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COVID-19, International Aviation, and Climate Change: How Airlines' Proposed Re-Write of International Civil Aviation Organization Rules would Undermine the Carbon Offsetting and Reduction Scheme for International Aviation

May 2020 / ANALYSIS

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Summary

COVID-19 has wreaked havoc on lives and livelihoods, including for the world's airlines. They are facing real economic and structural threats - but UN climate action is not one of those.

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), adopted by the 190+ Member States of the International Civil Aviation Organization (ICAO), caps the net CO_2 emissions of international flights at the average of their 2019-2020 emissions. Airlines must offset any emissions above this level using ICAO-eligible sustainable alternative fuels (SAF) or ICAO-approved carbon credits.

ICAO's flagship environmental initiative takes effect in 2021. Governments, airlines, and investors have spent years preparing through ICAO's Act CORSIA program and CORSIA's package of rules: an Annex to the Chicago Convention; an Environmental Technical Manual; fourteen implementation elements; and procedures to avoid double-counting of carbon credits. Measured against plummeting 2020 aviation emissions, CORSIA could require more offsets than airlines anticipated in the unlikely scenario that air travel rebounds swiftly. But airlines have yet to regain passengers' trust - and aviation's climate impact is part of that question.

In March 2020, the airlines' trade association asked ICAO's 36-member governing Council to re-write CORSIA - to set the cap at 2019 emissions instead of the 2019-2020 average.

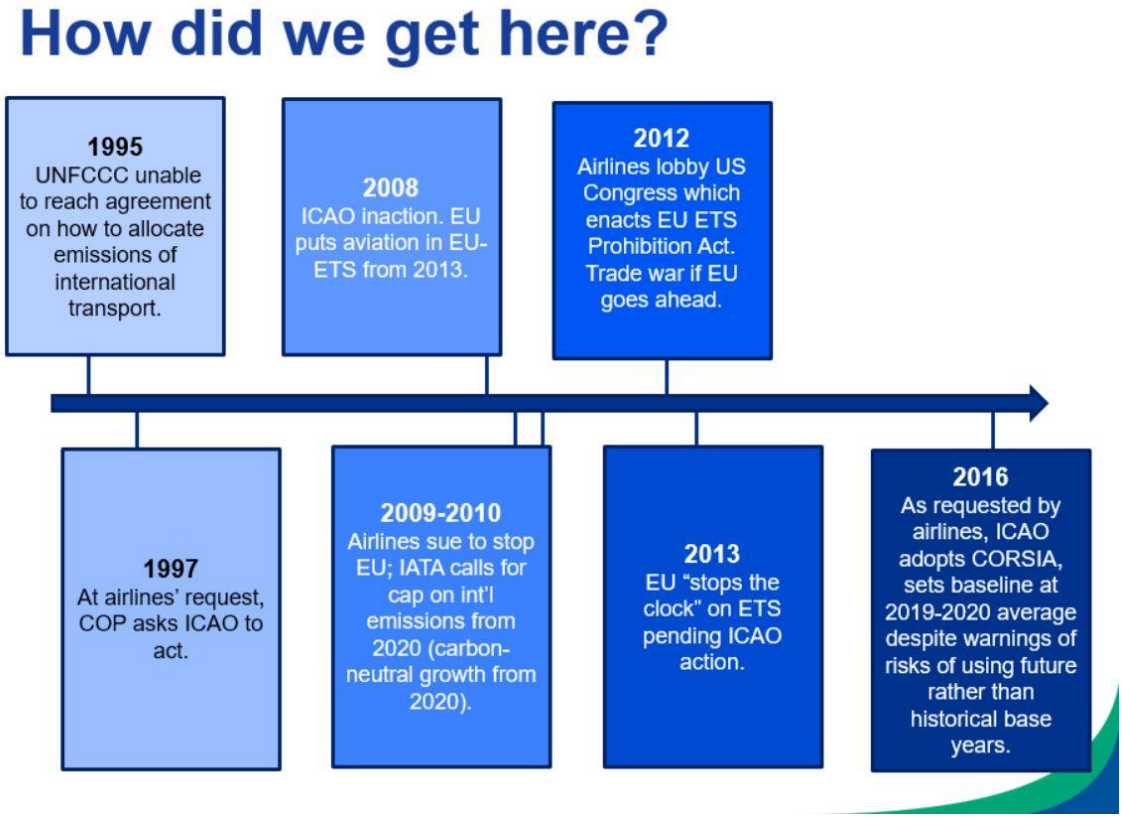
EDF's analysis finds that in most scenarios, this change would ***eliminate all offset requirements for three to five years.*** The ad hoc re-write risks stranding investments in

emission reductions and undermining investor confidence in aviation's commitment to a low carbon future, including sustainable alternative fuels.

EDF also finds that a little-known flexibility provision already built into CORSIA[1] could reduce offset burdens in the early years to levels airlines anticipated pre-COVID and avoid the bad precedent of hasty rule re-writes, a precedent that would undermine future Assembly decisions. We find that if this flexibility provision is used, offset programs already approved by ICAO's Council will be able to supply plenty of high quality credits available to help airlines meet their carbon limits in CORSIA's initial years. The Council is considering a new round of offset program applications that could expand the approved supply in 2021.

Under CORSIA, February 2025 is the deadline for airlines to cancel emission units for CORSIA's first three years. ICAO's Assembly, which adopted CORSIA and which is charged with undertaking regularly scheduled reviews of CORSIA's operations, can consider at its next scheduled session in 2022 whether changes to CORSIA's fundamental structure are needed, considering the shape and pace of recovery from the global pandemic.

A hasty decision to re-write CORSIA's fundamental rules would push the offset obligation to 2028 or later - a gap of thirty years[2] from when governments first called on ICAO to act on climate – and confirm to the broader public that ICAO is not the place to deal with the climate damage of air travel.



[1] See ICAO Assembly Resolutions A39-3 and A40-18 at Paragraph 11(e).
[2] See Article 2.2 (1997).

How CORSIA Calculates Airlines' Offset Obligations

Under CORSIA, for the first nine years of the program, the quantity of emissions airlines are required to offset is based entirely on the sector's overall average growth above baseline, i.e., above the sector's average emissions levels in the years 2019-2020.[3]

[3] In the remaining six years of CORSIA, the program switches gradually toward calculations based on individual airline growth above the 2019-2020 baseline. See the CORSIA Resolutions A39-3 and A40-18, which provide:

11. *Decides* that the amount of CO_2 emissions required to be offset by an aircraft operator in a given year from 2021 is calculated every year as follows:

a) an aircraft operator's offset requirement = [% Sectoral × (an aircraft operator's emissions covered by CORSIA in a given year × the sector's growth factor in the given year)] + [% Individual × (an aircraft operator's emissions covered by CORSIA in a given year × that aircraft operator's growth factor in the given year);

b) where the sector's growth factor = (total emissions covered by CORSIA in the given year – average of total emissions covered by CORSIA between 2019 and 2020) / total emissions covered by CORSIA in the given year;

c) where the aircraft operator's growth factor = (the aircraft operator's total emissions covered by CORSIA in the given year – average of the aircraft operator's emissions covered by CORSIA between 2019 and 2020) / the aircraft operator's total emissions covered by CORSIA in the given year;

d) where the % Sectoral = (100% – % Individual) and;

e) where the % Sectoral and % Individual will be applied as follows:

i) from 2021 through 2023, 100% sectoral and 0% individual, though each participating State may choose during this pilot phase whether to apply this to:

a) an aircraft operator's emissions covered by CORSIA in a given year, as stated above, or

b) an aircraft operator's emissions covered by CORSIA in 2020;

ii) from 2024 through 2026, 100 % sectoral and 0% individual;

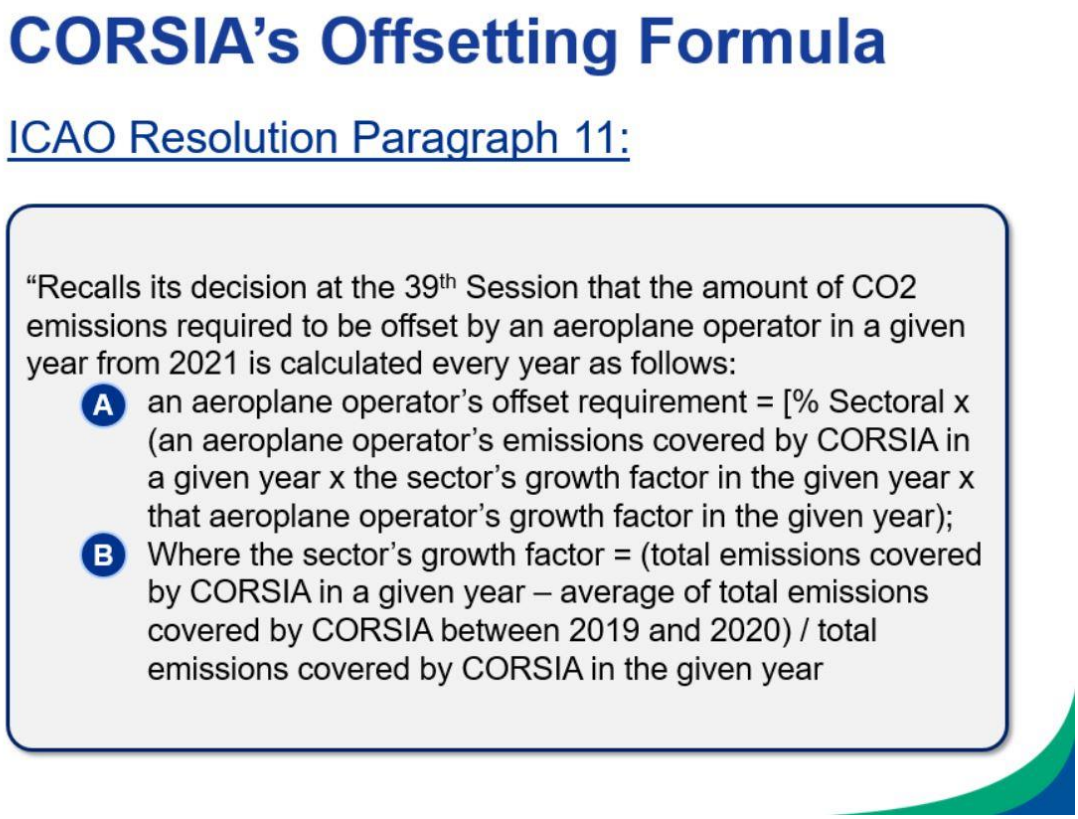
iii) from 2027 through 2029, 100 % sectoral and 0% individual;

iv) from 2030 through 2032, at least 20% individual, with the Council recommending to the Assembly in 2028 whether and to what extent to adjust the individual percentage;

v) from 2033 through 2035, at least 70% individual, with the Council recommending to the Assembly in 2028 whether and to what extent to adjust the individual percentage;

f) the aircraft operator's emissions and the total emissions covered by CORSIA in the given year do not include emissions exempted from the scheme in that year;

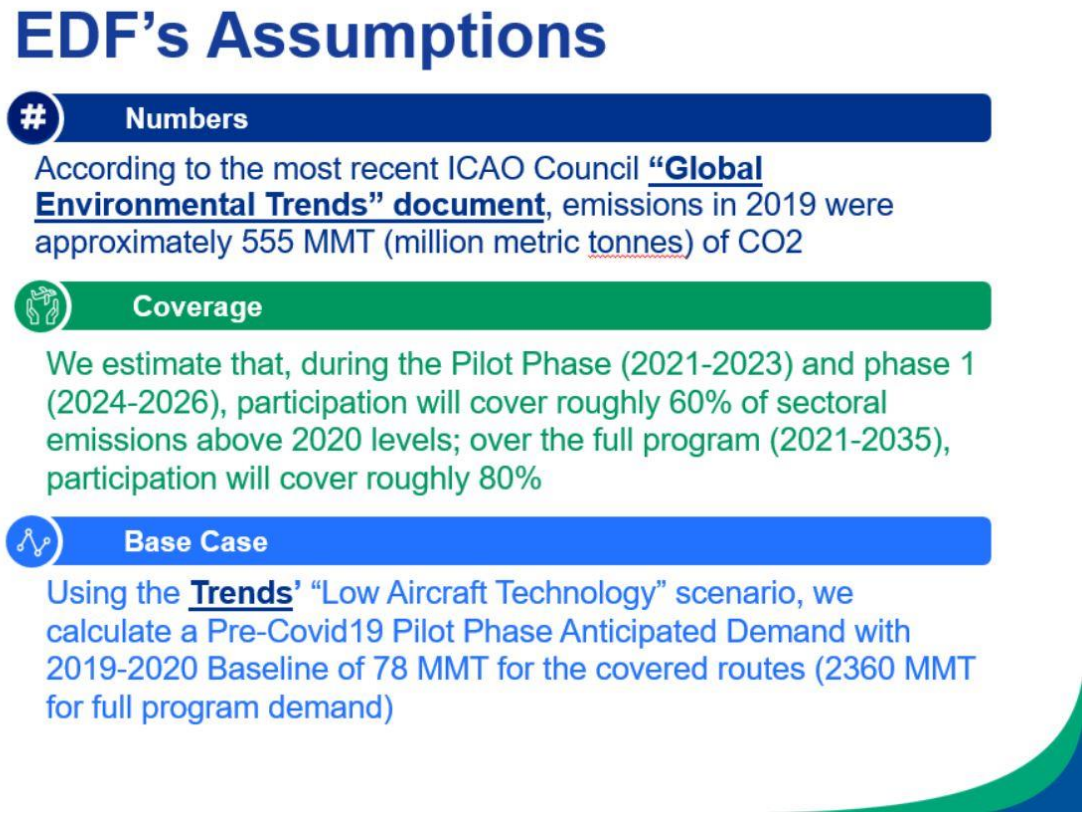
g) the scope of emissions in paragraphs 11 b) and 11 c) above will be recalculated at the start of each year to take into account routes to and from all States that will be added due to their voluntary participation or the start of a new phase or compliance cycle;



As long as the sector is growing above baseline, airlines will have offsetting obligations.

