

# Impact of COVID-19 on CORSIA

Annie Petsonk, International Counsel

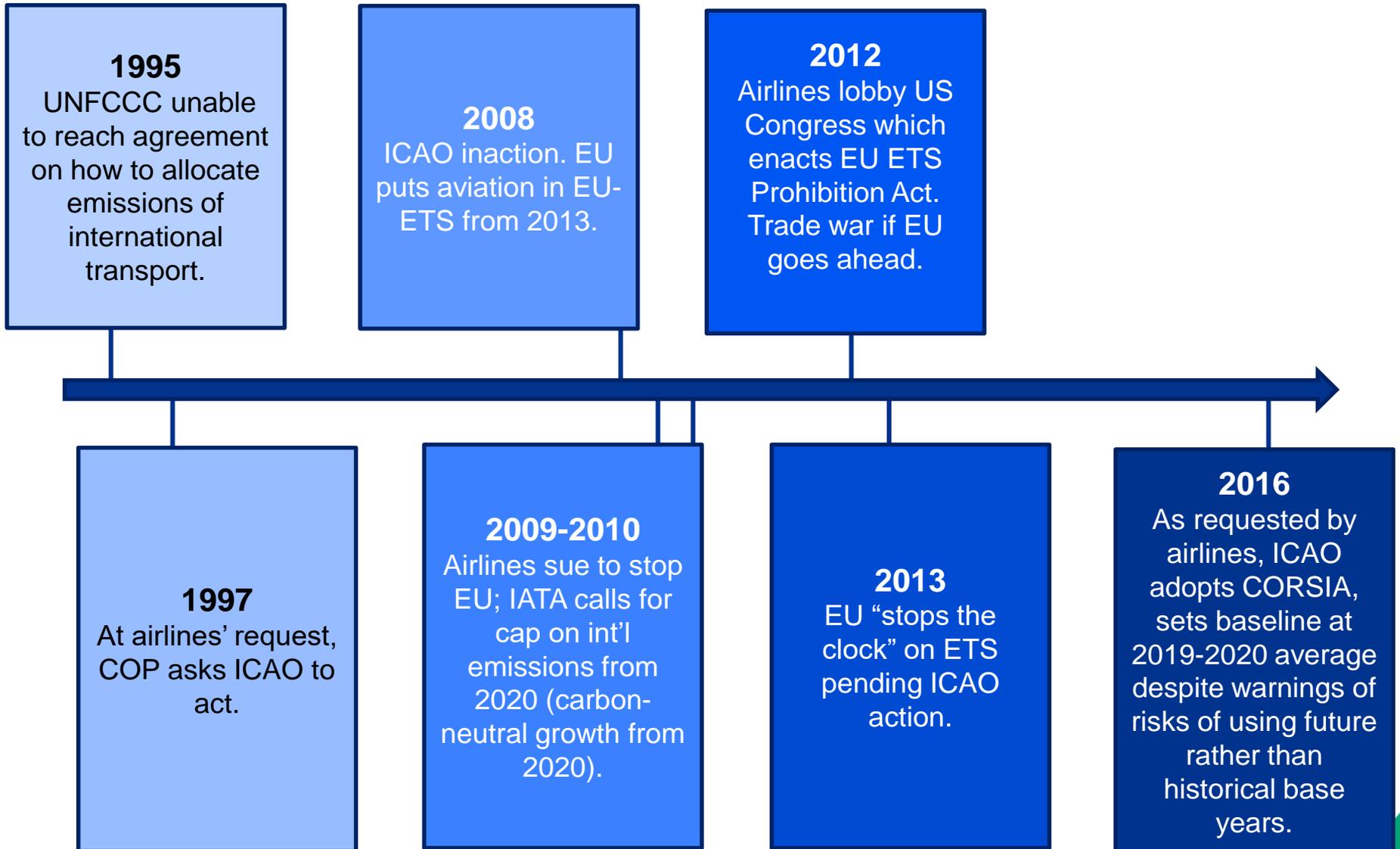
Pedro Piris-Cabezas, Director, Sustainable  
Int. Transport & Lead Senior Economist

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# How did we get here?



# CORSIA's Offsetting Formula

## ICAO Resolution Paragraph 11:

“Recalls its decision at the 39<sup>th</sup> Session that the amount of CO<sub>2</sub> emissions required to be offset by an aeroplane operator in a given year from 2021 is calculated every year as follows:

- A** an aeroplane operator's offset requirement = [% Sectoral x (an aeroplane operator's emissions covered by CORSIA in a given year x the sector's growth factor in the given year x that aeroplane operator's growth factor in the given year);
- B** Where the sector's growth factor = (total emissions covered by CORSIA in a given year – average of total emissions covered by CORSIA between 2019 and 2020) / total emissions covered by CORSIA in the given year

# EDF's Assumptions

## # Numbers

According to the most recent ICAO Council “**Global Environmental Trends**” document, emissions in 2019 were approximately 555 MMT (million metric tonnes) of CO<sub>2</sub>

## Coverage

We estimate that, during the Pilot Phase (2021-2023) and phase 1 (2024-2026), participation will cover roughly 60% of sectoral emissions above 2020 levels; over the full program (2021-2035), participation will cover roughly 80%

