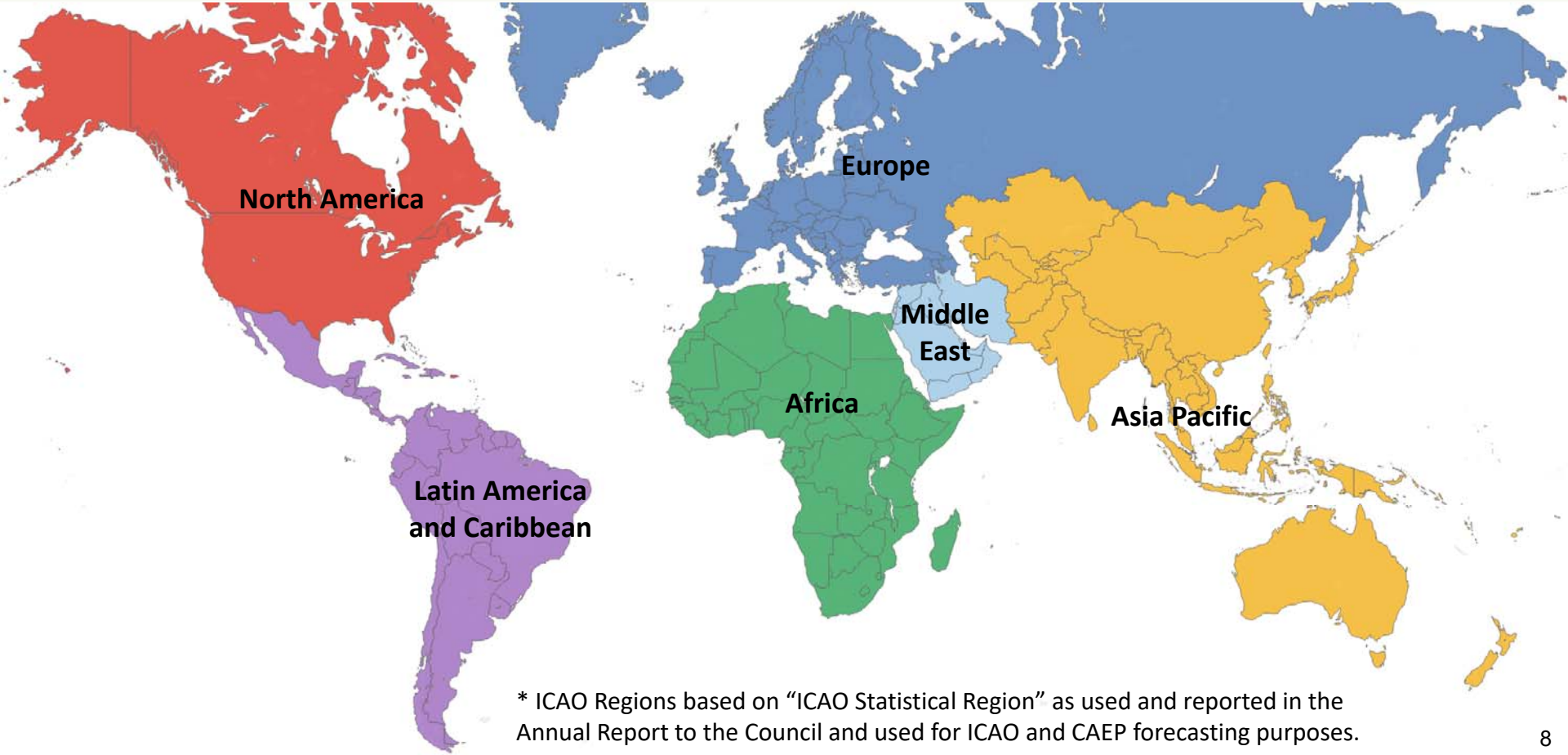




* Net CO_2 Emissions defined as *CO_2 emissions from international aviation* minus *offsetting requirements.*

Note. - Due to the increased number of CORSIA baseline options considered in this version of the CORSIA Periodic Review analyses, it was not possible to summarize results in a similar format as slide 10 of CWP/15326, Appendix A. Similar information is presented in the format above.