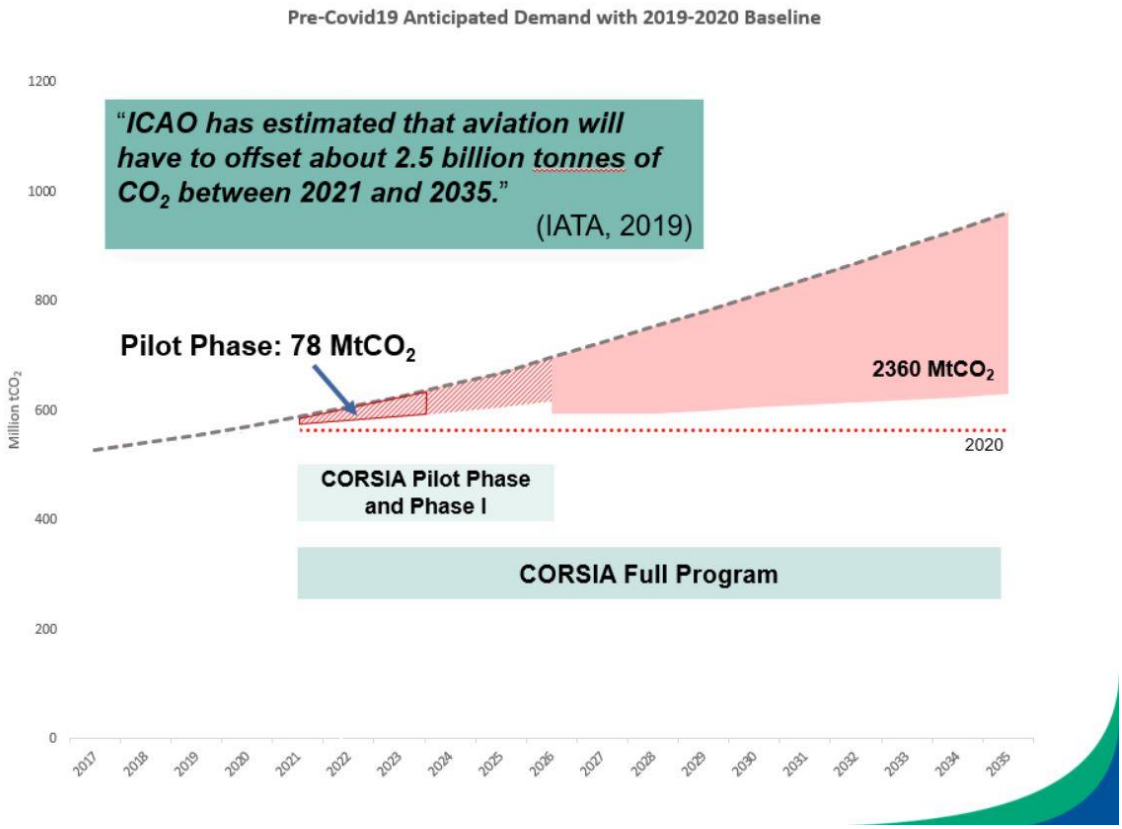
Background for the Analysis

We conducted our analysis using the latest ICAO Global Environmental Trends presented to the ICAO General Assembly in 2019. Based on CORSIA rules for participation, exemptions, and notifications as of 1 May 2020 from ICAO Member States of their intent to participate voluntarily in CORSIA's first six years (the "pilot phase" and "phase one"), we estimate that during the pilot phase (2021-2023) and phase 1 (2024-2026), participation will cover roughly 60% of sectoral emissions above baseline levels; over the full program (2021-2035), participation will cover roughly 80% of these emissions.



Based on these participation rates, in the pre-COVID scenario, we calculate the emissions "gap" to be 78 million metric tonnes of carbon dioxide needed to offset over the first three years of the program. Over the full 15 years of the program, the amount of offsetting required would be about 2.5 billion tonnes.[4] This base case scenario is consistent with low aircraft technology availability rather than using the most optimistic scenario in terms of penetration of new aircraft technology and operational improvements. And it is consistent with IATA's and ICAO's 2019 calculations as well.

[4] ICAO Global Environmental Trends Working Paper, https://www.icao.int/Meetings/a40/Documents/WP/wp_054_en.pdf



Over the full course of the program, from 2021-2035, participation becomes mandatory starting in 2027, which translates to roughly 80% coverage. It is important to note that the percent coverage may fluctuate in the first six years of the voluntary phase as an impact of COVID-19; however, this analysis is modeled using the current available information, which indicates a 60% participation rate for the first three years.

The pre-COVID base case scenario referred to in the analysis here on after is 78 million tonnes of carbon dioxide required for offsetting obligations.

Overview of the Analysis: Three Parameters, Five Scenarios

To develop scenarios for post-COVID recovery, EDF considered three parameters:

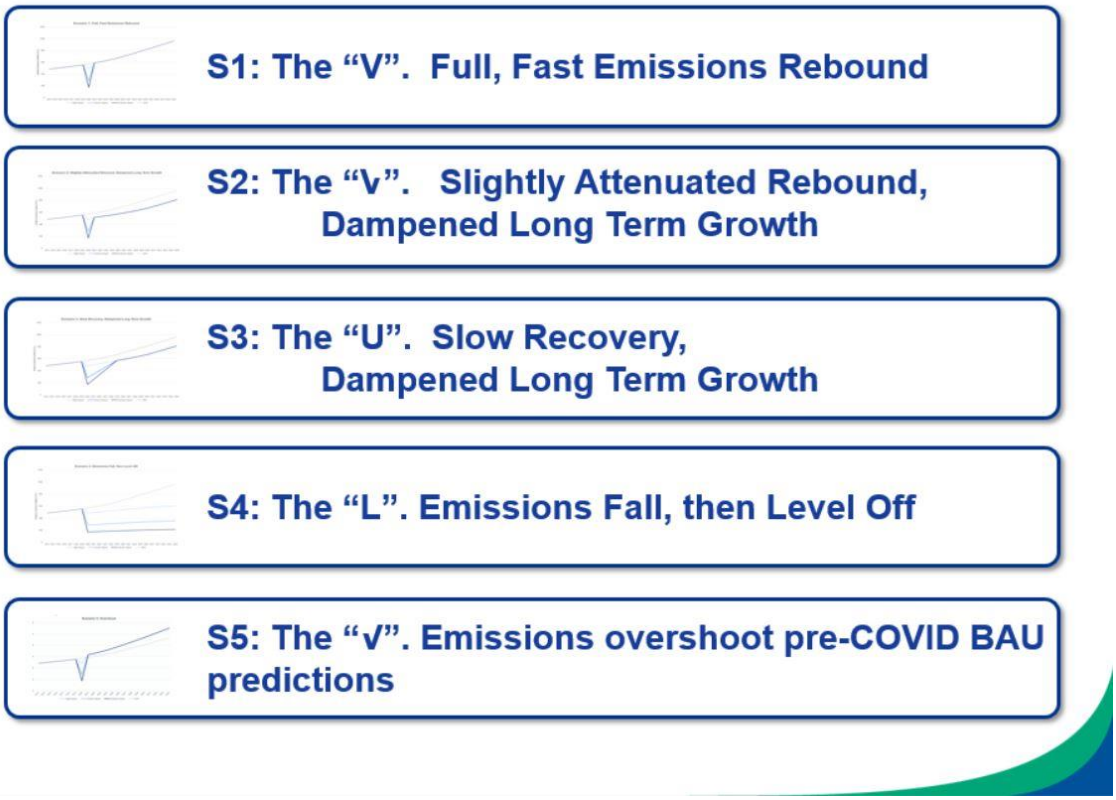
1. The severity of COVID's impact on international aviation's emissions in 2020: how low do emissions go?
2. How fast does the international aviation market rebound?
3. What does international aviation's long-term growth trajectory look like?

Under the first parameter, severity of impact in 2020, we looked at three potential severity levels: high, severe and extreme impact on aviation emissions in 2020. Taking into account the differential declines in passenger and cargo emissions, as well as regional differences, we considered the following impacts on international aviation emissions world-wide:

- The “high impact” case assumes a 20% decline in emissions in 2020.
- The “severe impact” case assumes emissions decline 50% in 2020.
- The “extreme impact” case assumes emissions decline 70% in 2020.

The second parameter of market rebound addresses how rapidly aviation markets recover to actual or forecasted pre-COVID levels. The last parameter, long-term growth, addresses whether aviation emissions grow year-on-year along the trajectory forecasted by ICAO or whether air travel fundamentally changes such that the trajectory is different.

Based on these three parameters, we crafted five main scenarios:[5]

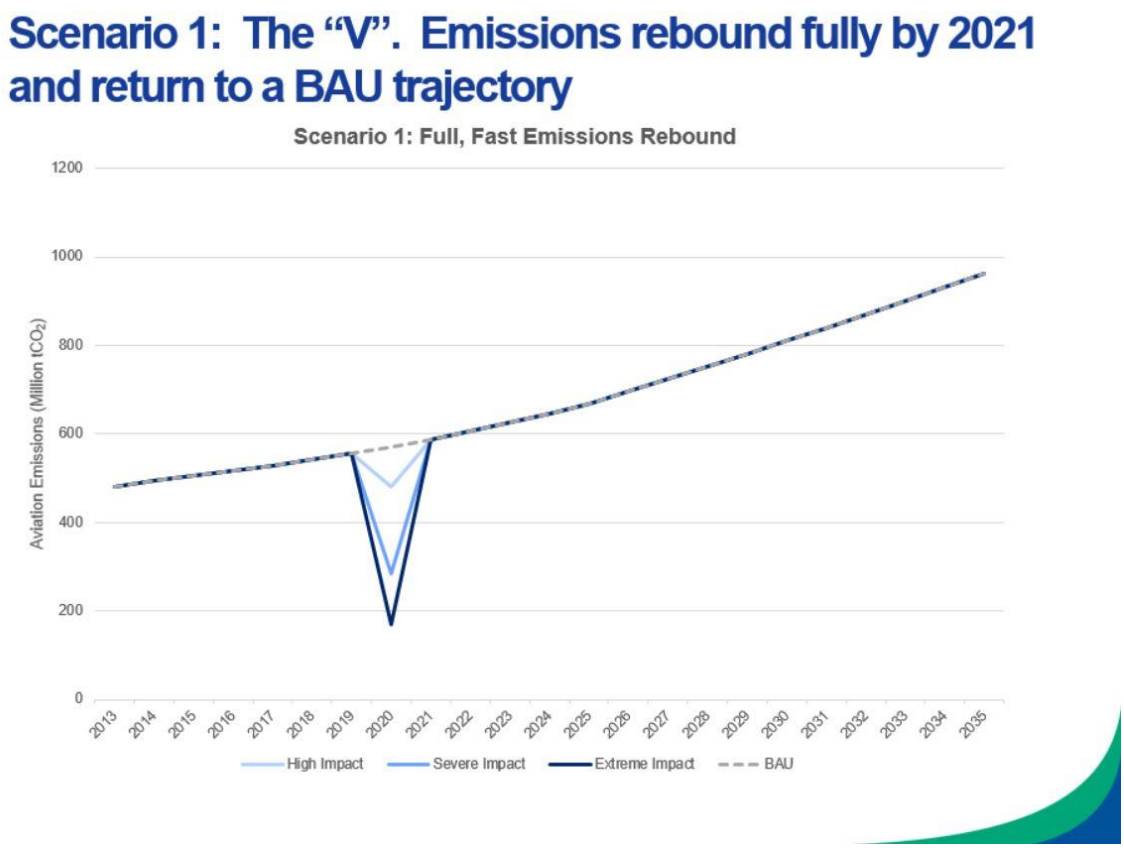


We now introduce each of these scenarios in turn and review the implications of each for offsetting obligations under CORSIA during the pilot phase and during the full fifteen years of CORSIA.

Next, under each scenario, we analyze the effect of the proposed re-write of the CORSIA baseline on offset obligations. We also consider the effect on offset obligations of invoking the Pilot Phase Flexibility Mechanism, which we introduce immediately following the descriptions of the five scenarios.

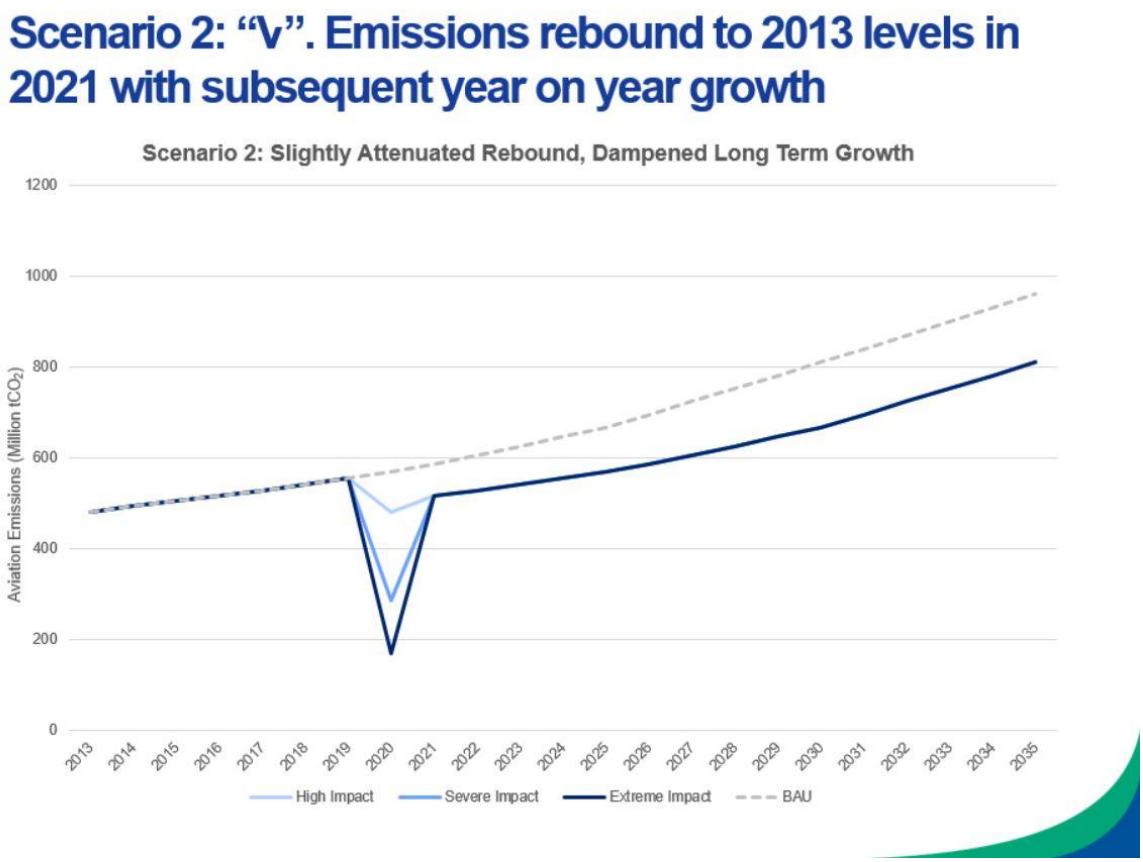
[5] Of course, many more scenarios are possible.