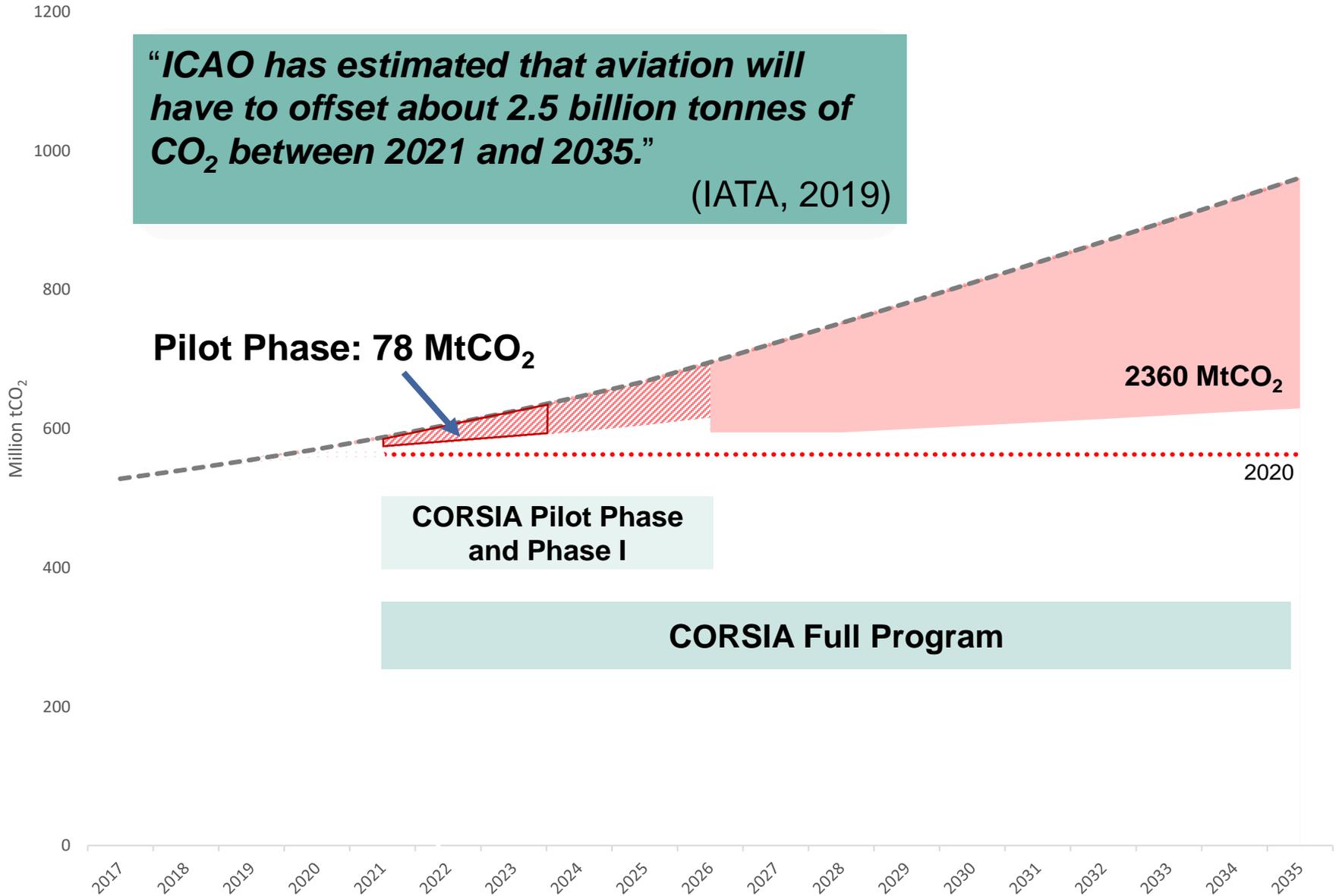
## Base Case

Using the Trends' “Low Aircraft Technology” scenario, we calculate a Pre-Covid19 Pilot Phase Anticipated Demand with 2019-2020 Baseline of 78 MMT for the covered routes (2360 MMT for full program demand)

# Pre-Covid19 Anticipated Demand with 2019-2020 Baseline

***“ICAO has estimated that aviation will have to offset about 2.5 billion tonnes of CO<sub>2</sub> between 2021 and 2035.”***

(IATA, 2019)



**Pilot Phase: 78 MtCO<sub>2</sub>**

**2360 MtCO<sub>2</sub>**

2020

**CORSIA Pilot Phase  
and Phase I**

**CORSIA Full Program**

# **CORSIA Post-COVID Demand**

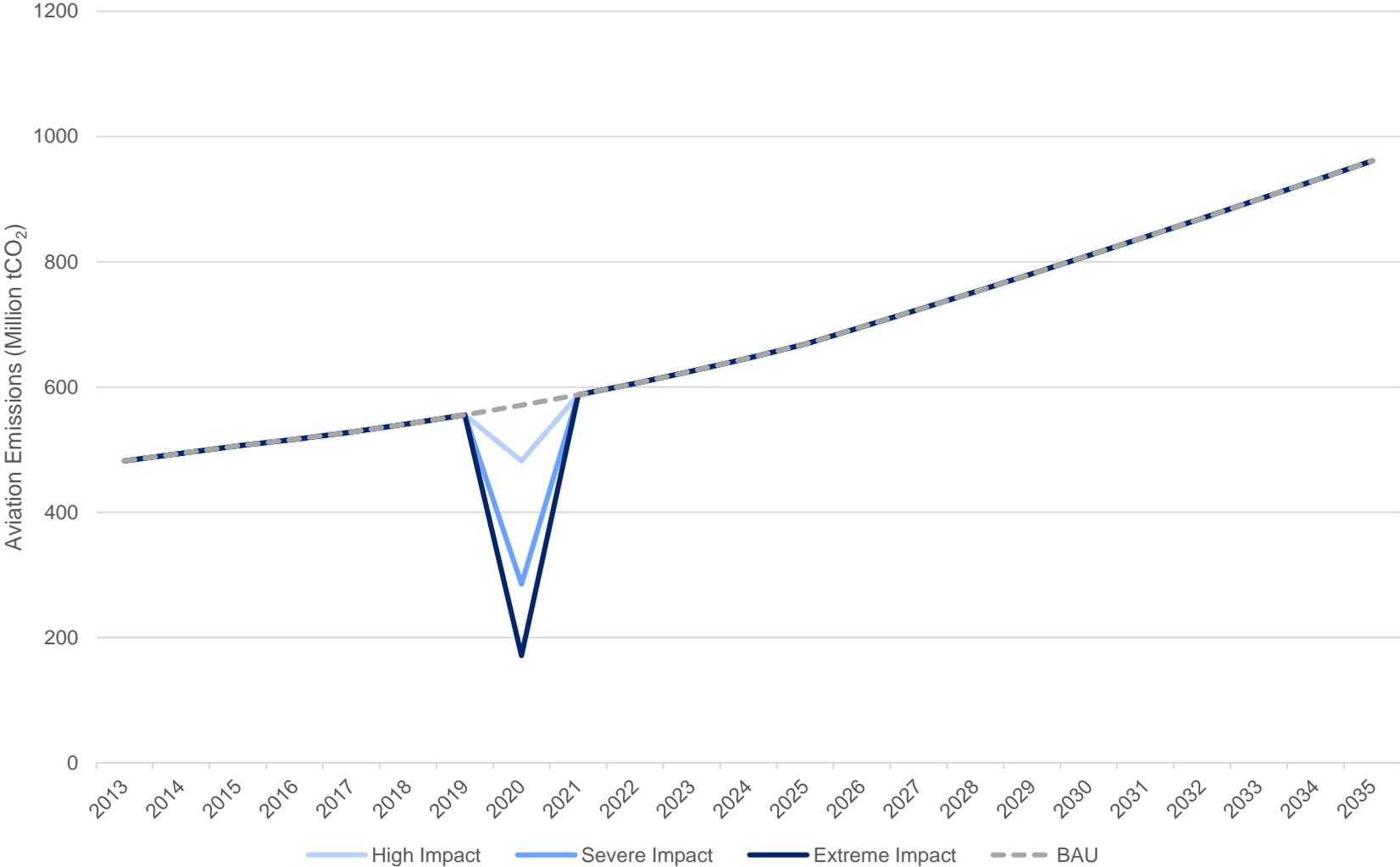
## **Emissions Trajectories under Five COVID Scenarios:**