Background on ICAO Regions*

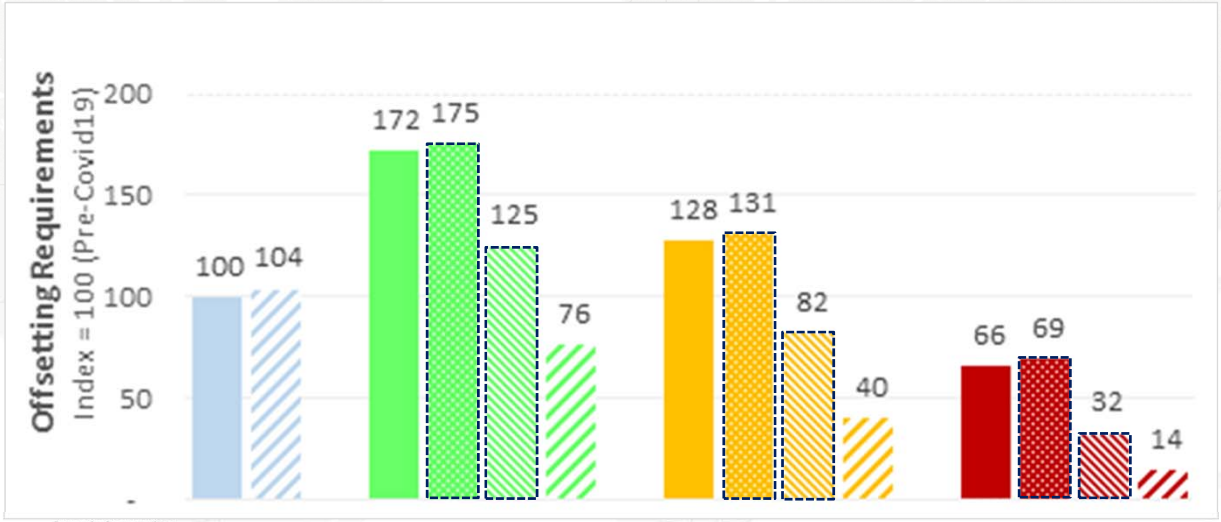


* ICAO Regions based on “ICAO Statistical Region” as used and reported in the Annual Report to the Council and used for ICAO and CAEP forecasting purposes.

Regional Breakdown of Offsetting Requirements by ICAO Regions

Offsetting Requirements Index = 100
for pre-Covid 19 (Base) scenario

Illustrative ICAO Region



Scenario Assumptions	Base (CAEP/11 ref. 2015) No Covid19 Scenario		High Covid19 Recovery Scenario				Mid Covid19 Recovery Scenario				Low Covid19 Recovery Scenario			
CO_2 Emissions Trends														
CORSIA Baseline (2021-2023)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)	2019 (only)
CORSIA Baseline (2024-2035)	Avg 2019 -2020	2019 (only)	Avg 2019 -2020	70% 2019	85% 2019	2019 (only)	Avg 2019 -2020	70% 2019	85% 2019	2019 (only)	Avg 2019 -2020	70% 2019	85% 2019	2019 (only)
				New/Additional CORSIA Baseline Options				New/Additional CORSIA Baseline Options				New/Additional CORSIA Baseline Options		

Note. – Results for a given ICAO Region include all aeroplane operators attributed to an ICAO Member State (within the ICAO Region) regardless of where the operator flies i.e., on which State pairs the operator conducts international flights.