S1: The “V” scenario



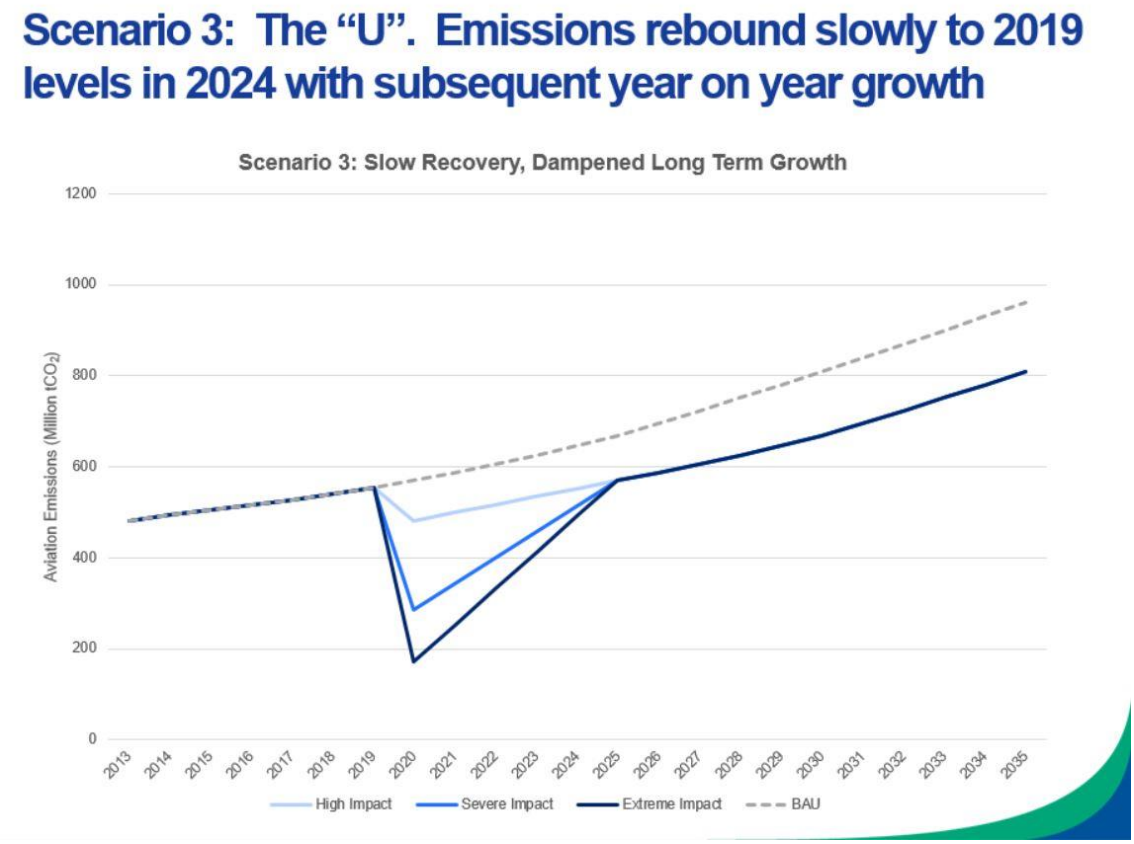
S1: The “V” scenario. This first scenario hypothesizes that while emissions drop in 2020, there is a full fast emissions rebound in 2021, thus the “V” shape. In the high impact case illustrated in light blue, in 2020 emissions drop to 2013 levels. In the severe impact case, illustrated in medium blue, 2020 emissions drop 50% from 2020-projected levels. In the extreme impact case, shown in dark blue, 2020 emissions drop 70% from projected levels. In each case, under this scenario, by 2021 emissions rebound to the level forecasted pre-COVID, and thereafter follow the ICAO Trends Report trajectory for long-term growth.

S2: ✓-shape scenario



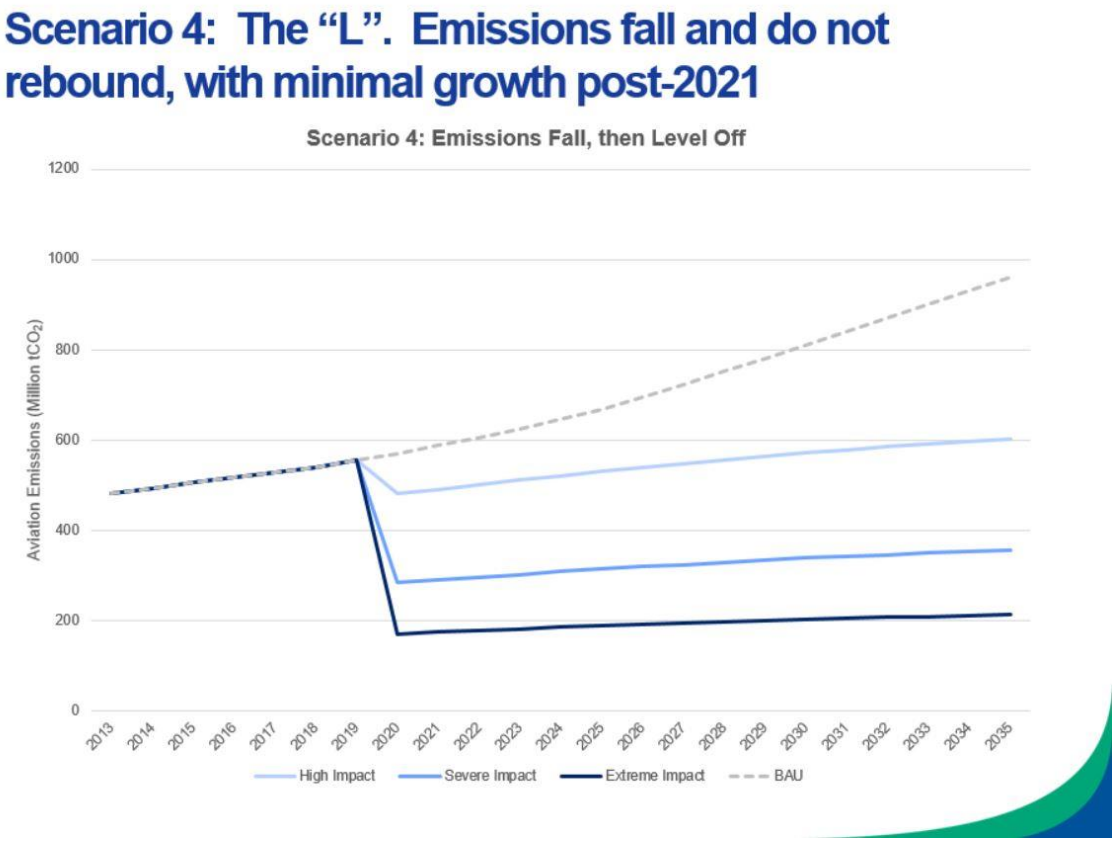
S2: The Modified "V" Scenario. Scenario 2 considers an attenuated rebound with dampened long-term growth. In this scenario, emissions drop as per the high-impact, severe-impact, and extreme-impact cases, then rebound in 2021 to 2013 levels; subsequent year-on-year growth follows the trend-line of the ICAO Environmental Trends document.

S3: U-shape scenario



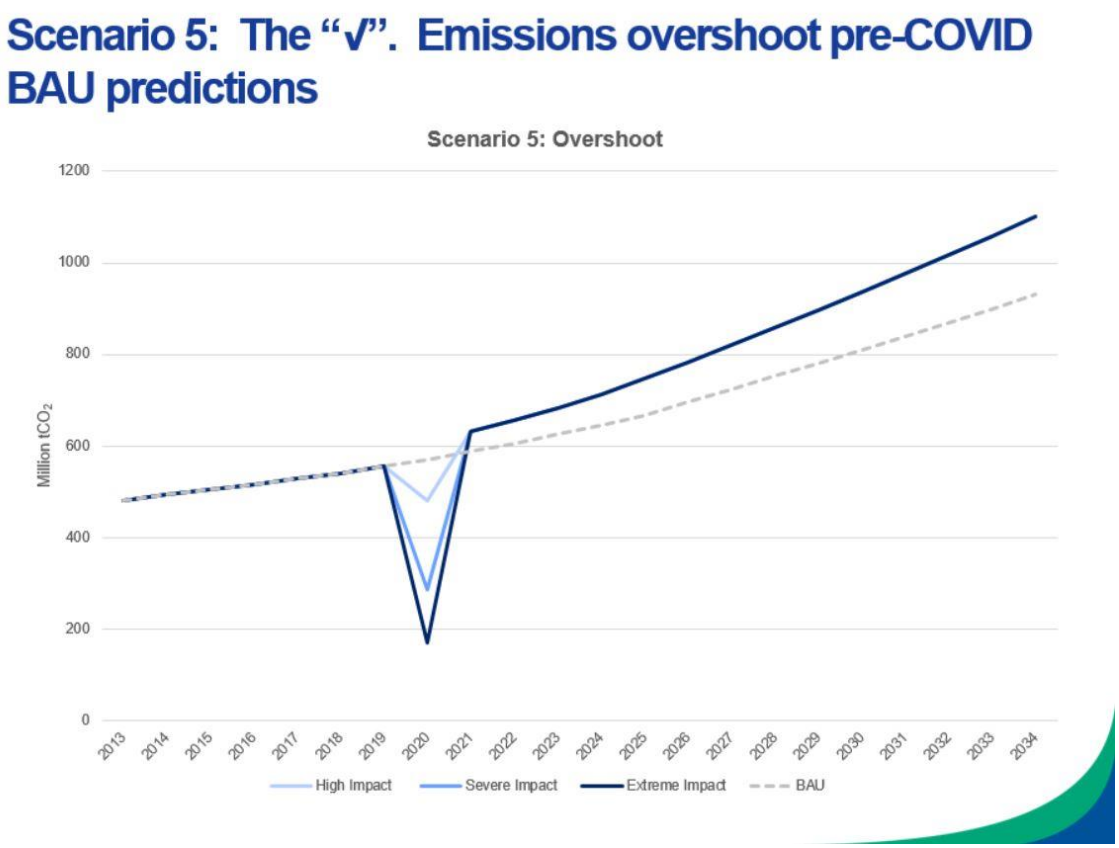
S3: The "U" Scenario. In the third scenario, emissions fall in 2020 as per the high, severe, and extreme cases, and begin to recover in 2021, but at a slower rate than in the "V" scenario. Emissions reach pre-COVID forecasted 2020 levels in 2025, and subsequently grow year-on-year following the ICAO Environmental Trends trajectory.

S4: L-shape scenario



S4: The "L" Scenario. In the fourth scenario, emissions fall in 2020 as per the high, severe, and extreme cases, and grow on a different trajectory than the ICAO 2019 Trends. In this scenario, long-term growth of emissions slows 2% per year from 2021 to 2025, 1.5% per year for 2026 to 2030, and 1% per year from 2031 to 2035.

S5: ✔-shape scenario

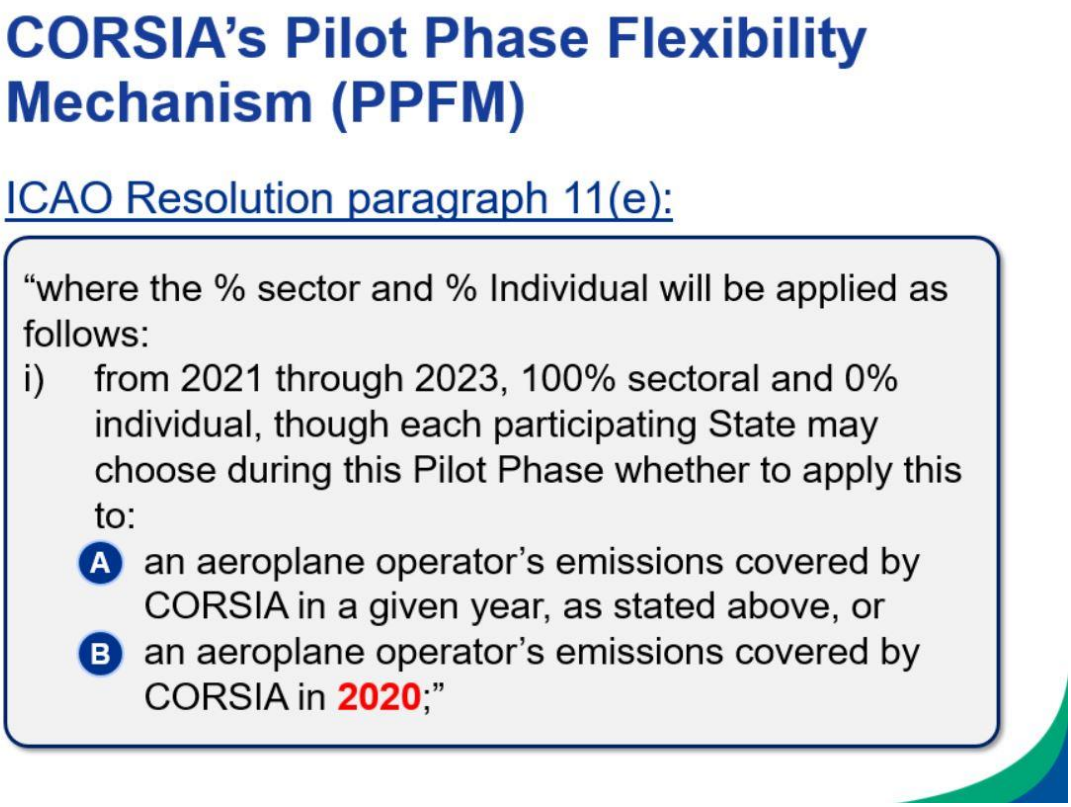


S5: The Overshoot Scenario. In this fifth scenario, 2020 emissions fall as per the high, severe, and extreme cases, and then recover to higher-than-forecasted emissions levels, as could occur if air traffic recovers but passengers must social distance, requiring more flights to serve the same number of passengers. In this scenario, starting in 2021, emissions increase year-on-year at rates modeled in the ICAO Trends document, but from a higher absolute level than forecasted in the Trends document.

CORSIA's Pilot Phase Flexibility Mechanism

When the ICAO Assembly established CORSIA in 2016, it adopted a special provision to give airlines greater flexibility in the first three years of CORSIA. Under this provision, which is found in Paragraph 11(e) of CORSIA's founding Resolution, [6] during the CORSIA pilot phase, when the basic CORSIA offset formula requires each airline to offset an amount equal to its emissions in each given year (2021, 2022, and 2023) multiplied by the sector's year-on-year growth rate, each participating Member State of ICAO can calculate the offset obligation using the airline's emissions *in 2020* multiplied by the sector's year-on-year growth rate.

[6] See ICAO Assembly Resolutions A39-3 and A40-18 at Paragraph 11(e).