**V, v, U, L, √**



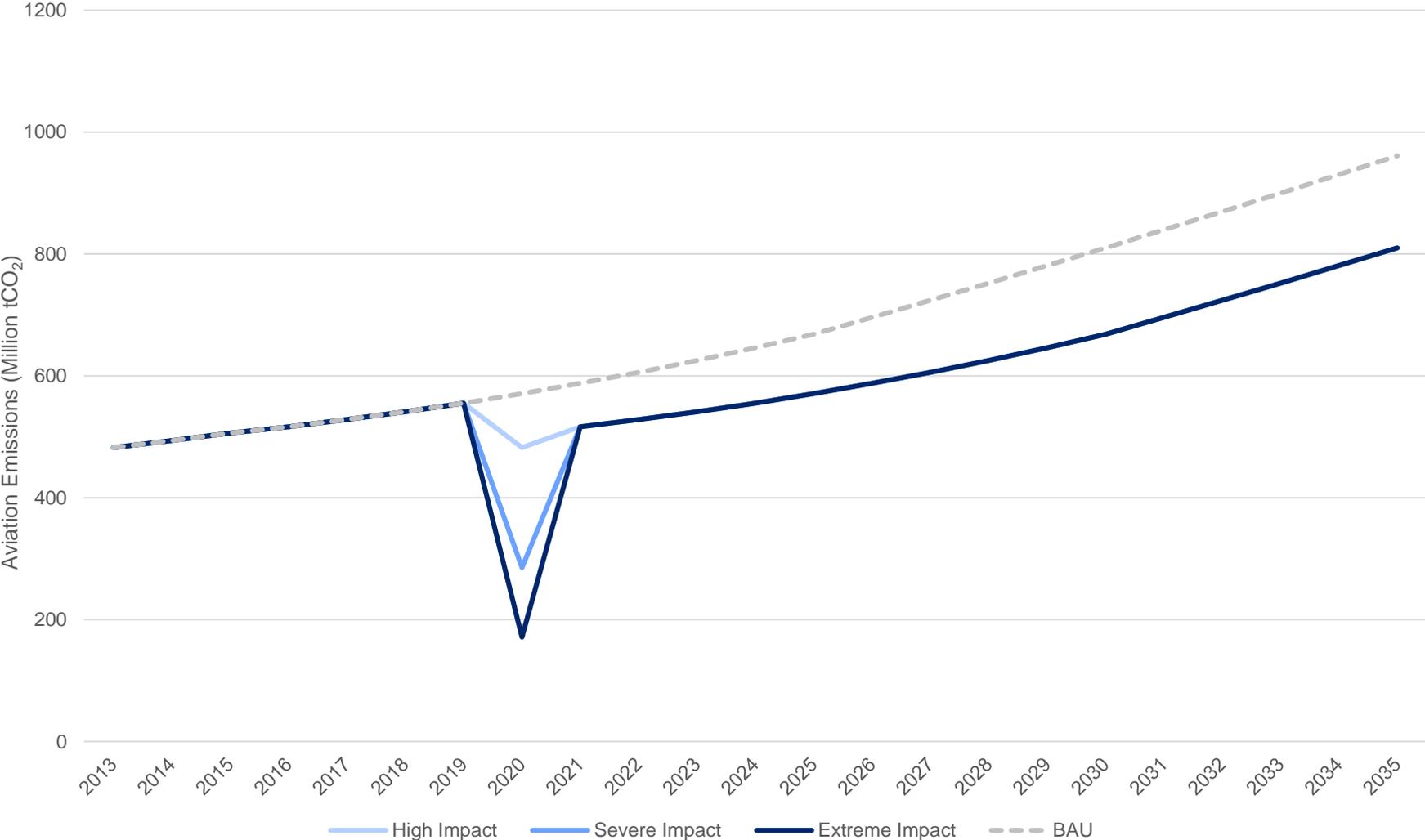
# Scenario 1: The “V”. Emissions rebound fully by 2021 and return to a BAU trajectory

Scenario 1: Full, Fast Emissions Rebound



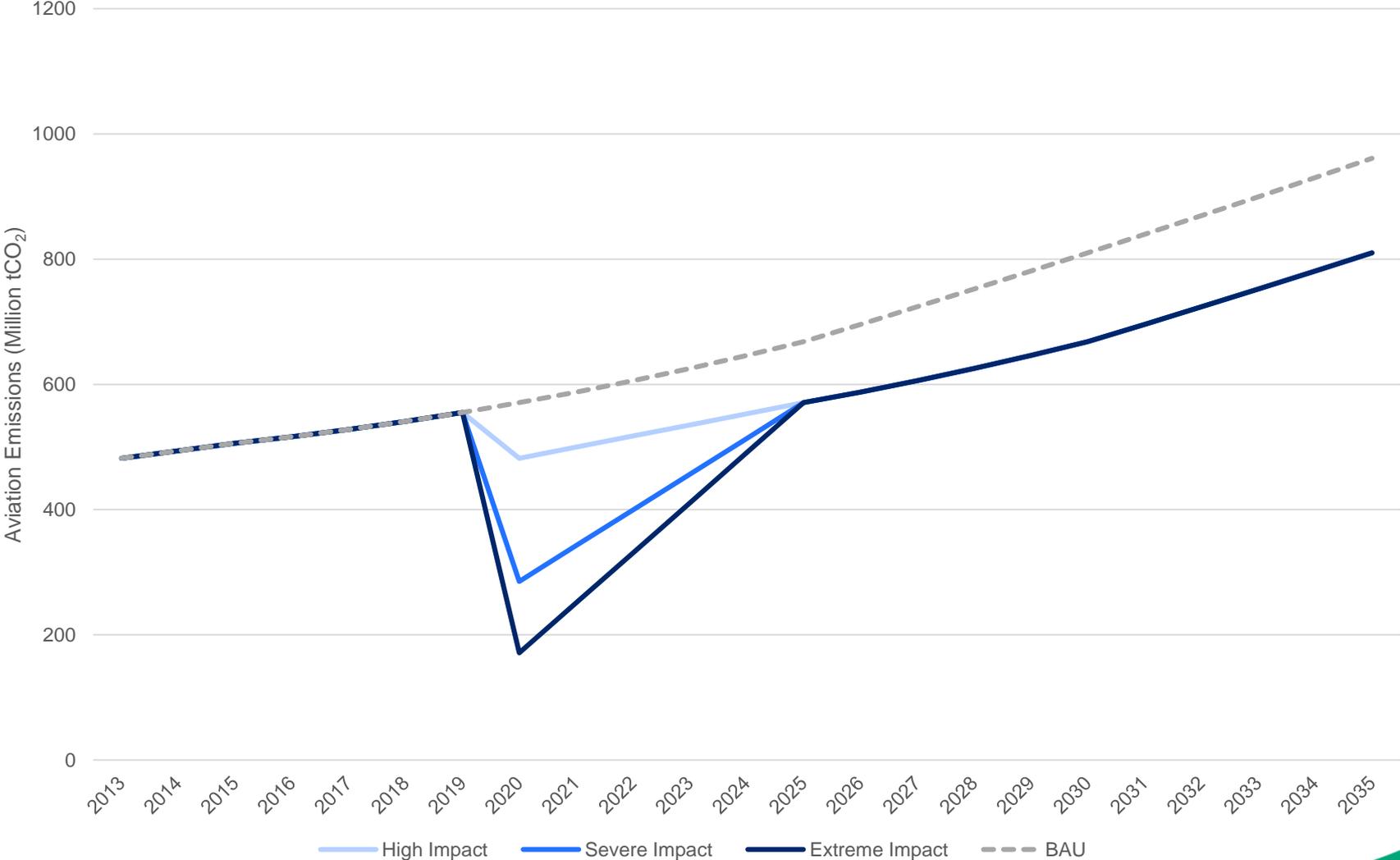
# Scenario 2: “V”. Emissions rebound to 2013 levels in 2021 with subsequent year on year growth