Summary of Assumptions:

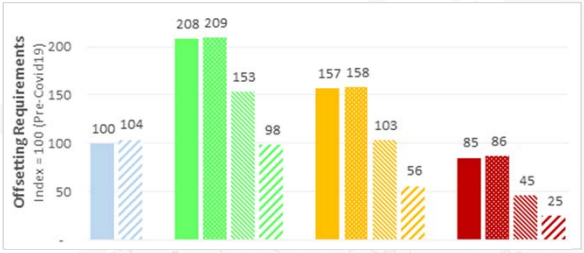
CORSIA Baseline Ref. Year (Pilot):	2019 (only)
CORSIA Baseline Ref. Year (2024-2035):	**2019**, 70% 2019, **85% 2019** or Avg. 2019-2020
Sectoral/Individual :	80% / 20% in 2030-2032
Sectoral/Individual :	30% / 70% in 2033-2035
States for Chapter 3 State Pairs:	Edition 2 (July 2021)

Regional Breakdown of Offsetting Requirements by ICAO Regions

Offsetting Requirements Index = 100 for pre-Covid 19 (Base) scenario

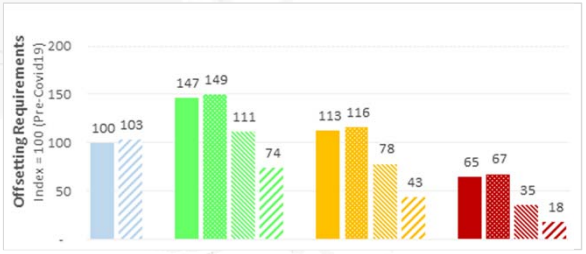
North America

Europe

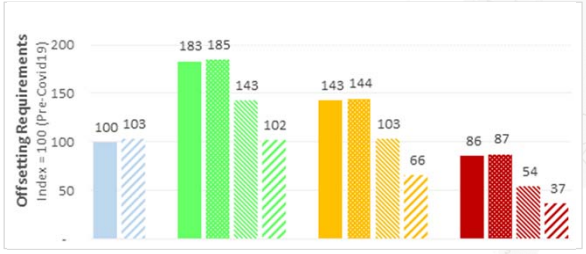


Middle East

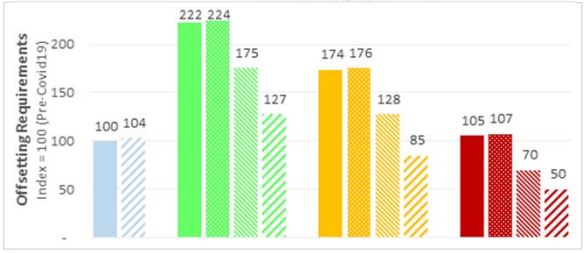
Asia Pacific



Latin America and Caribbean



Africa



Summary of Assumptions:

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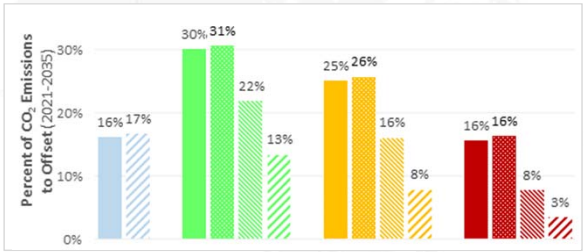
Sectoral/Individual :	80% / 20% in 2030-2032
Sectoral/Individual :	30% / 70% in 2033-2035
States for Chapter 3 State Pairs:	Edition 2 (July 2021)

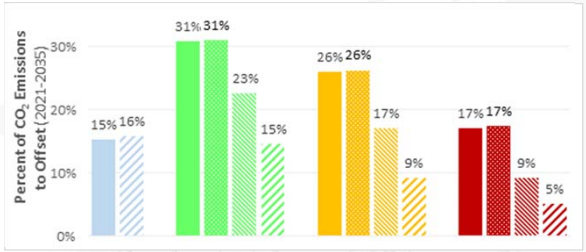
Percent CO_2 emissions to Offset by ICAO Regions

Percent CO_2 emissions to offset based on **total international aviation CO_2 emissions** (A16V4 Chapter 2).*