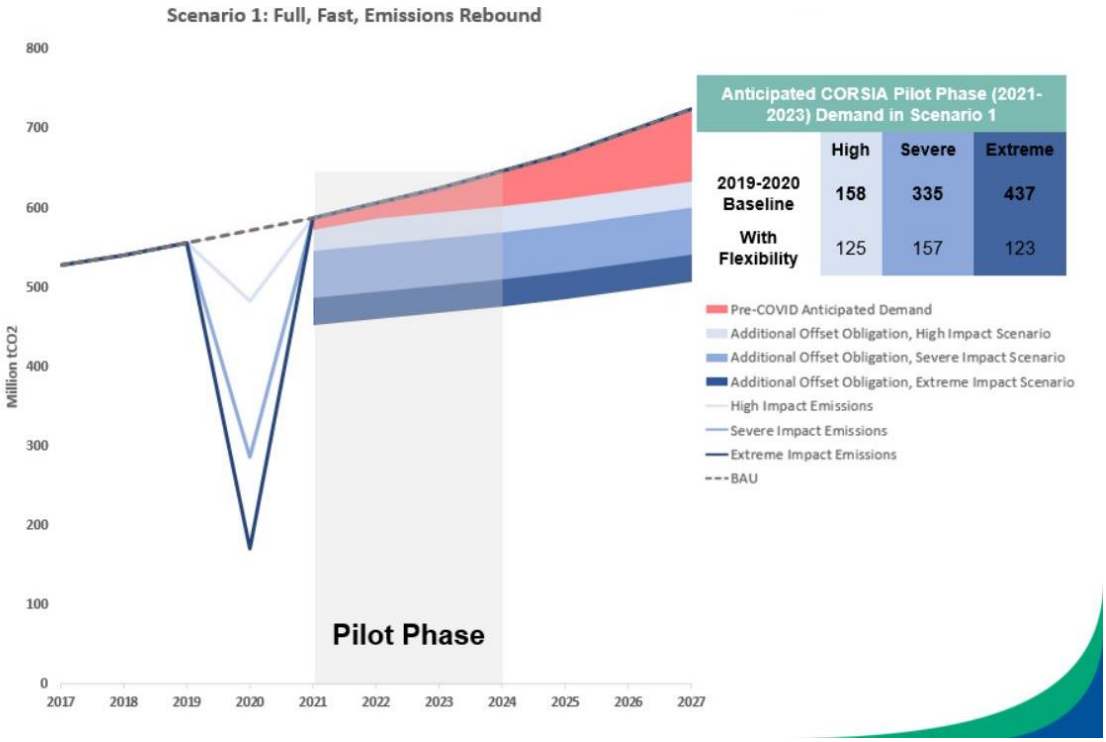
Because emissions for many operators are going to be very low in 2020, multiplying very low 2020 emissions by the sectoral growth rate would result in a very low or a markedly lower offsetting obligation than would otherwise be the case if emissions grow in 2021, 2022 or 2023 – giving airlines flexibility in meeting CORSIA's offsetting requirements precisely when airlines most need that flexibility as they are recovering from the impacts of COVID.

The Analysis

Under each of the five scenarios, how much would airlines need to offset post-COVID with CORSIA's existing 2019-2020 baseline; with CORSIA's Pilot Phase Flexibility Mechanism; and with IATA's proposed re-write of CORSIA (2019-only baseline)?

We now examine, for each of the five scenarios, what airlines' demand for carbon offsets would be during the pilot phase with CORSIA's existing 2019-2020 baseline; with CORSIA's Pilot Phase Flexibility Mechanism; and with IATA's proposed re-write of CORSIA (2019-only baseline). For each scenario, we first present a graph showing what offset demand looks like relative to the base case scenario of 78 million metric tonnes of offset demand during the pilot phase (the base case is indicated by the pink area below the projected pre-COVID BAU line). The shaded blue areas superimposed on the graph show the increase in demand under each COVID impact case (high, severe, extreme). The colors in the table correspond to that of the emissions pathway. Thus, the light blue line shows high impact, the medium blue line shows severe impact, and the dark blue line is extreme impact. The numbers in the table next to the graph correspond to the emissions required for offsetting in the pilot phase.

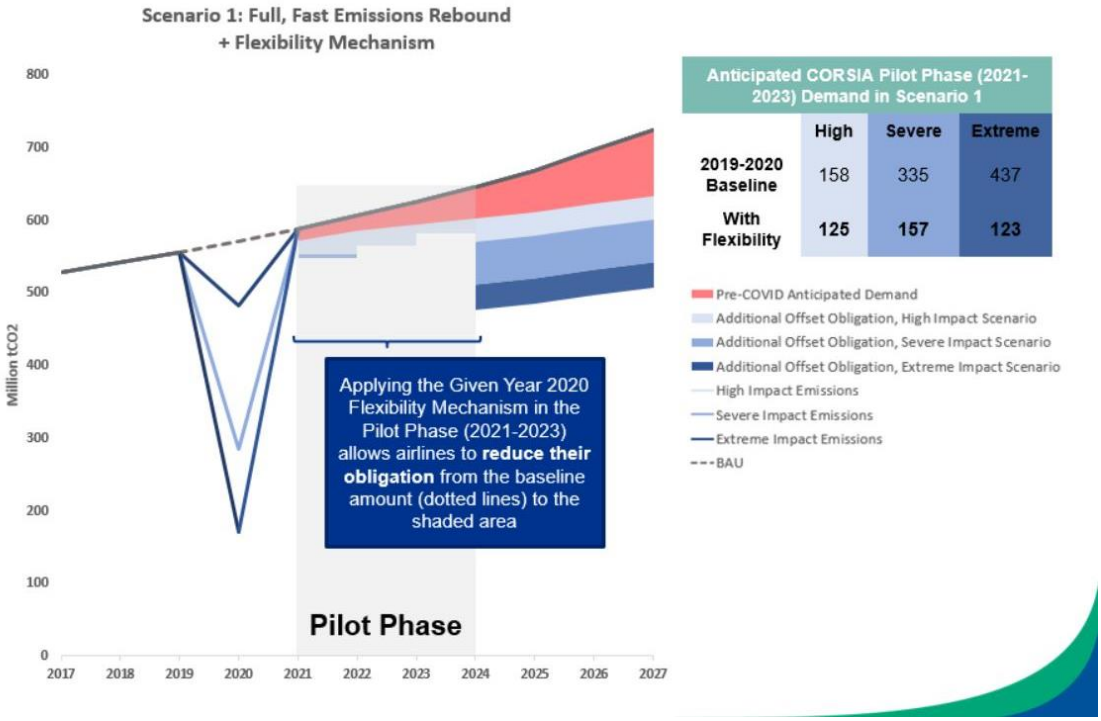
S1: V-shape scenario: 2019-2020 Baseline



Graph 1.1: Scenario 1 - full, fast emissions rebound.

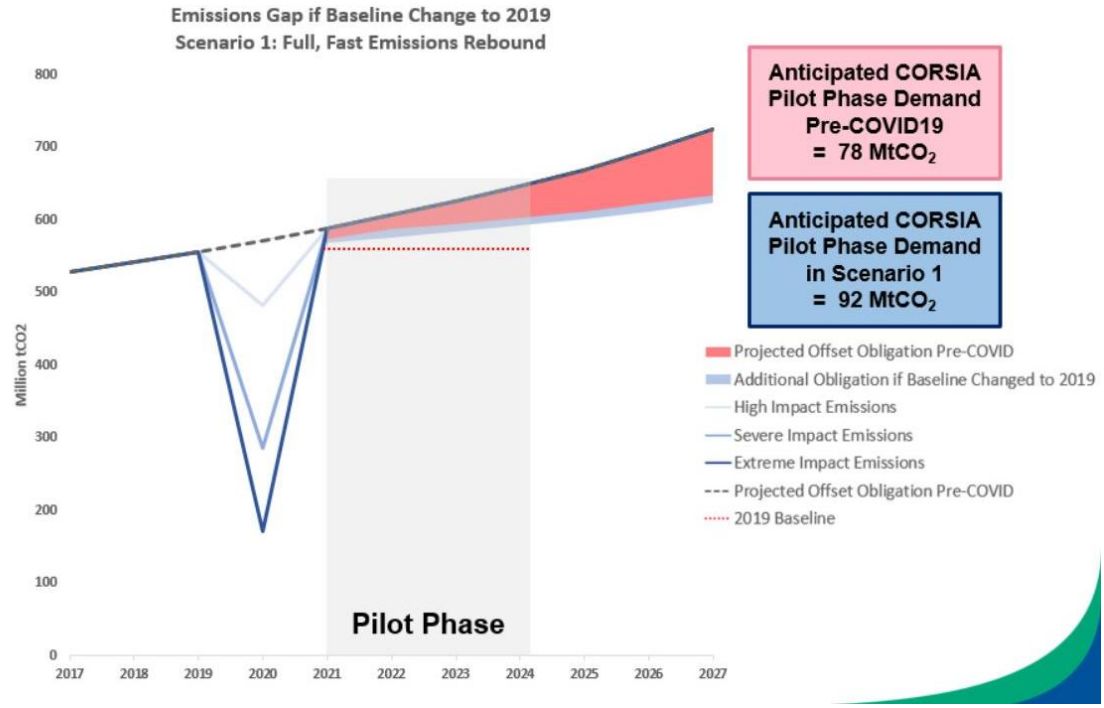
In the S1 “V” scenario, where emissions rebound to pre-COVID forecasted levels by 2021, offset credit demand increases across all impact levels, and as expected, the demand increases as the severity of impact increases.

The next graph shows how, in the S1 or “V” scenario, the Pilot Phase Flexibility Mechanism sharply reduces the offset demand.



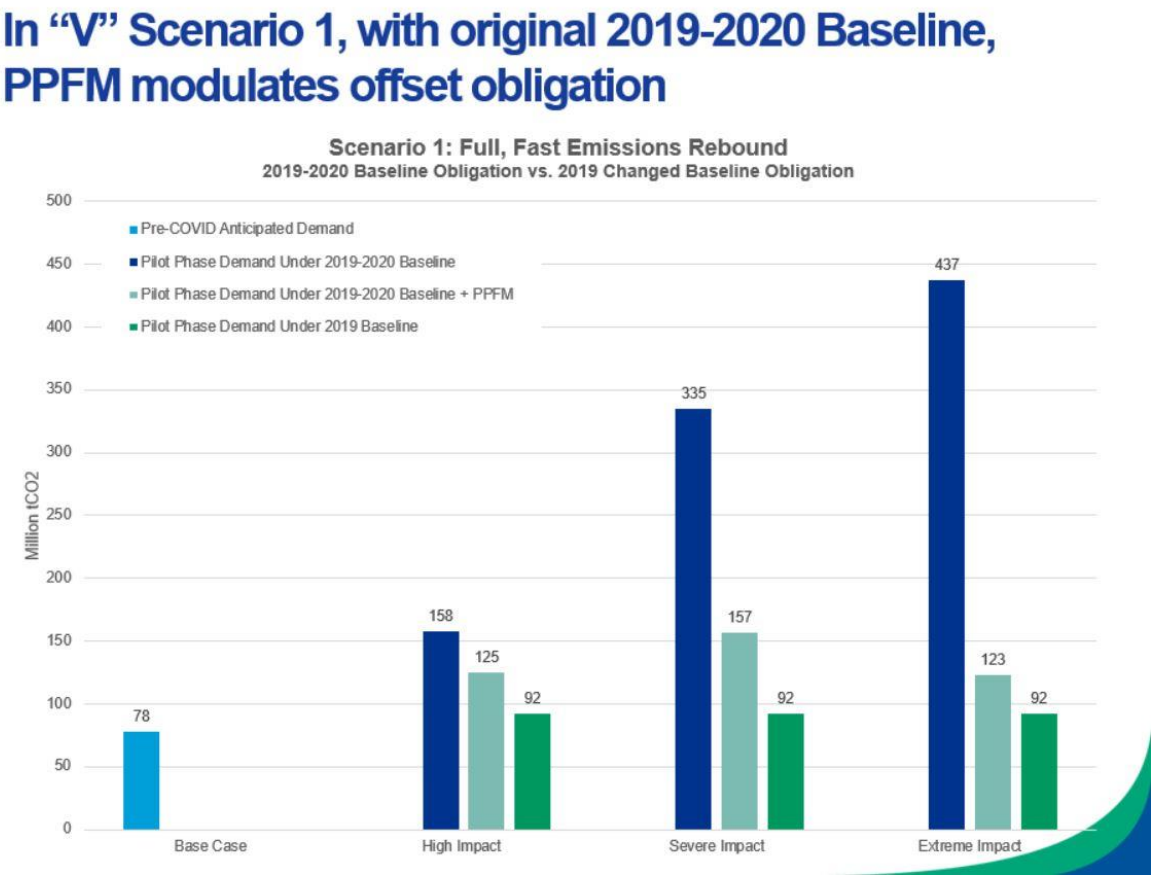
Graph 1.2: Scenario 1 - full, fast emissions rebound with flexibility mechanism

Note that the use of the Pilot Phase Flexibility Mechanism significantly modulates the offset obligation.



Graph 1.3: Scenario 1 - full, fast emissions rebound and emission gap if baseline changed to 2019.

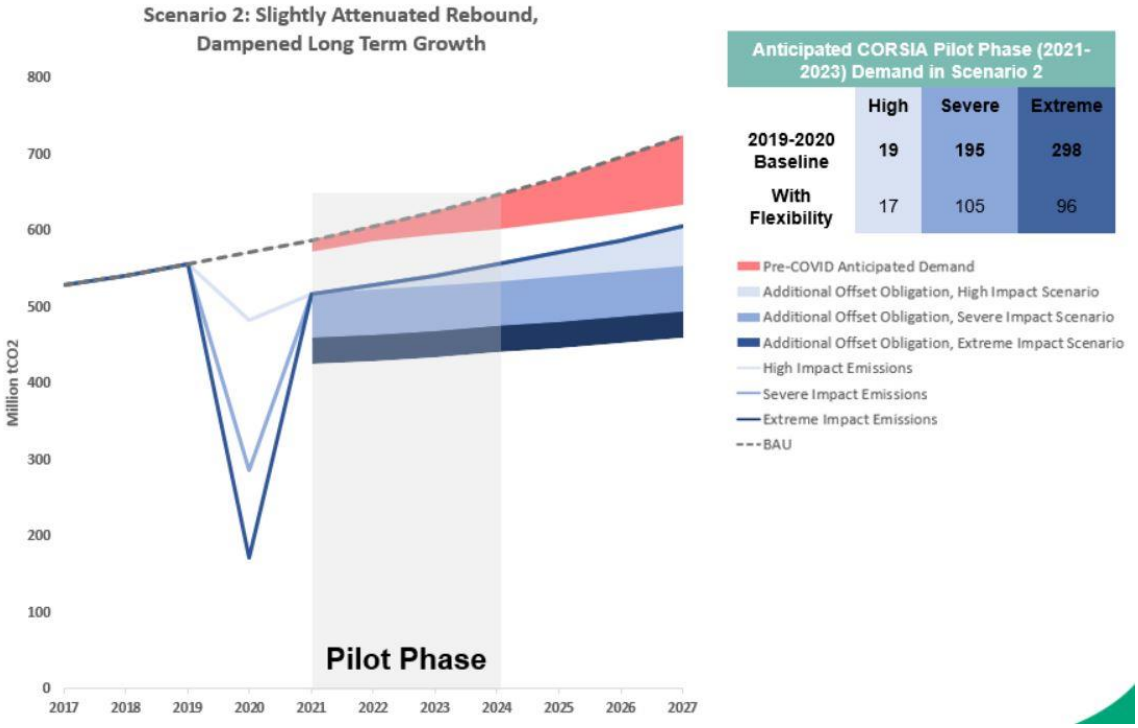
In the “V” fast-rebound scenario, changing the baseline to 2019-only would increase offset demand by 15% from pre-COVID levels, as indicated by the thin blue shaded area.



Graph 1.4: Scenario 1 - 2019-2020 baseline, PPFM, 2019-only baseline.