Scenario 2: Slightly Attenuated Rebound, Dampened Long Term Growth



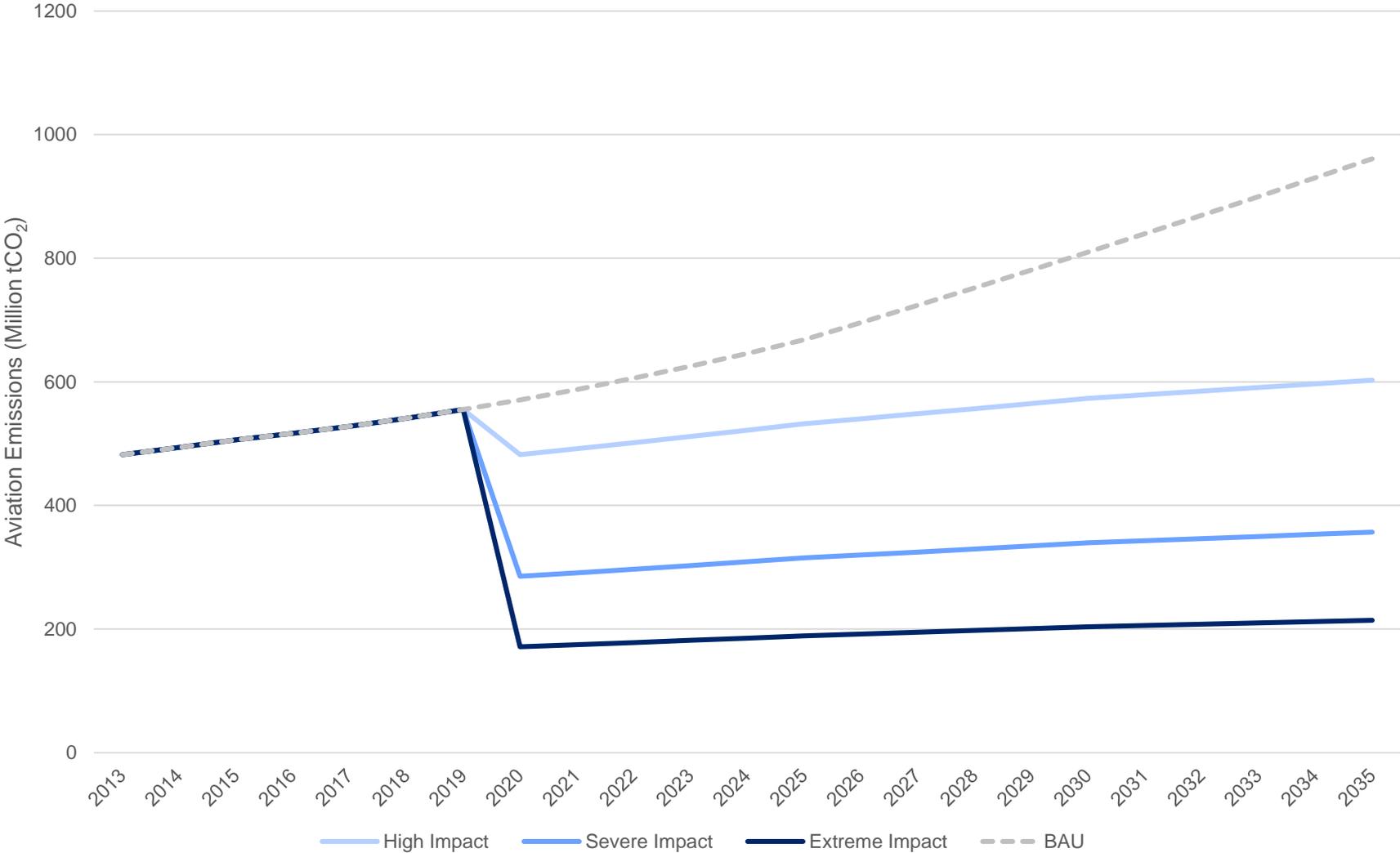
# Scenario 3: The “U”. Emissions rebound slowly to 2019 levels in 2024 with subsequent year on year growth

## Scenario 3: Slow Recovery, Dampened Long Term Growth



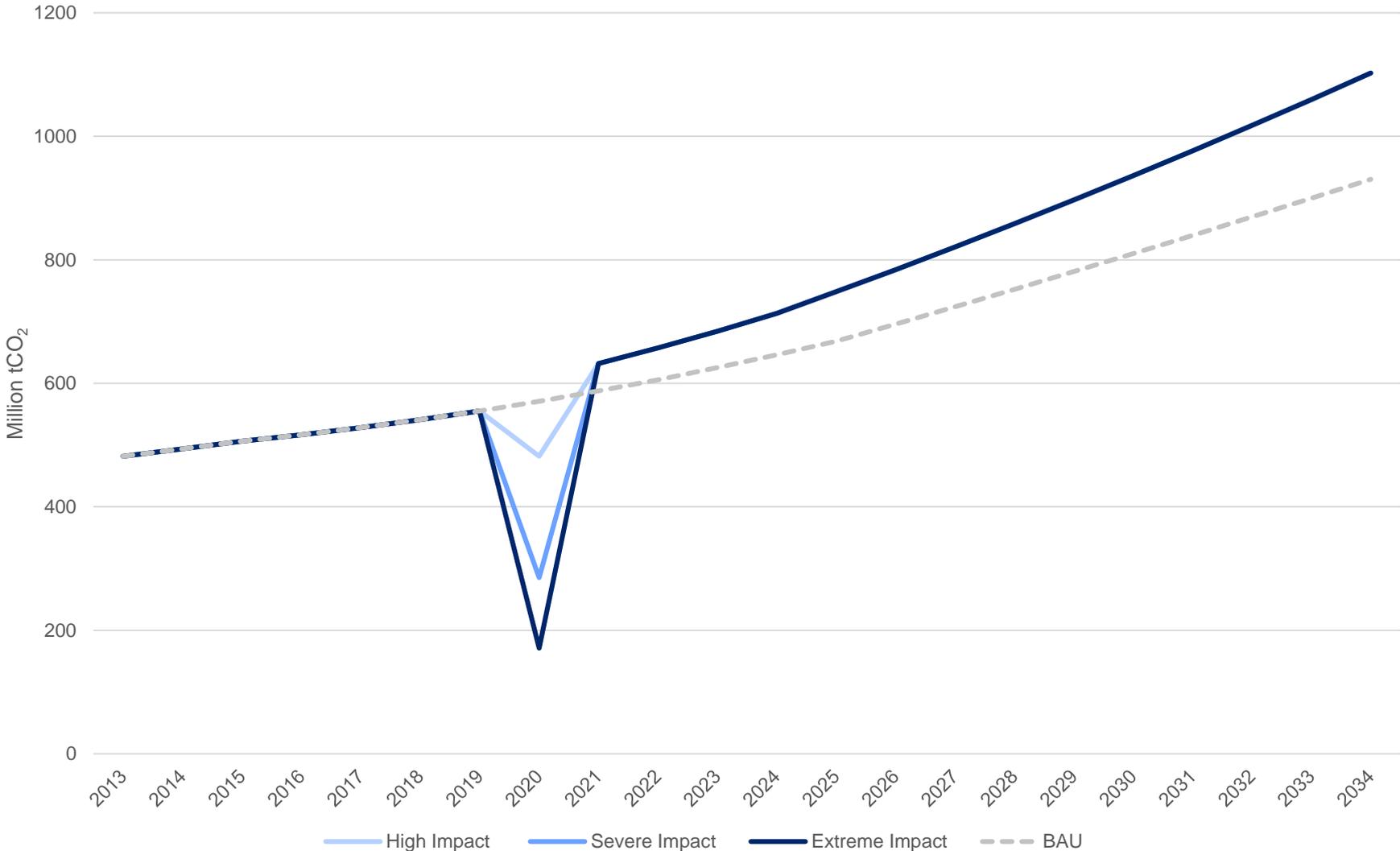
# Scenario 4: The “L”. Emissions fall and do not rebound, with minimal growth post-2021