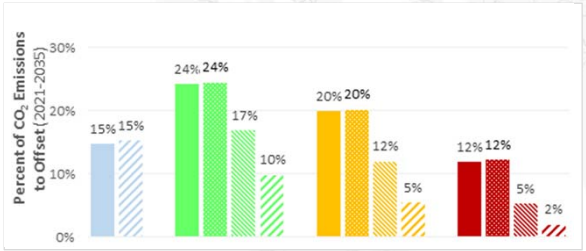
North America



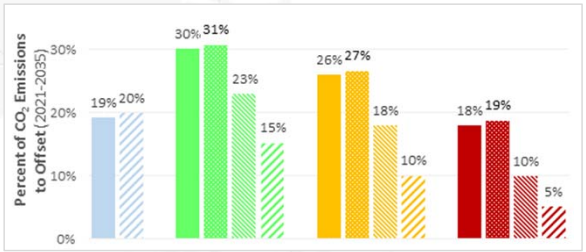
Europe



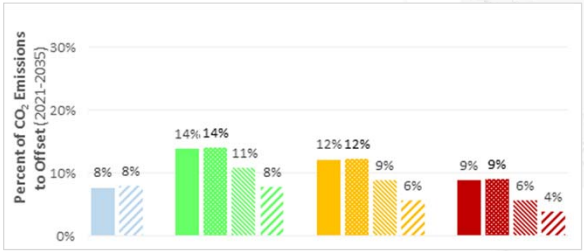
Middle East



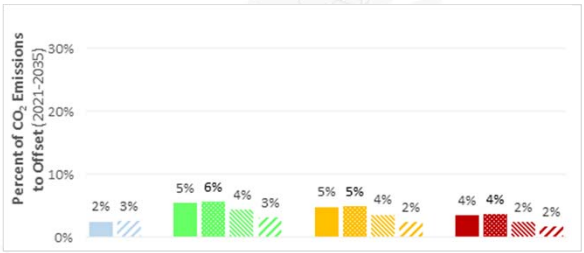
Asia Pacific



Latin America and Caribbean



Africa



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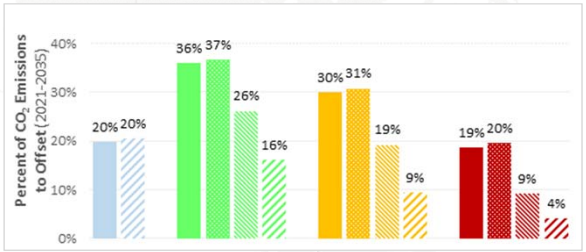
Sectoral/Individual :	30% / 70% in 2033-2035
States for Chapter 3 State Pairs:	Edition 2 (July 2021)

** Percent CO_2 emissions to offset calculated as: total offsetting requirements (2021-2035) divided by total CO_2 emissions from international aviation (A16V4 Chapter 2) from 2021 to 2035.*

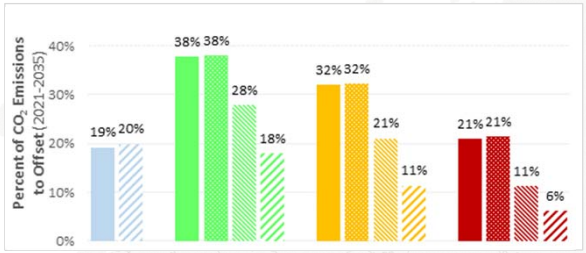
Percent CO_2 emissions to Offset by ICAO Regions (cont.)