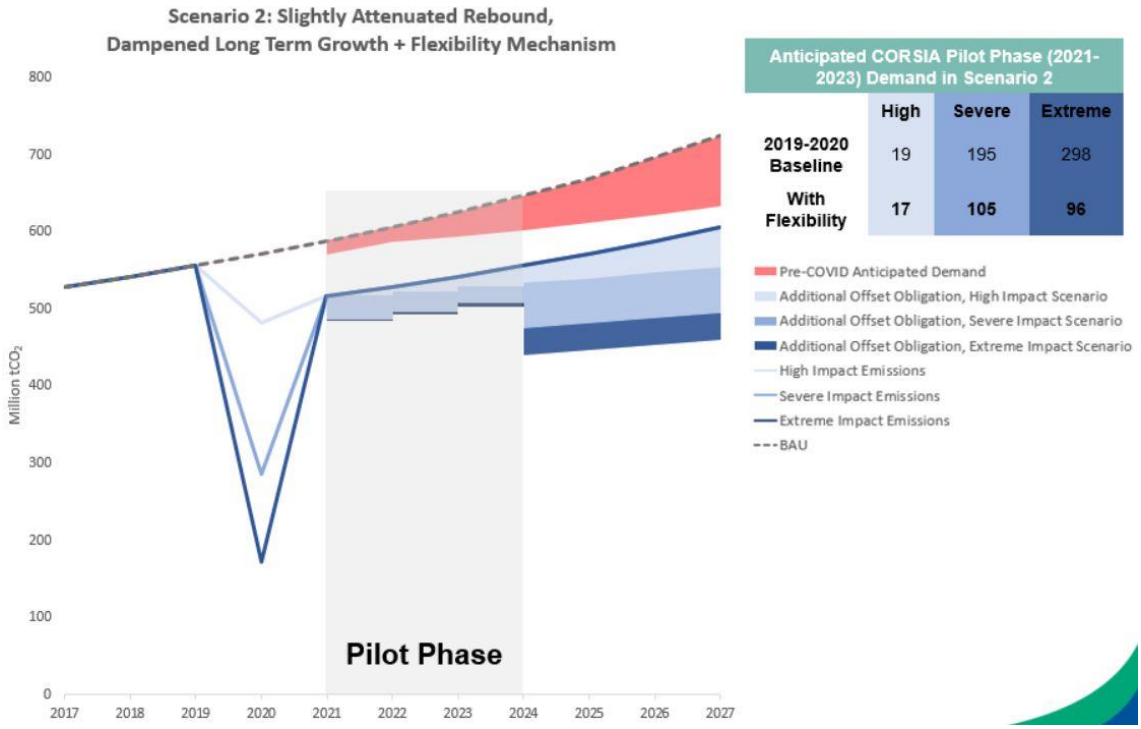
In this bar chart for Scenario 1 (the “V”), the dark blue indicates the demand for offsets in the Pilot Phase if the 2019-2020 baseline is maintained; the light green shows the modulated demand if the Pilot Phase Flexibility Mechanism is applied. The medium green is the offset demand if the baseline is changed to 2019-only; demand remains the same across all impact levels, as COVID has no impact on 2019 emissions.

S2: ↘-shape scenario: 2019-2020 Baseline



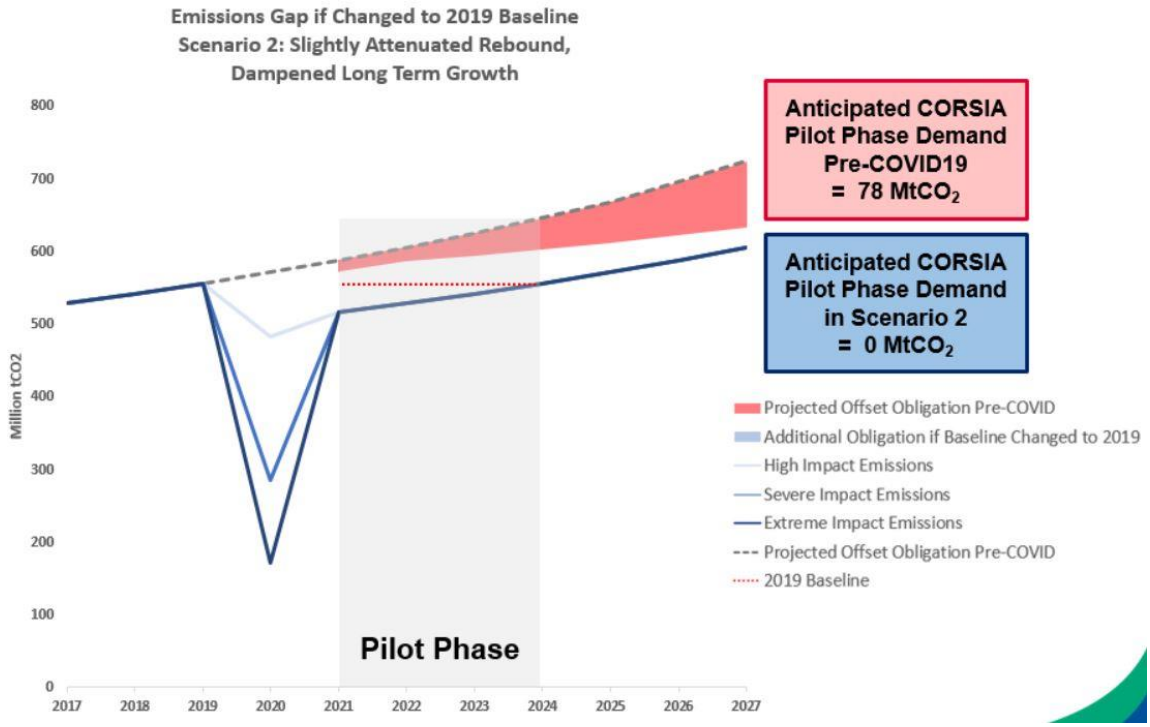
Graph 2.1: Scenario 2 - Slightly attenuated rebound and dampened long-term growth.

As noted above, Scenario 2 considers high, severe, and extreme drops in 2020 emissions, followed by attenuated rebound to 2013 levels with dampened long-term growth year-on-year thereafter. The first graph examines what demand looks like relative to the base case of 78 million metric tonnes in the pink shaded area. In this scenario, demand increases in the severe and extreme impact cases. Because the emissions level is lower post-COVID, the demand actually decreases in the high impact case and the emission gap shrinks, indicated by the thin light blue area under the emissions pathway.



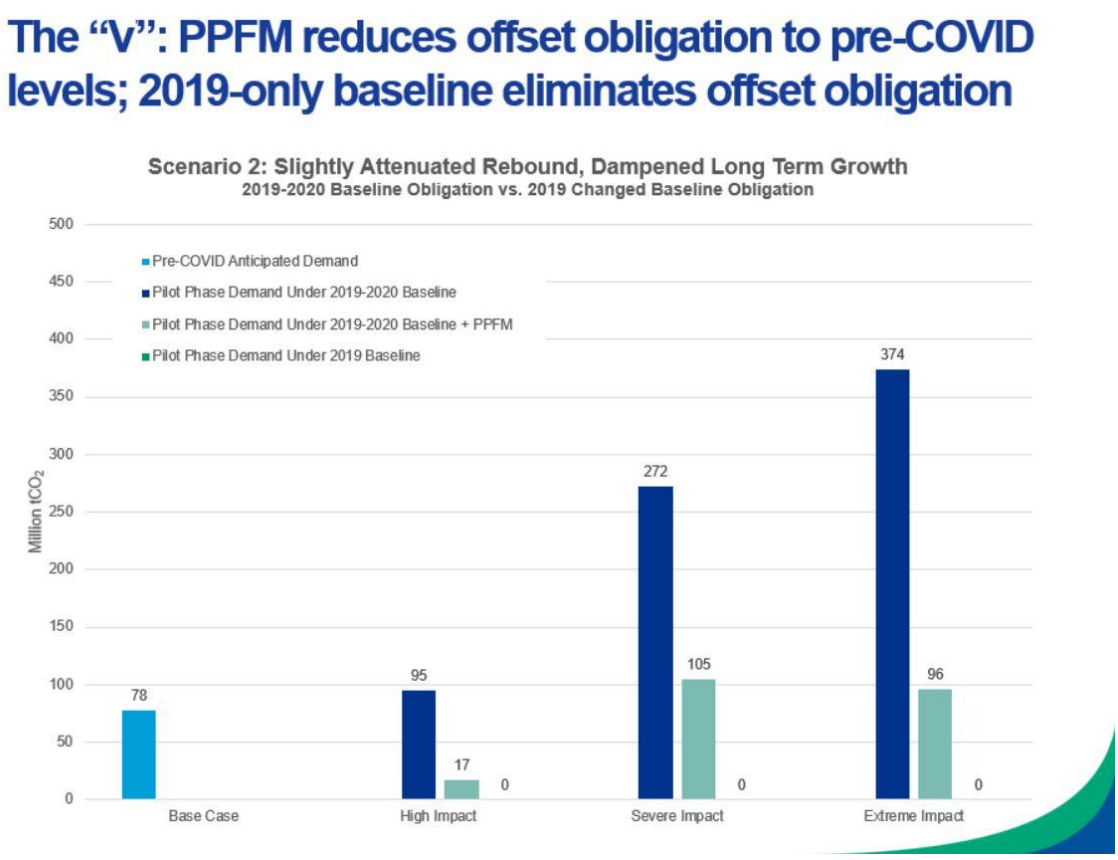
Graph 2.2: Scenario 2 - Slightly attenuated rebound and dampened long-term growth with flexibility mechanism.

Graph 2.2 shows the effect of the Pilot Phase Flexibility Mechanism on offset demand. This graph demonstrates that utilizing the flexibility provision results in a notable dampening of demand. The flexibility mechanism again effectively modulates, especially in the severe and extreme impact scenarios, how much airlines would be expected to offset.



Graph 2.3: Scenario 2 - Slightly attenuated rebound, dampened long-term growth and emission gap if baseline changed to 2019.

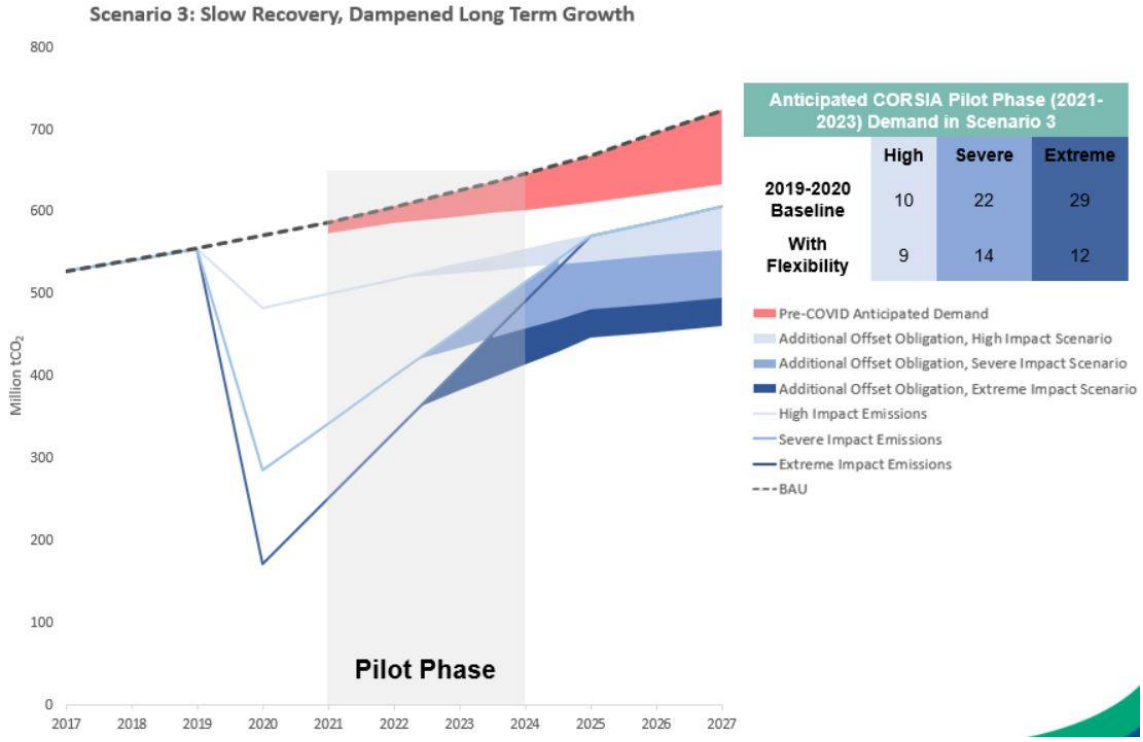
In Scenario 2, changing the baseline to 2019, depicted by the dotted red line shown in graph 2.3, would completely wipe out any pilot phase obligations for airlines until 2024.



Graph 2.4: Scenario 2 - 2019-2020 baseline, PPFM, 2019-only baseline.

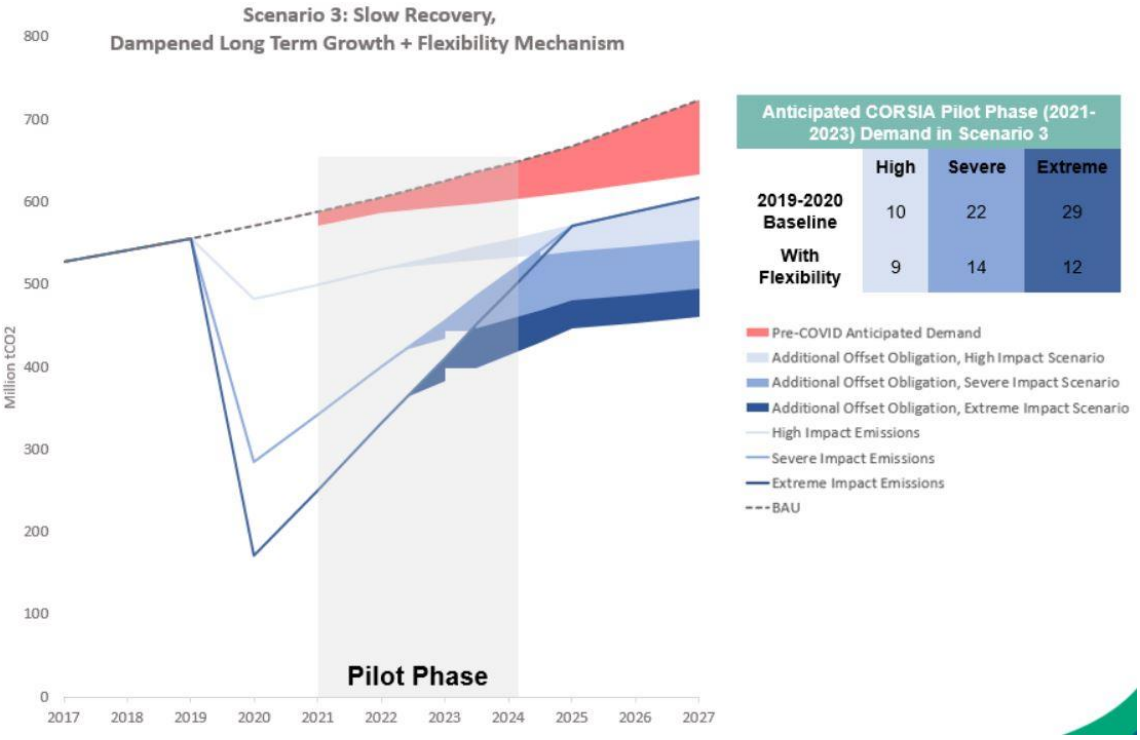
Graph 2.4 displays the comparison in bar graph form, showing how important the Pilot Phase Flexibility Mechanism is in reducing offset demand, and demonstrating how re-writing the baseline to the 2019-only would completely wipe out all offset obligations during the Pilot Phase.