Scenario 4: Emissions Fall, then Level Off



# Scenario 5: The “v”. Emissions overshoot pre-COVID BAU predictions

Scenario 5: Overshoot



High Impact   Severe Impact   Extreme Impact   BAU



**S1: The “V”. Full, Fast Emissions Rebound**



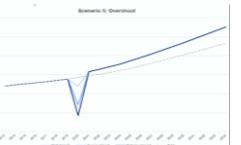
**S2: The “v”. Slightly Attenuated Rebound, Dampened Long Term Growth**



**S3: The “U”. Slow Recovery, Dampened Long Term Growth**



**S4: The “L”. Emissions Fall, then Level Off**



**S5: The “v”. Emissions overshoot pre-COVID BAU predictions**

# CORSIA's Pilot Phase Flexibility Mechanism (PPFM)

## ICAO Resolution paragraph 11(e):

“where the % sector 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 aeroplane operator's emissions covered by CORSIA in a given year, as stated above, or
  - B** an aeroplane operator's emissions covered by CORSIA in **2020**;

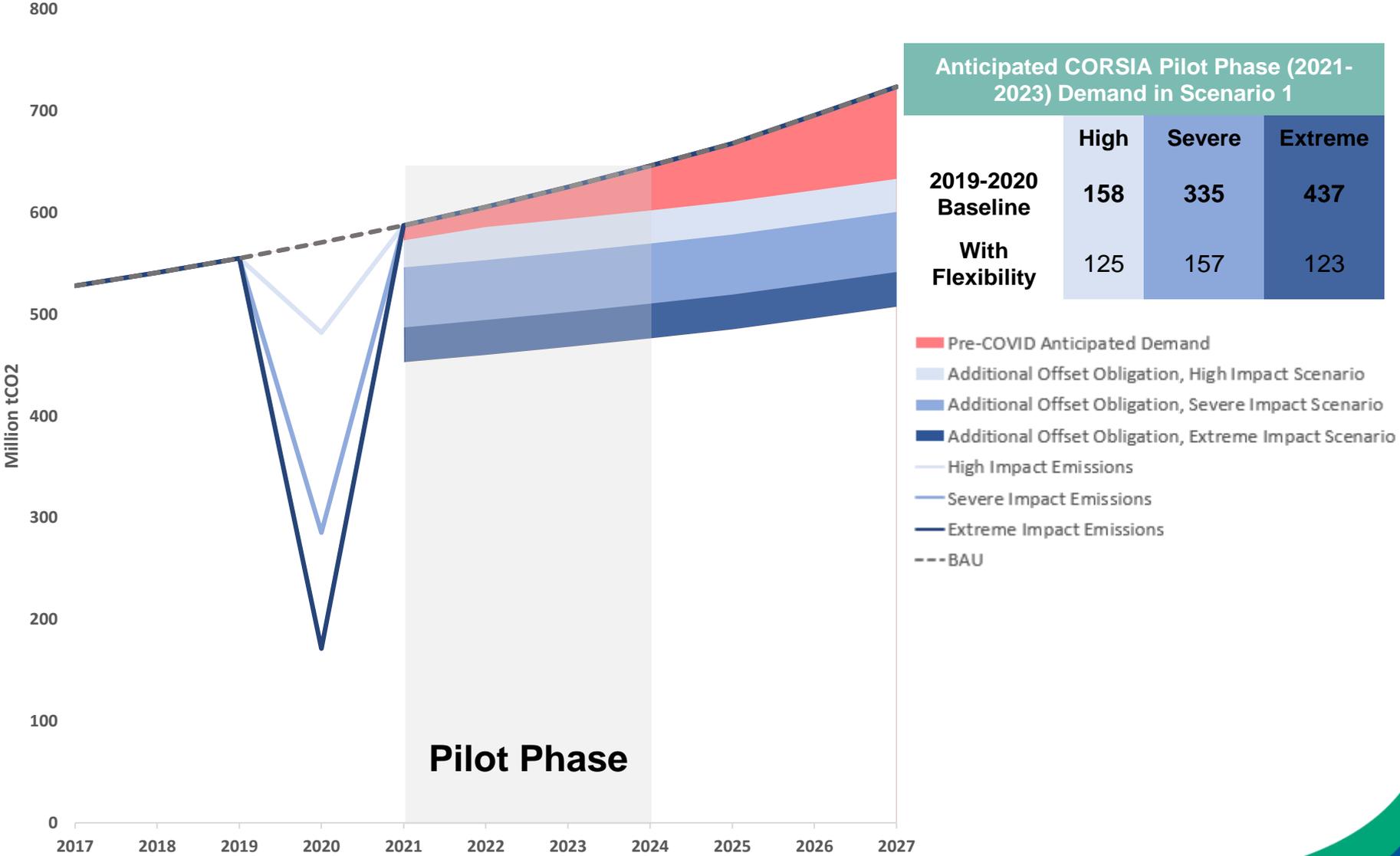
# **CORSIA Emissions Unit Demand: Five Post-COVID Scenarios Pilot Phase (2021-2023)**