Percent Chapter 3 CO_2 emissions to offset based on* ***total international aviation CO_2 emissions subject to offsetting requirements*** *(A16V4 Chapter 3).*

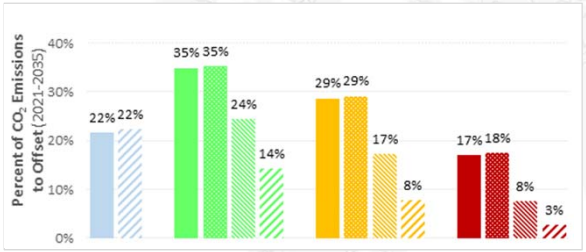
North America



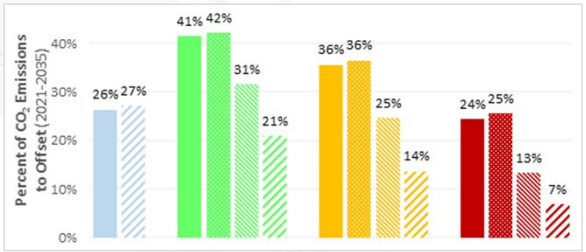
Europe



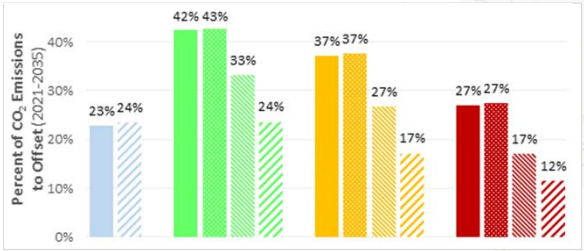
Middle East



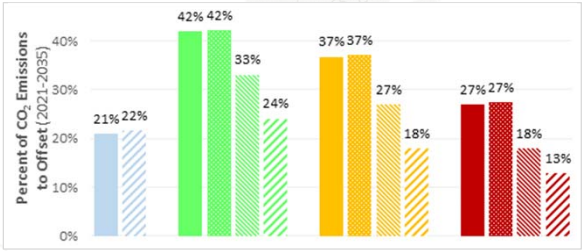
Asia Pacific



Latin America and Caribbean



Africa



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Sectoral/Individual :	80% / 20% in 2030-2032
Sectoral/Individual :	30% / 70% in 2033-2035
States for Chapter 3 State Pairs:	Edition 2 (July 2021)

** Percent Chapter 3 CO_2 emissions to offset calculated as: total offsetting requirements (2021-2035) divided by total international aviation CO_2 emissions subject to offsetting requirements (A16V4 Chapter 3) from 2021 to 2035.*

Summary on Regional Breakdown of Offsetting Requirements by ICAO Regions

- **As noted by Council during its 225th Session:**
  - **Results of regional breakdown of offsetting requirements by ICAO Region show similar relative changes in offsetting requirements between 2021 and 2035 compared to their expected quantities of offsetting requirements before COVID-19 in all regions**
    (i.e., all regions are expected to be affected by COVID-19 in a similar manner).
  - **The percent of CO_2 emissions offset is driven by the participation of States in CORSIA and this 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.**
- **The new/additional baseline options (i.e., 70% of 2019 and 85% of 2019) do not change these observations.**

Summary on Analyses of Additional Baselines Options: Observations

- As expected, for all operators combined (i.e., international aviation level), the equivalent 70% of 2019 is very close to the Avg. 2019-2020 baseline and results in similar distribution and overall quantities of offsetting requirements.
- Note that depending on the impact of COVID-19 on actual 2020 emissions of the operator(s), the Avg. 2019-2020 and 70% of 2019 baselines can have different impacts on individual operators' offsetting requirements when CORSIA transitions to some individual approach (%) in 2030-2035. A lower reduction of emissions in 2020 leads to lower offsetting requirements and vice versa.
- The 85% of 2019 baseline represents a mid-point between 70% of 2019 and 2019 (only) baseline options, and would result in lower offsetting requirements than under an Avg. 2019-2020 and 70% of 2019 baselines.
- Under Avg. 2019-2020, 70% of 2019 and 85% of 2019 baselines, net CO_2 emissions could remain below a 2019 emissions level (as proxy of pre-COVID emissions level) in the majority of scenarios and years (unlike under a 2019 only baseline).

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THANK YOU