S3: U-shape scenario



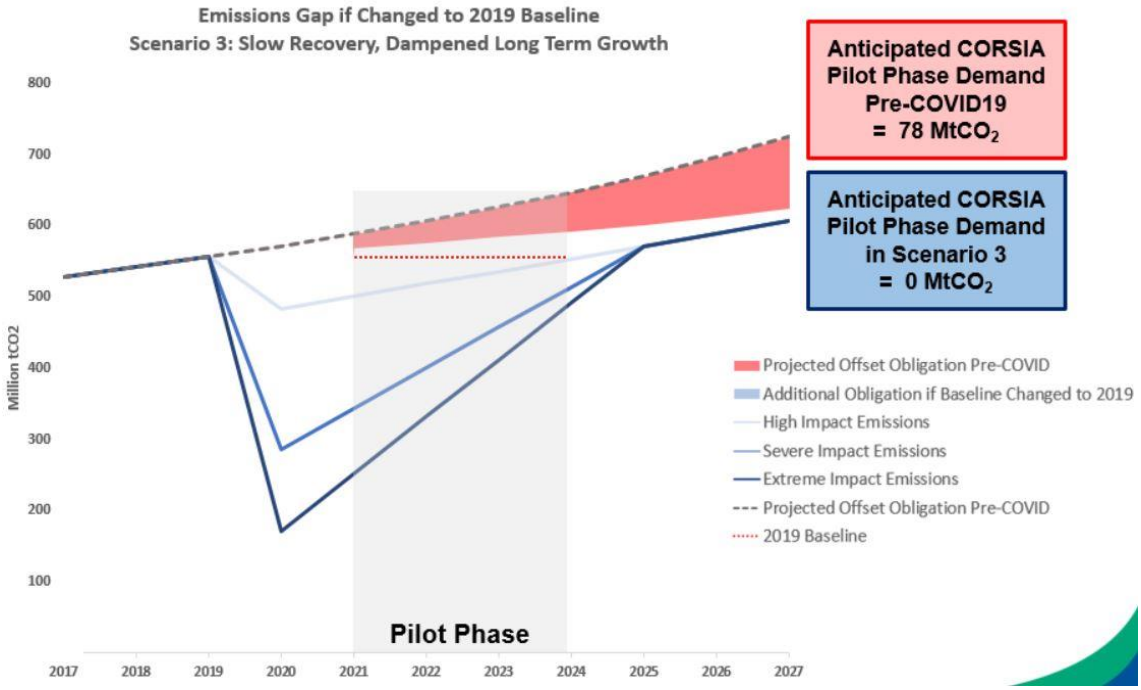
Graph 3.1: Scenario 3 - Slow recovery and dampened long-term growth.

As noted above, in the U-shaped emissions scenario, emissions recovery is slow; with the result that in the Pilot Phase, demand for emissions units is much lower than the base case.



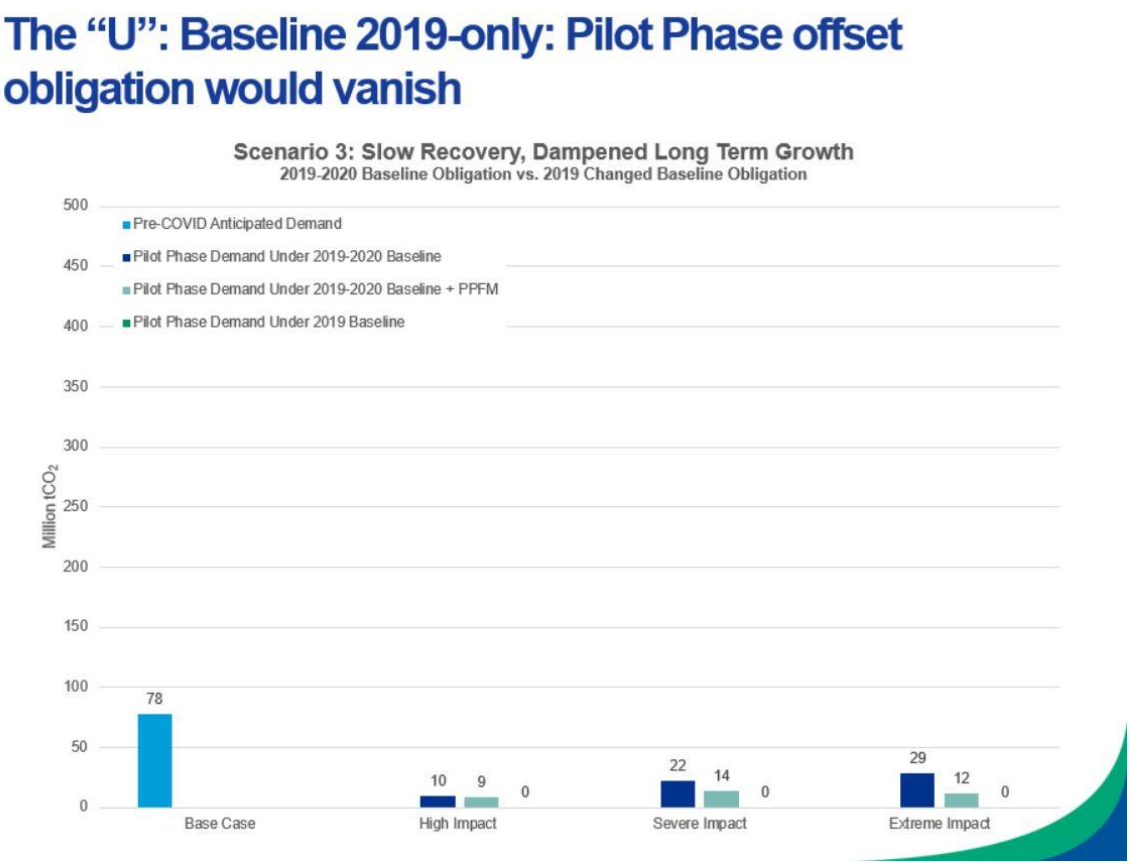
Graph 3.2: Scenario 3 - Slow recovery and dampened long-term growth with flexibility mechanism.

Graph 3.2 highlights the effect of the Pilot Phase Flexibility Mechanism, which would lower the offsetting requirements even further.



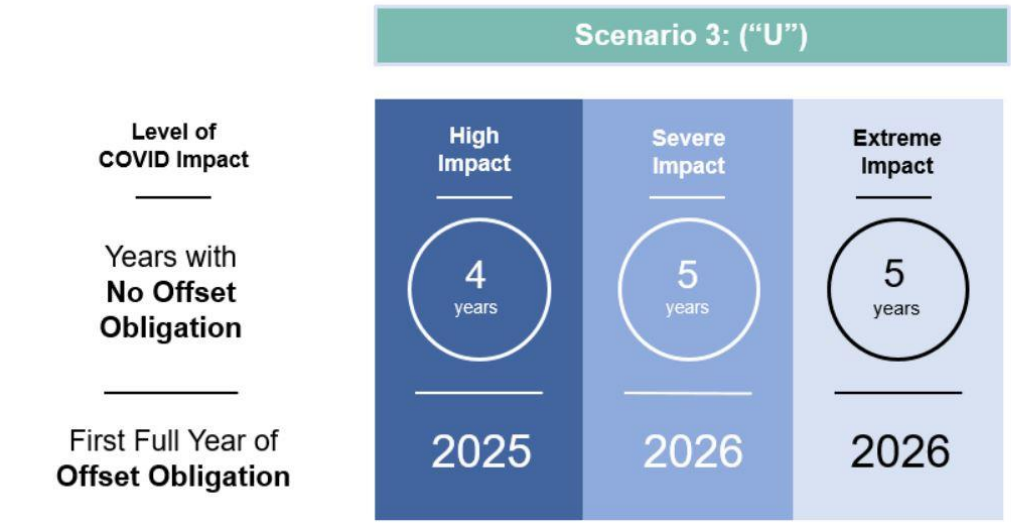
Graph 3.3: Scenario 3 - Slow recovery, dampened long-term growth and emission gap if baseline changed to 2019.

Graph 3.3 illustrates that under the U-shaped scenario, re-writing the baseline to 2019-only would completely wipe out any pilot phase obligation.

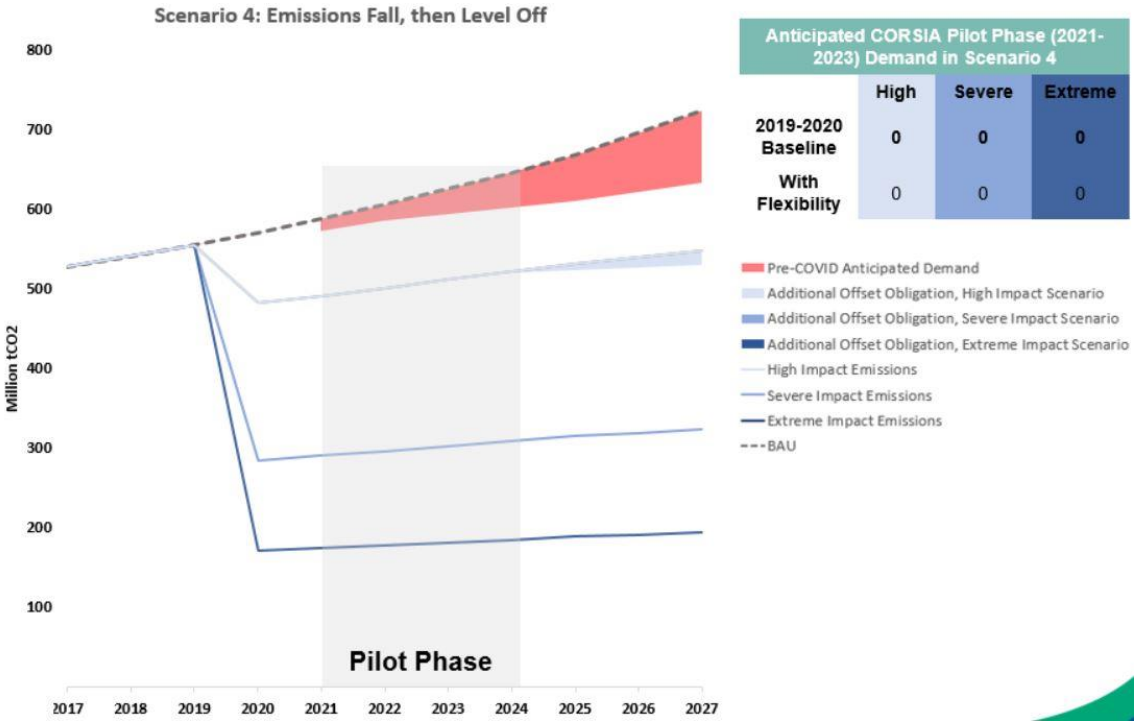


Graph 3.4: Scenario 3 - 2019-2020 baseline, PPFM, 2019-only baseline.

In fact, under the U-shaped scenario, if the baseline were changed to 2019-only, offset obligations would be eliminated well beyond the Pilot Phase – mitigation obligations would be delayed for as much as five years.

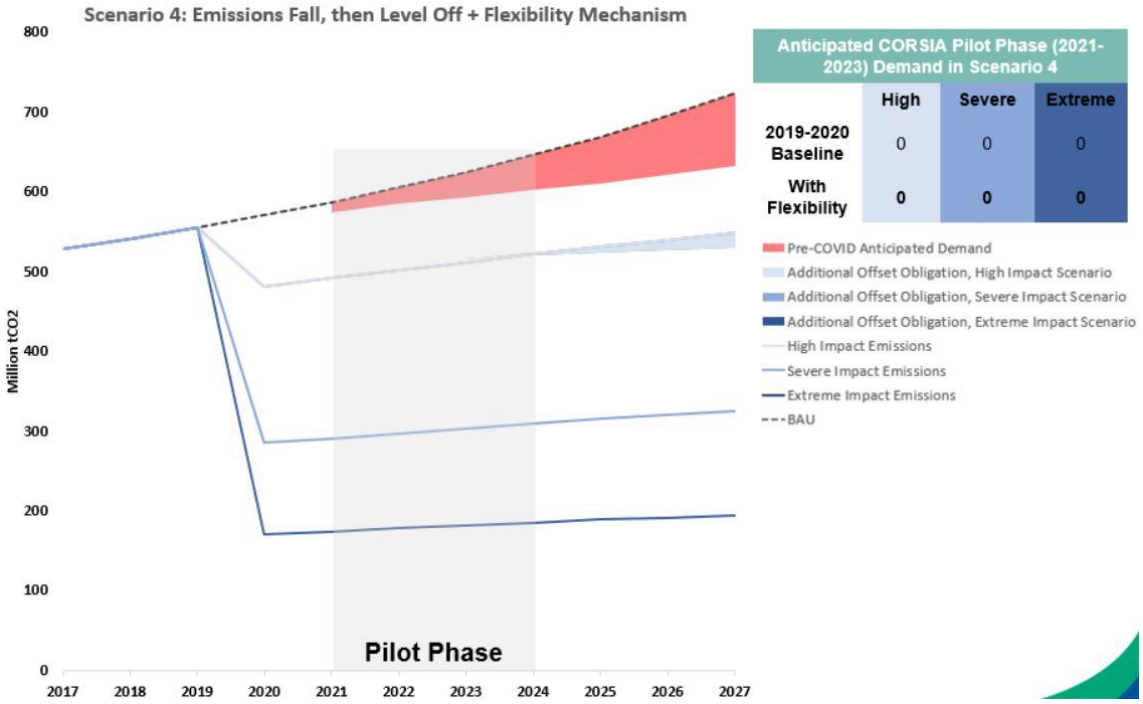


S4: L-shape scenario



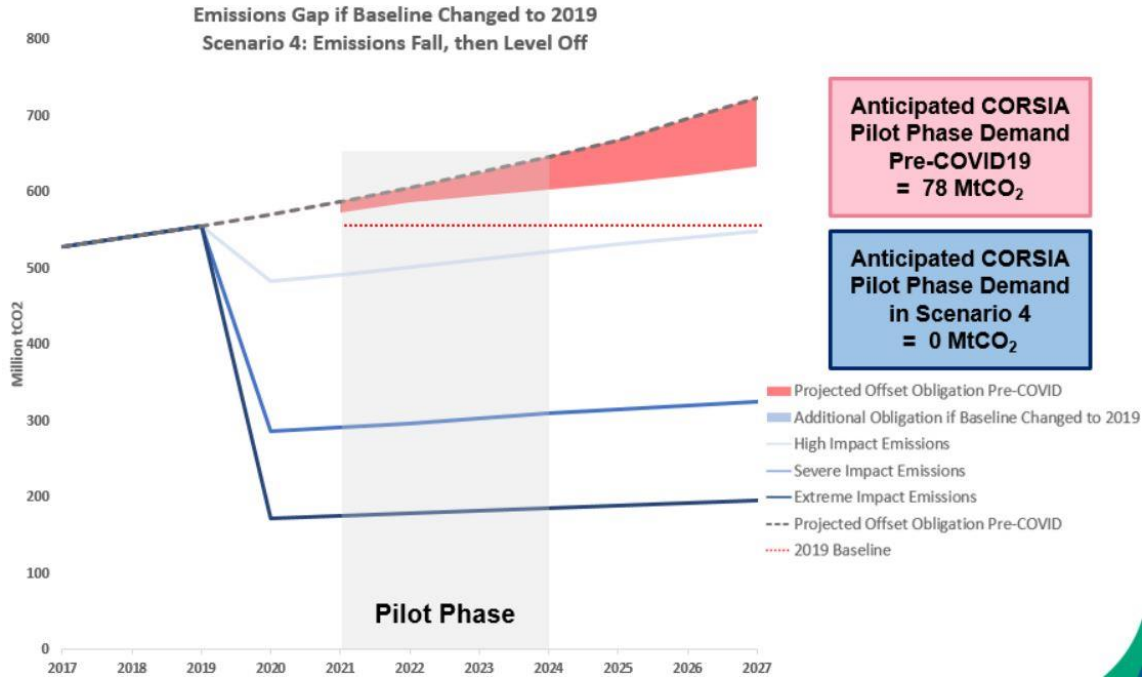
Graph 4.1: Scenario 4 - Emissions fall then level off.