Scenario 1

# The “V”: Full, Fast Emissions Rebound

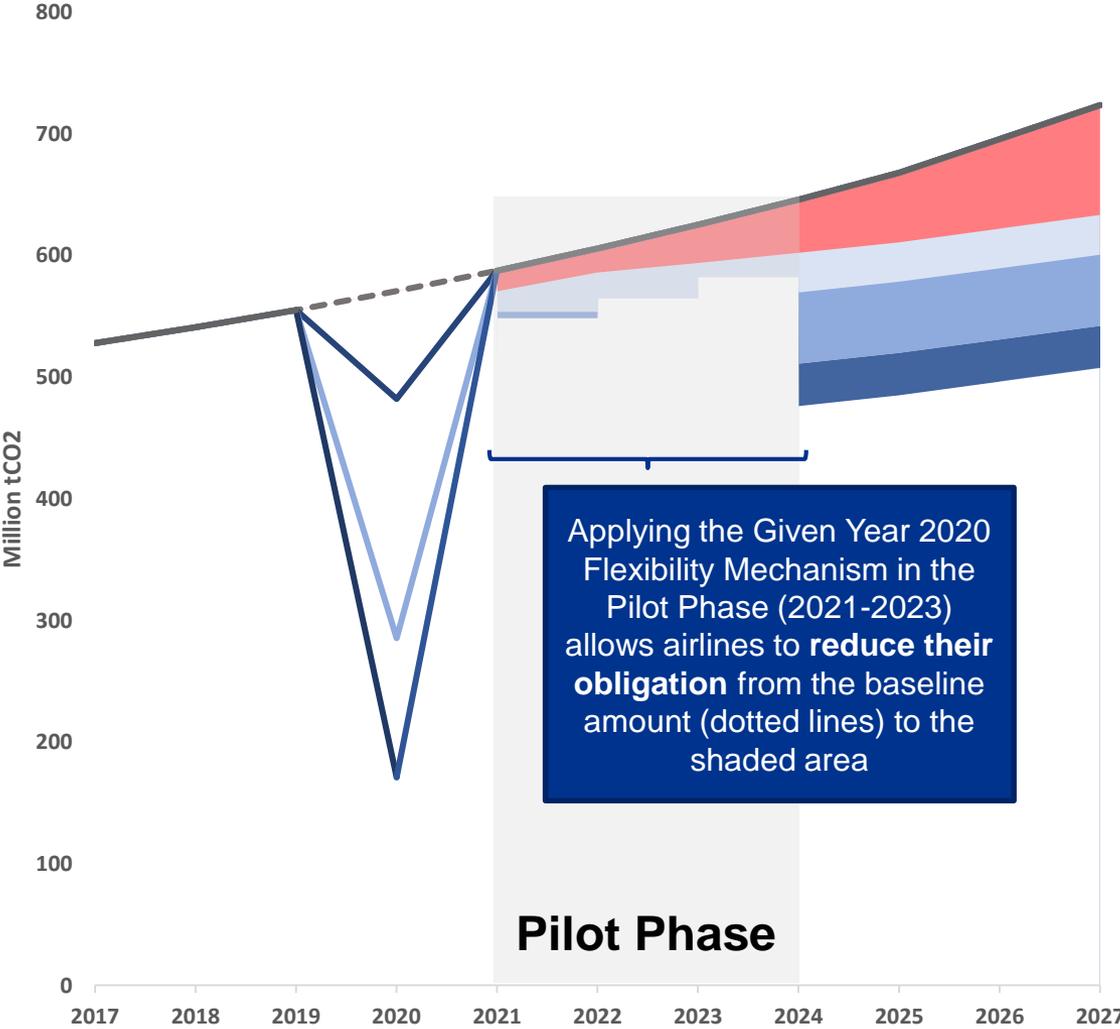
# The “V”: Full recovery by 2021, Baseline 2019-2020: PPFM modulates the increase in offset obligation

Scenario 1: Full, Fast, Emissions Rebound



# The “V”: Full recovery by 2021, Baseline 2019-2020: PPFM modulates the increase in offset obligation

Scenario 1: Full, Fast Emissions Rebound + Flexibility Mechanism



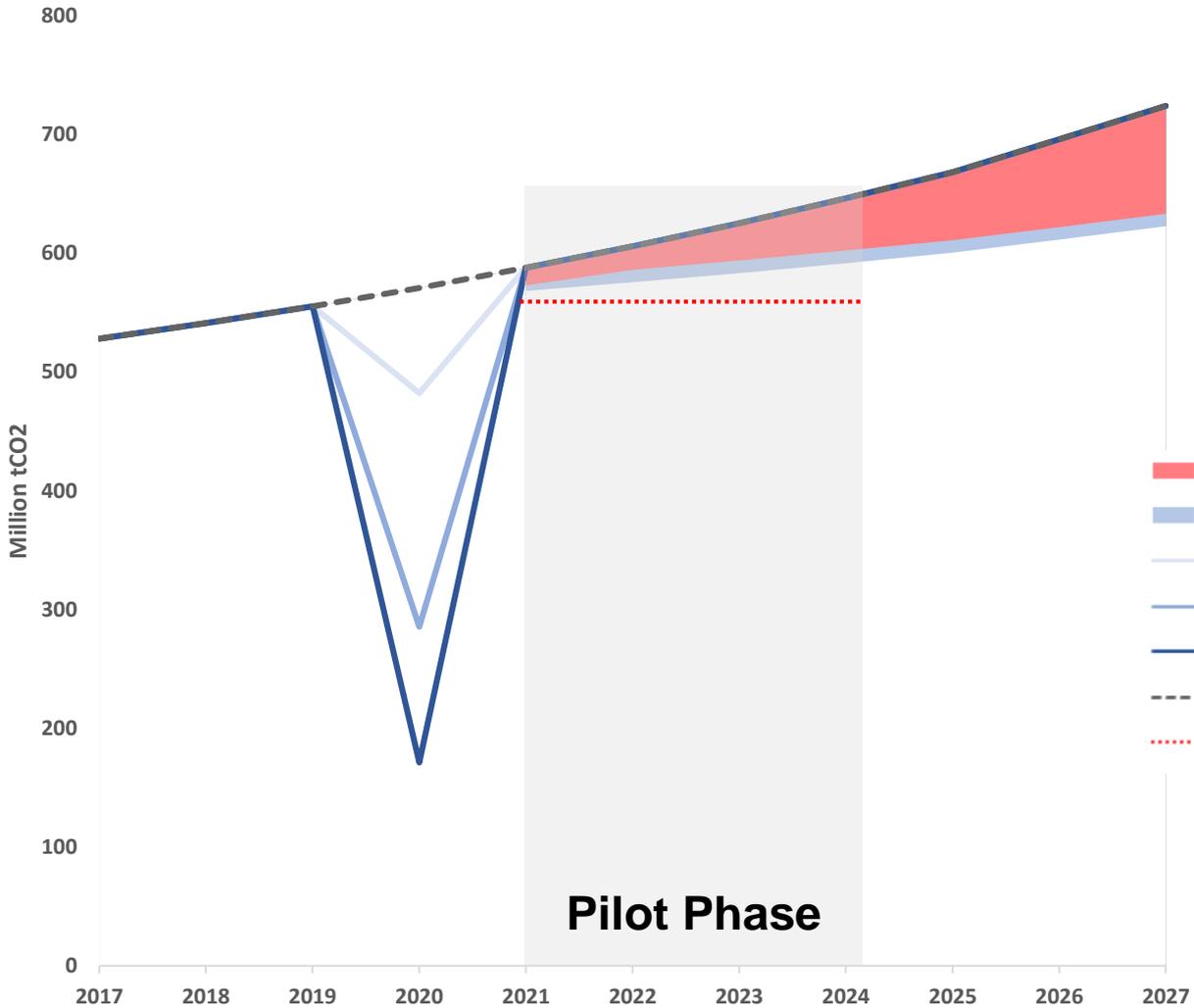
Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 1