The fourth scenario is an L-shape scenario where emissions fall and long-term growth is slow. In this scenario, the pilot phase obligation is non-existent for all impact levels. This is because all of the emissions pathways are below the baseline for the entire pilot phase.



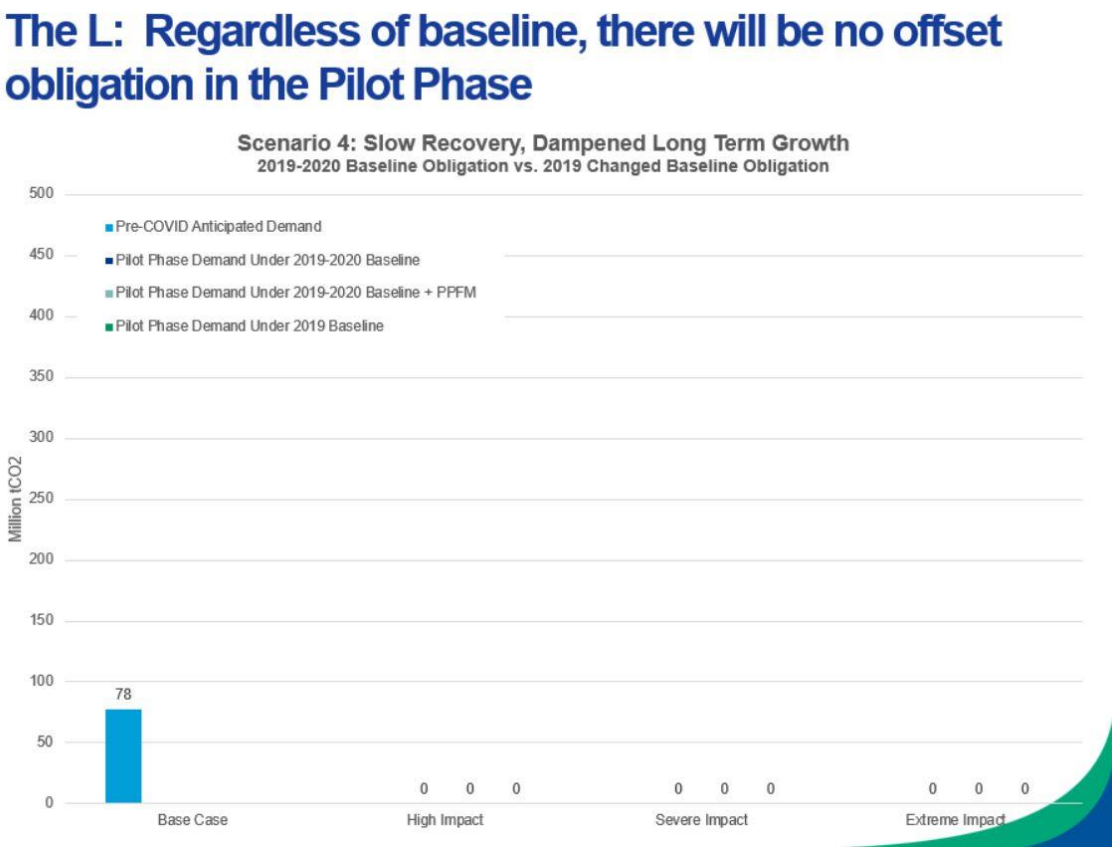
Graph 4.2: Scenario 4 - Emissions fall then level off with flexibility mechanism.

Graph 4.2 shows that with no obligation in the first place applying the flexibility mechanism will essentially make no difference and the obligation would still be zero.



Graph 4.3: Scenario 4 - Emissions fall then level off and emission gap if baseline changed to 2019.

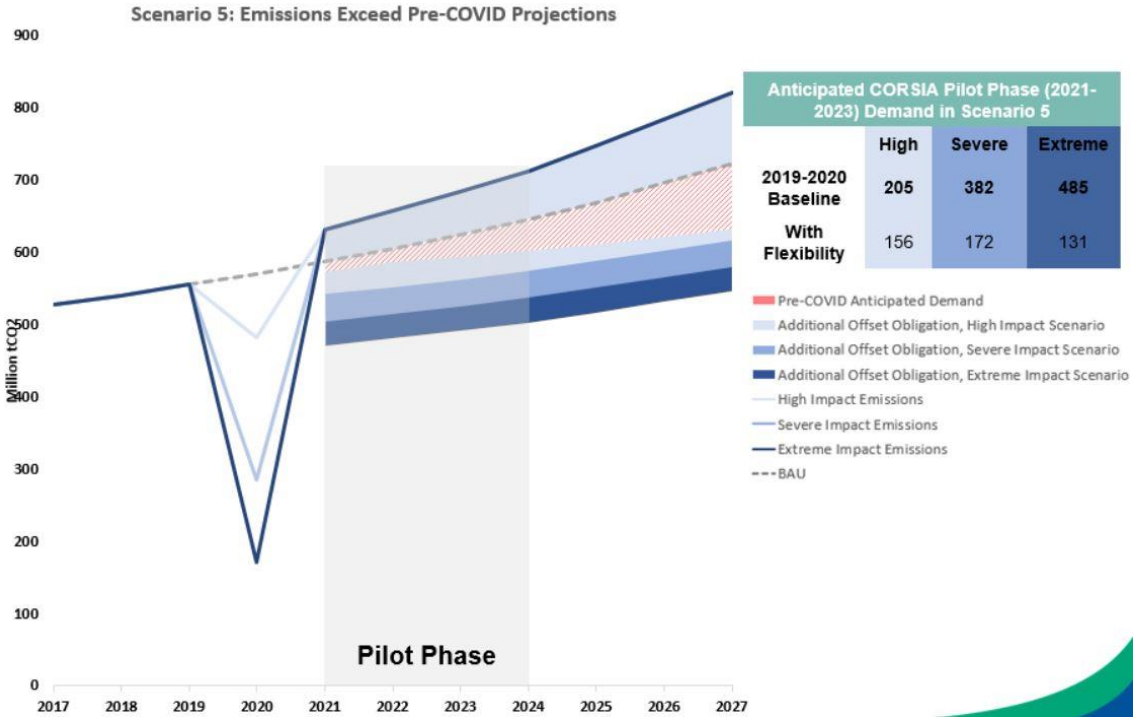
The same is true of the 2019 baseline. Since the 2019 baseline is above each emissions trajectory, there's no offset demand at all.



Graph 4.4: Scenario 4 - 2019-2020 baseline, PPFM, 2019-only baseline.

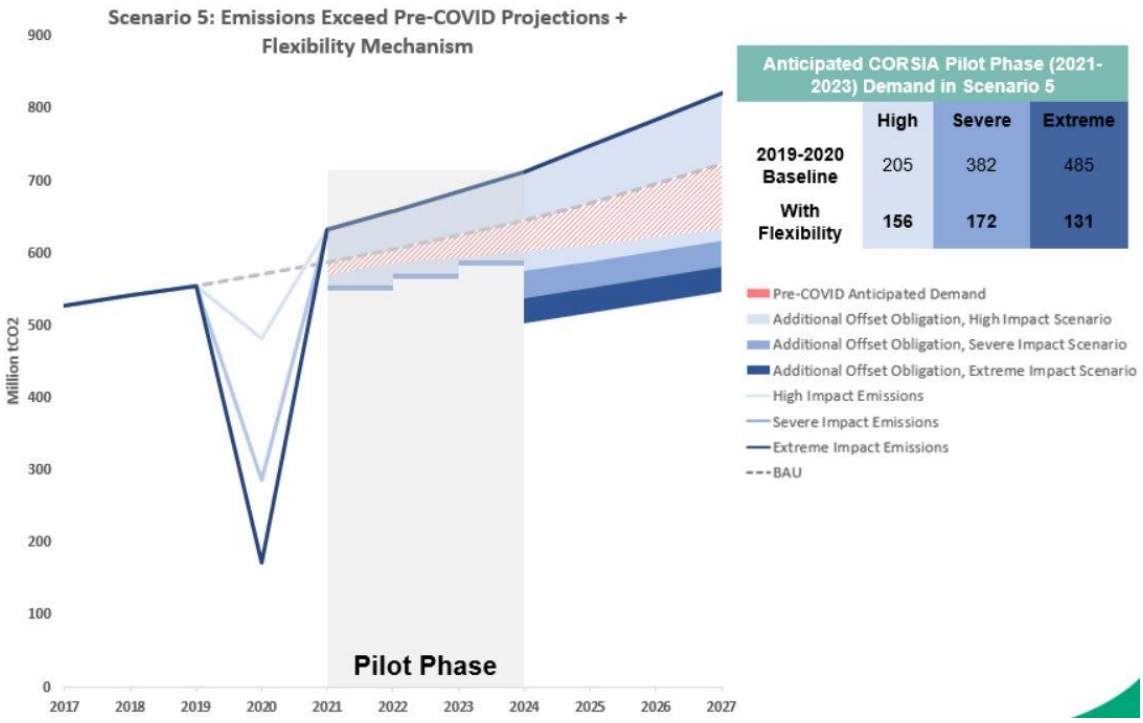
As illustrated in Graph 4.4, demand does not exist regardless of the baseline.

S5: ✔-shape: The "Overshoot" Scenario



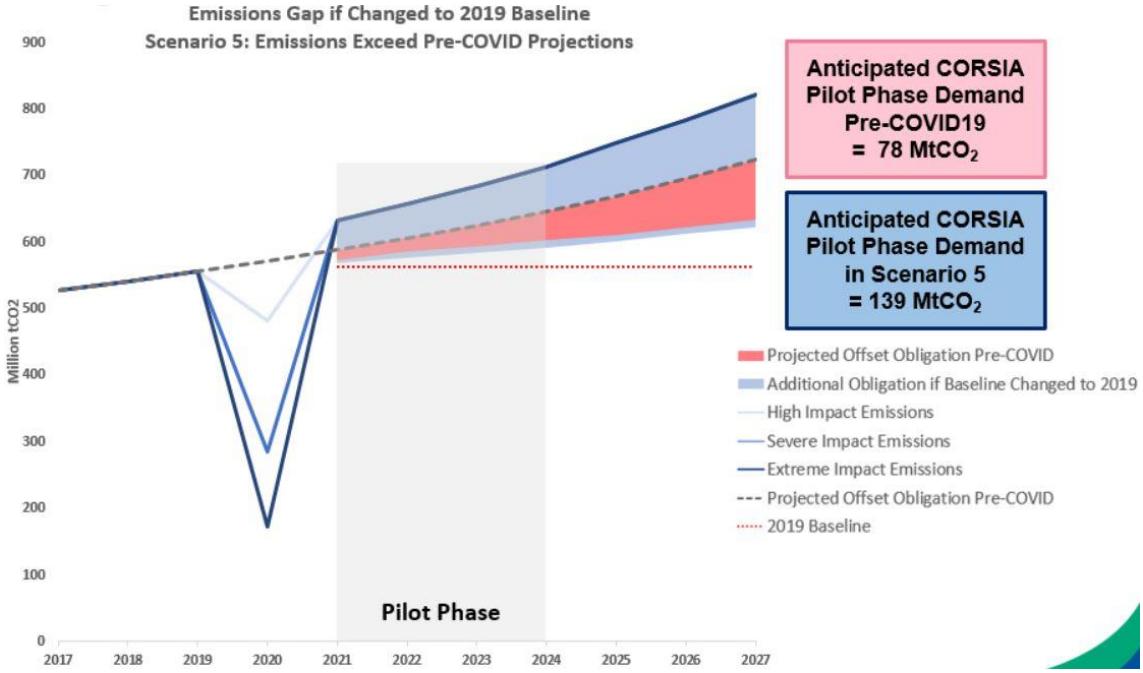
Graph 5.1: Scenario 5 - Emissions exceed pre-COVID projections.

As noted above, this scenario considers the possibility that after the 2020 drop in emissions, emissions rebound and overshoot the ICAO 2019 Trends projection, potentially because passengers must social distance on aircraft and more flights are needed to carry them. Because the emission pathways increase above BAU, the offset demand increases across all impact levels when the baseline is maintained at 2019-2020 levels in graph 5.1 The light blue area above the dashed BAU line illustrates the additional offsetting requirements relative to the pre-COVID anticipated demand shown in the pattern pink area.