	High	Severe	Extreme
<b>2019-2020 Baseline</b>	158	335	437
<b>With Flexibility</b>	125	157	123

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- BAU

# The “V”: Full recovery by 2021, Baseline 2019 only: Offset demand would increase 15%

Emissions Gap if Baseline Change to 2019  
Scenario 1: Full, Fast Emissions Rebound



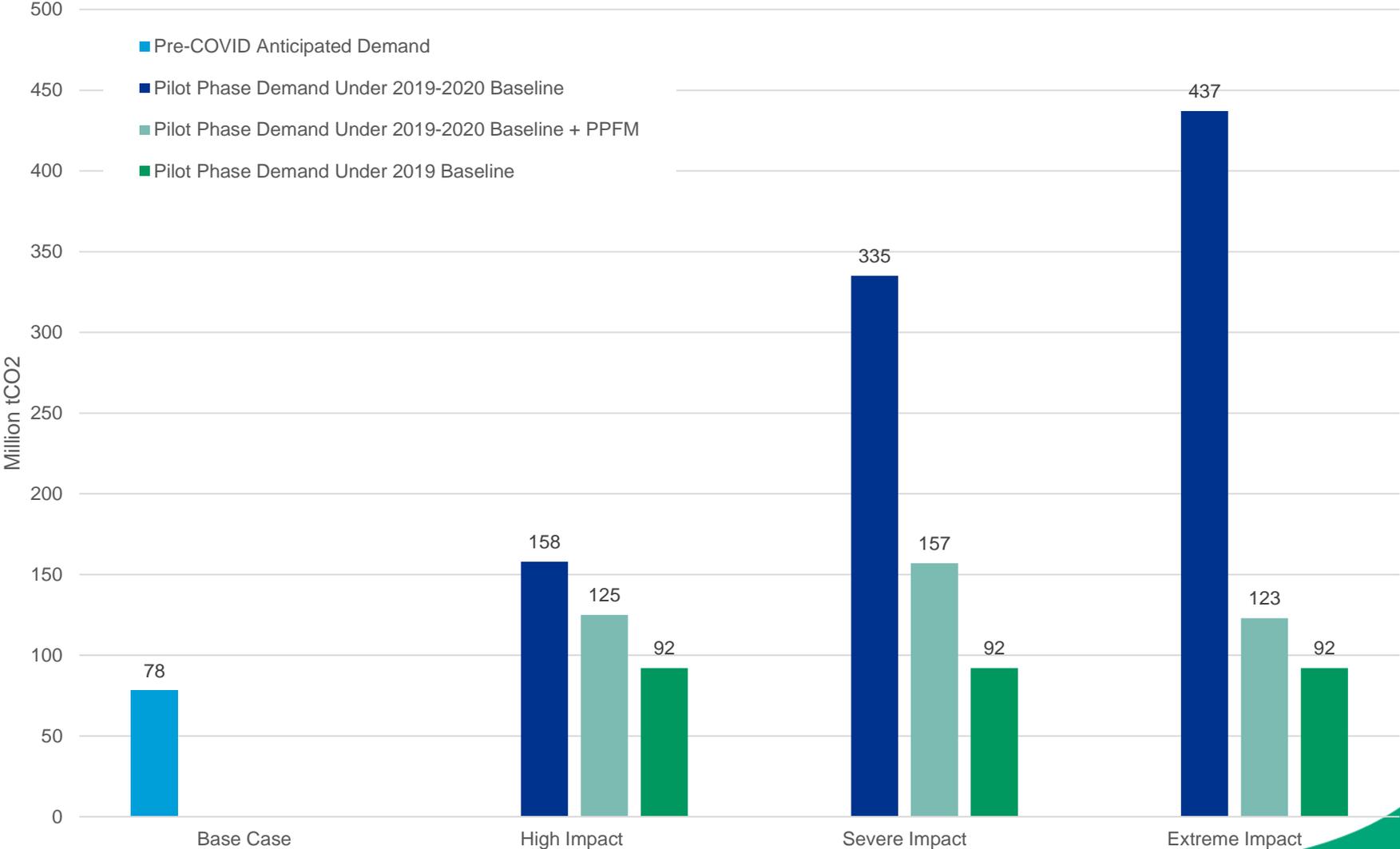
**Anticipated CORSIA Pilot Phase Demand Pre-COVID19 = 78 MtCO<sub>2</sub>**

**Anticipated CORSIA Pilot Phase Demand in Scenario 1 = 92 MtCO<sub>2</sub>**

- Projected Offset Obligation Pre-COVID
- Additional Obligation if Baseline Changed to 2019
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- Projected Offset Obligation Pre-COVID
- 2019 Baseline

# In “V” Scenario 1, with original 2019-2020 Baseline, PPFM modulates offset obligation

Scenario 1: Full, Fast Emissions Rebound  
2019-2020 Baseline Obligation vs. 2019 Changed Baseline Obligation