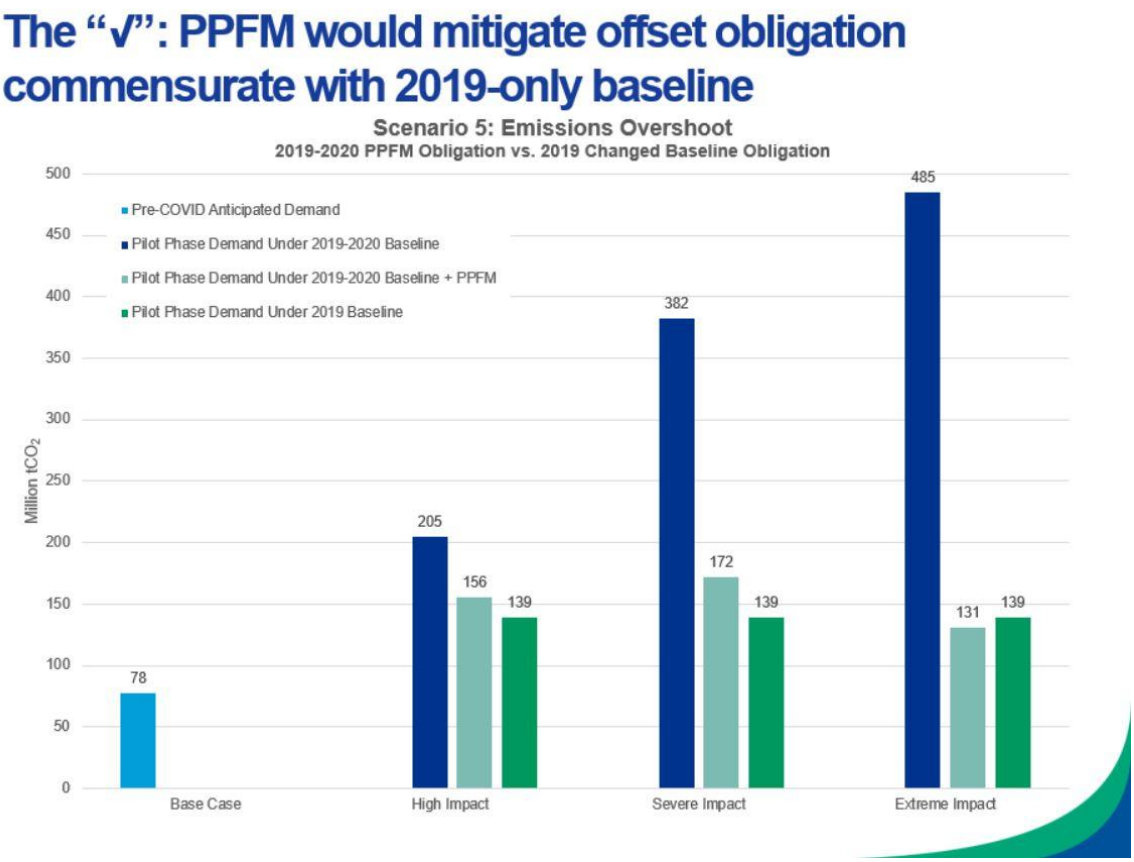
Graph 5.2: Scenario 5 - Emissions exceed pre-COVID projections with flexibility mechanism.

The flexibility mechanism modulates this effect to some degree but demand still exceeds what was projected to be in the base case.



Graph 5.3: Scenario 5 - Emissions exceed pre-COVID projections and emission gap if baseline changed to 2019.

In the 2019 baseline scenario, demand is still much higher, primarily because the emissions are higher.



Graph 5.4: Scenario 5 - 2019-2020 baseline, PPFM, 2019-only baseline.

Graph 5.4 shows that a scenario where emissions overshoot would result in larger demand relative to pre-COVID base case. Though demand is much higher across all impact levels with 2019-2020 baseline emission, it is modulated by the flexibility mechanism and the 2019 baseline scenario. In this overshoot scenario, using the flexibility mechanism greatly reduces the offset obligation commensurate with 2019-only baseline across all three impact levels. In the case of an extreme impact, the flexibility mechanism could reduce demand below that of 2019-only baseline case.

Summary Tables

The five scenarios, the offset obligations with the baseline maintained at 2019-2020 levels, the effect of the Pilot Phase Flexibility Mechanism, and the effect of re-writing the baseline to 2019-only, are summarized in the next three tables.

Pilot Phase Post-COVID Scenarios (Pre-COVID BAU Demand=78)*

Scenario	BAU*	2019-2020 Baseline*			2019 Baseline*		
		High	*Severe*	*Extreme*	*High*	*Severe*	*Extreme*
S1 ("V")	**78**	**158**	**335**	**437**	**92**	**92**	**92**
S1+Flexibility	-	125	157	123	72	44	26
S2 ("v")	**-**	**19**	**195**	**298**	**0**	**0**	**0**
S2+Flexibility	-	17	105	96	0	0	0
S3 ("U")	**-**	**10**	**22**	**29**	**0**	**0**	**0**
S3+Flexibility	-	9	14	12	0	0	0
S4 ("L")	**-**	**0**	**0**	**0**	**0**	**0**	**0**
S4+Flexibility	-	0	0	0	0	0	0
S5 ("√")	**-**	**205**	**382**	**485**	**139**	**139**	**139**
S5+Flexibility	-	156	172	131	105	62	37

* All measurements in $MMTCO_2$

Table 1: Summary of demand for pilot phase post-COVID scenarios.

Pilot Phase Post-COVID Scenarios Percent Change Relative to Pre-COVID BAU Demand of 78 MMT

Scenario	BAU*	2019-2020 Baseline*			2019 Baseline*		
		High	*Severe*	*Extreme*	*High*	*Severe*	*Extreme*
S1 ("V")	**78**	**+103%**	**+330%**	**+462%**	**+18%**	**+18%**	**+18%**
S1+Flexibility	-	+61%	+102%	+59%	-7%	-43%	-67%
S2 ("V")	**-**	**-75%**	**+150%**	**+282%**	**-100%**	**-100%**	**-100%**
S2+Flexibility	-	-78%	+35%	+24%	-100%	-100%	-100%
S3 ("U")	**-**	**-87%**	**-72%**	**-63%**	**-100%**	**-100%**	**-100%**
S3+Flexibility	-	-88%	-82%	-85%	-100%	-100%	-100%
S4 ("L")	**-**	**-100%**	**-100%**	**-100%**	**-100%**	**-100%**	**-100%**
S4+Flexibility	-	-100%	-100%	-100%	-100%	-100%	-100%
S5 ("√")	**-**	**+163%**	**+391%**	**+523%**	**+79%**	**+79%**	**+79%**
S5+Flexibility	-	+100%	+121%	+68%	+35%	-20%	-52%

* All measurements in $MMTCO_2$

Table 1.2: Summary of demand for pilot phase post-COVID scenarios in percentage change.

In looking at the pilot phase, if the baseline is retained at 2019-2020 levels in the first three years, 2021, 2022 and 2023, then under most scenarios, with the exception of L-shape scenario, there is some offsetting during the pilot phase. Where the offset requirements significantly increased relative to the 78 million metric tonnes of demand, the use of the flexibility mechanism, that is multiplying the emissions by 2020-year emissions instead of by the given year emissions, greatly modulates the effect of the COVID impact on the demand. In most scenarios, the flexibility mechanism effectively smooths out the effects of high, severe and extreme impact levels, effectively shaving off the "tail" of very high offset obligations, in much the same way as would changing the baseline to 2019.

For example, if emissions follow a V-shape scenario, offset obligations would increase potentially as much as 359 million metric tonnes over three years over the base case (78 million metric tonnes). That's more than five-fold increase, but applying the flexibility mechanism brings that number back down. Any state participating in the pilot phase can apply this special mechanism to reduce its offset obligation, bringing it close to the pre-COVID estimated amount.

However, if the baseline is changed to 2019, as IATA has requested, then offset obligation during the pilot phase is simply zeroed out during the first three years of the program simply because of the baseline change.

Full Program Demand Summary

Scenario	BAU*	2019-2020 Baseline*			2019 Baseline*		
		High	*Severe*	*Extreme*	*High*	*Severe*	*Extreme*
S1 ("V")	**2360**	**2893**	**4073**	**4758**	**2454**	**2454**	**2454**
% Change	-	+23%	+73%	+102%	+4%	+4%	+4%
S2 ("v")	**2360**	**1464**	**2642**	**3327**	**1087**	**1087**	**1087**
% Change	-	-38%	+12%	+41%	-54%	-54%	-54%
S3 ("U")	**2360**	**1450**	**2378**	**2917**	**1087**	**1087**	**1087**
% Change	-	-39%	+1%	+24%	-54%	-54%	-54%
S4 ("L")	**2360**	**454**	**0**	**0**	**166**	**0**	**0**
% Change	-	-81%	-100%	-100%	-93%	-100%	-100%
S5 ("√")	**2360**	**3772**	**4952**	**5637**	**3333**	**3333**	**3333**
% Change	-	+60%	+110%	+139%	+41%	+41%	+41%

* All measurements in $MMTCO_2$

Table 2: Summary of demand for the full program post-COVID scenarios.

Table 2 summarizes the changes to offset obligations under the five scenarios over the full 15 years of the program, through 2035.

The table illustrates that under the principal scenarios S2, S3, or S4, re-writing the baseline to 2019-only would greatly reduce airlines' offset obligation over the 15-year life of CORSIA, cutting it essentially in half. While the COVID crisis would have forced overall emissions down, changing CORSIA's baseline to 2019-only would greatly undermine the incentive for airlines to grow their business while driving emissions reductions.

Pilot Phase: Offset Supply and Offset Demand

Pilot Phase Post-COVID Scenarios
Supply* Relative to Demand

Scenario	Supply*	Supply Exceeds Demand	Demand: 2019-2020 Baseline*		
			High	*Severe*	*Extreme*
S1 ("V")	**386 - 569**	**yes for most**	**158**	**335**	**437**
S1+Flexibility	386 - 569	yes	125	156	123
S2 ("\/")	**386 - 569**	**yes**	**19**	**195**	**298**
S2+Flexibility	386 - 569	yes	17	105	96
S3 ("U")	**386 - 569**	**yes**	**10**	**22**	**29**
S3+Flexibility	386 - 569	yes	9	14	12
S4 ("L")	**386 - 569**	**yes**	**0**	**0**	**0**
S4+Flexibility	386 - 569	yes	0	0	0
S5 ("/")	**386 - 569**	**yes for most**	**205**	**382**	**485**
S5+Flexibility	386 - 569	yes	156	172	131

* $MMTCO_2$ *Supply Scenarios from Ecosystem Marketplace March 2020 Analysis

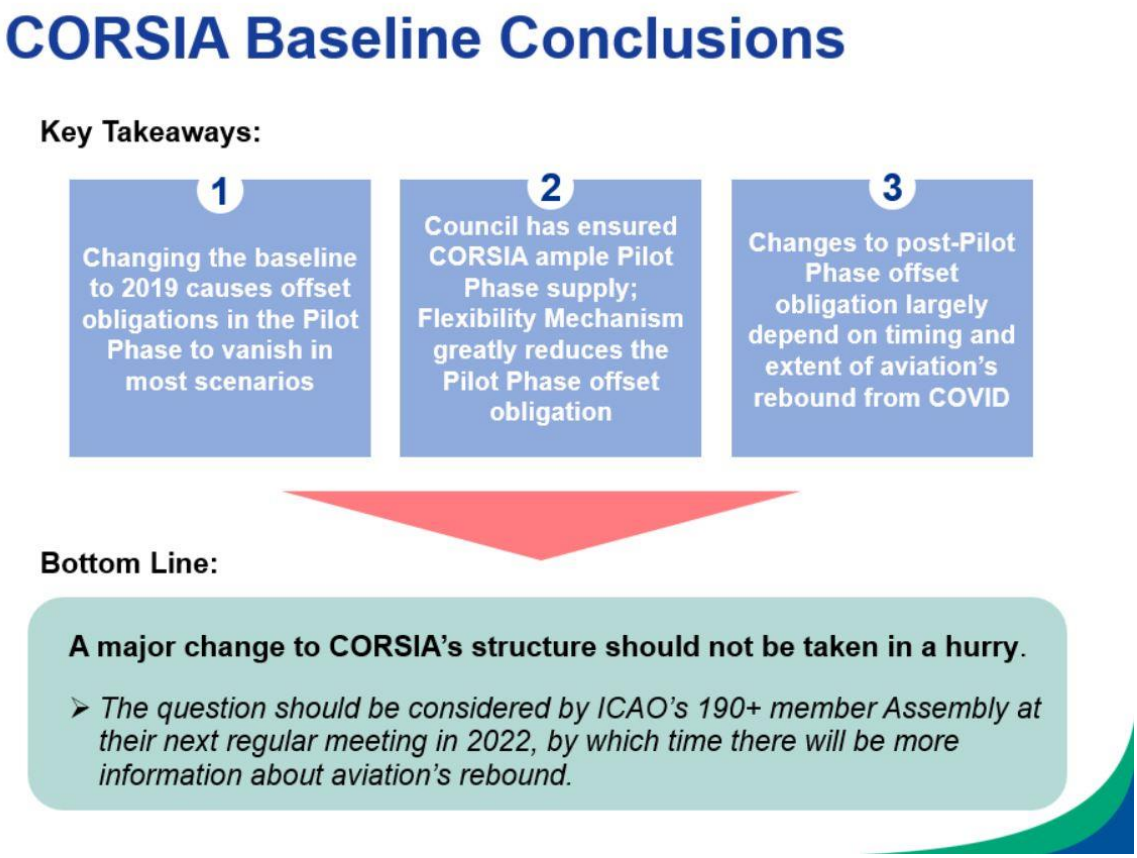
Table 3: Summary of supply for pilot phase post-COVID scenarios.

In March 2020, Ecosystem Marketplace published an offset supply analysis for CORSIA pilot phase based on the first round of applications for CORSIA eligibility. It estimated that the anticipated supply to CORSIA would be sufficient to cover the pilot phase demand, even with the effects of COVID then known. Revisiting that supply estimate in comparison to the pilot phase demand analyses provided above demonstrates that in light of the ICAO Council's March 2020 approval of certain offset programs, the supply of CORSIA-eligible offsets will be sufficient under the major scenarios, provided that States utilize the Pilot Phase Flexibility Mechanism. Moreover, ICAO Council has opened a second round of applications for offset programs to be approved by end of 2020, which could increase supply further.

Based on the current projections from a variety of sources, it looks like the sharp V-shape scenario is not a likely outcome. The most probable outlook for the emission pathway suggests

a likelihood between scenario 2 and 3, with COVID impact level somewhere between the severe and extreme impact level in 2020.

Conclusion



This analysis shows that changing the baseline to 2019 causes the pilot phase offset obligations to vanish. Furthermore, the use of the Pilot Phase Flexibility Mechanism, should a country decide to use it, would help modulate the airlines' need for offsets during the pilot phase. In most scenarios, the Pilot Phase Flexibility Mechanism contained in paragraph 11.e of the CORSIA Resolution greatly reduces the offset obligation during the pilot phase. At this time, changes to the pilot phase offset obligations largely depend on the extent and timing of aviation's recovery from COVID. It would be premature for Council to change the baseline now, when the flexibility mechanism is already embedded in the CORSIA program to help countries, if they want it. Further, Council has already approved ample supply of offsets for the intervening years.

Such a fundamental change to the structure of CORSIA could cause investors to question the commitment to decarbonization of aviation and undermine the sector's overall efforts to reduce emissions. Moreover, it could discourage investment in new aviation technologies, such as low carbon fuel technologies, and risk stranding investments that have already been made in offset projects and programs. More fundamentally, it would send a signal that the basic structure of a carbon market could be altered without following the rules. CORSIA has provisions that require

assessment of the overall program every three years, and the 190+ members of the ICAO Assembly could change the fundamental rules of CORSIA if it so chose based on those triennial assessments, first meeting in 2022. To change the baseline in haste by the 36-member Council rather than the full Assembly risks sending the signal that a small group of governments can change the fundamental rules of the carbon market without warning. This would greatly undermine the stability and predictability that is essential to the system to move into long-term climate solutions.