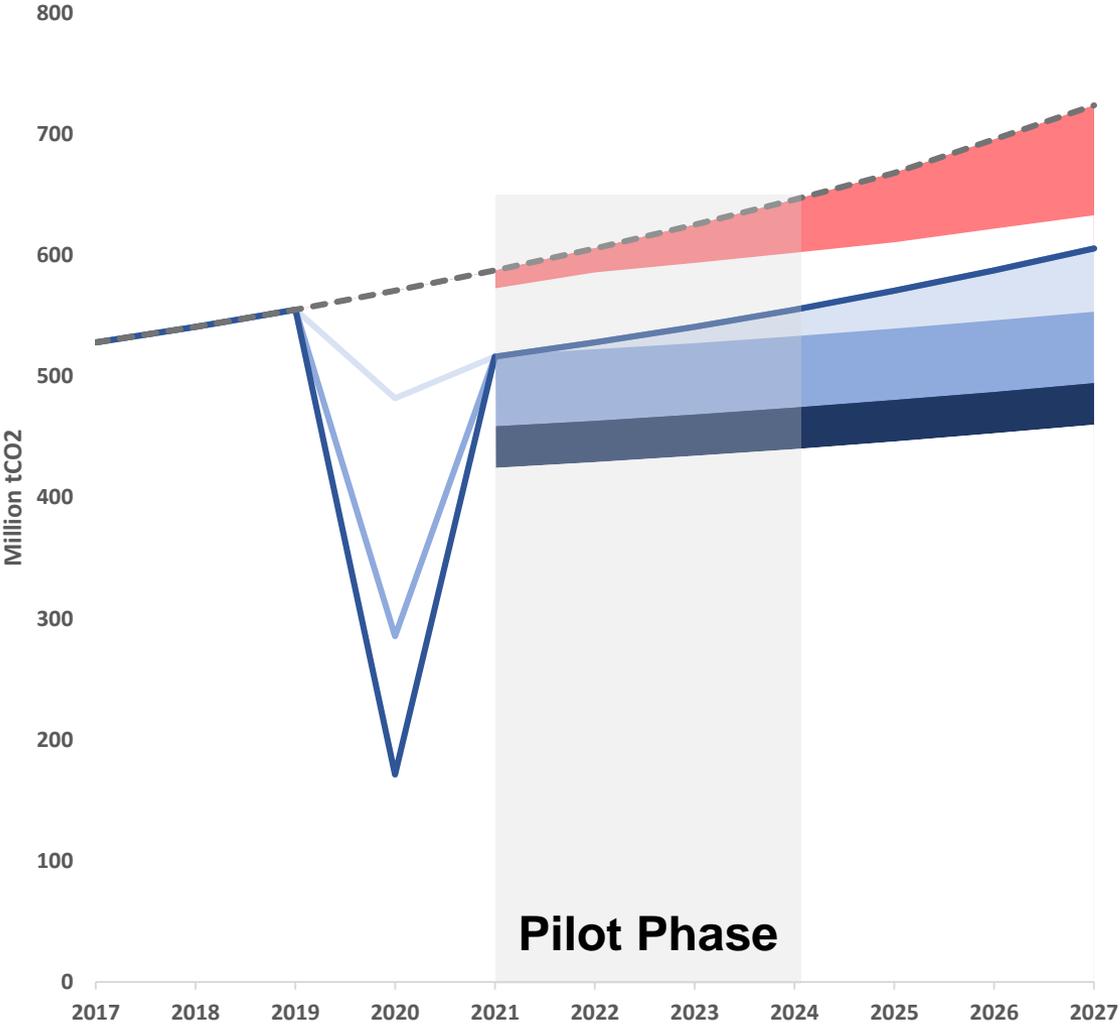
## Scenario 2

**The “V”: Slightly Attenuated  
Rebound, Dampened Long Term  
Growth**



# Scenario 2 : “V”, Baseline 2019-2020: PPFM reduces offset obligation to nearly pre-COVID levels

Scenario 2: Slightly Attenuated Rebound, Dampened Long Term Growth

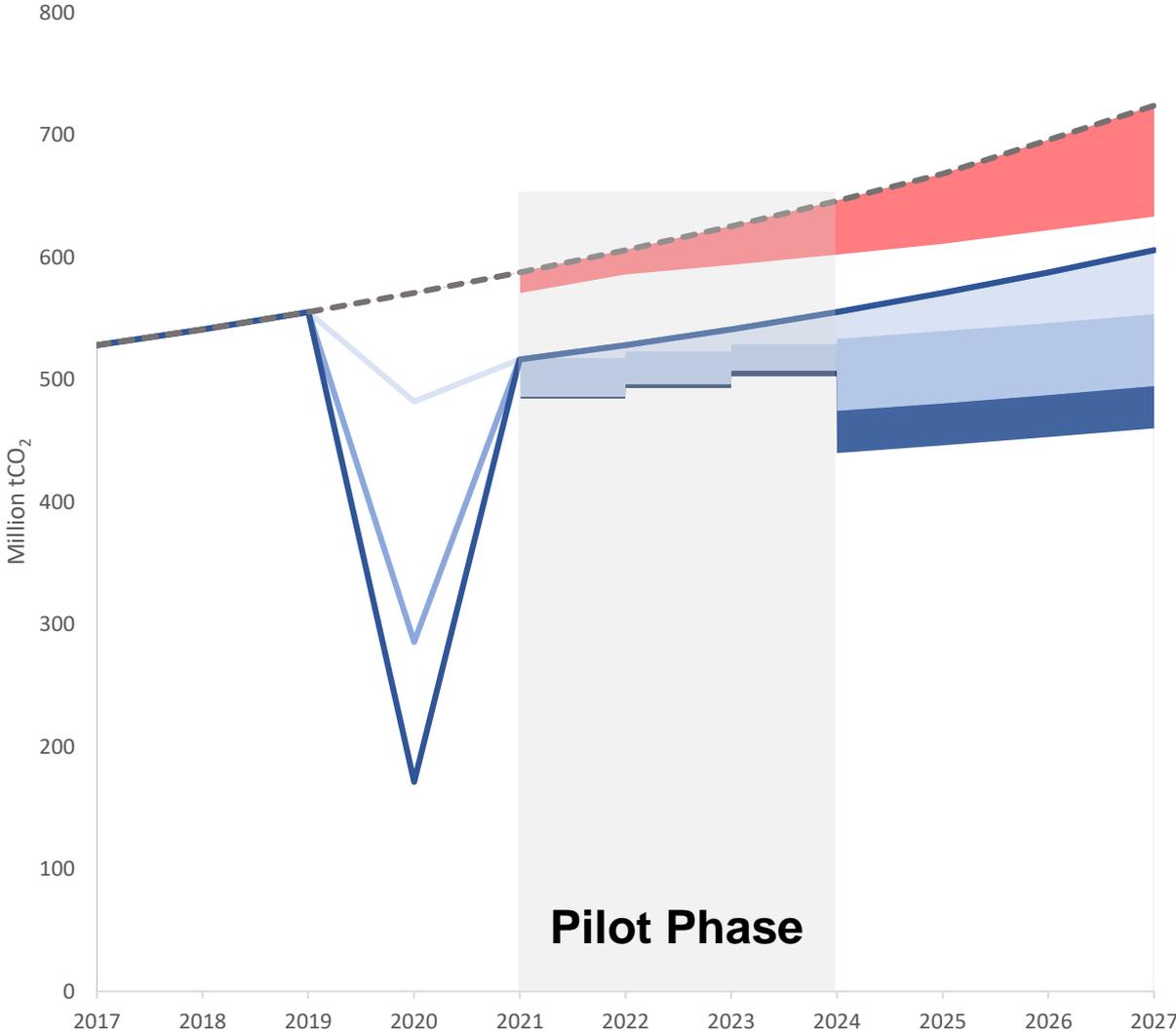


Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 2			
	High	Severe	Extreme
<b>2019-2020 Baseline</b>	19	195	298
<b>With Flexibility</b>	17	105	96

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- - - BAU

# Scenario 2 : “V”, Baseline 2019-2020: PPFM reduces offset obligation to nearly pre-COVID levels

Scenario 2: Slightly Attenuated Rebound, Dampened Long Term Growth + Flexibility Mechanism

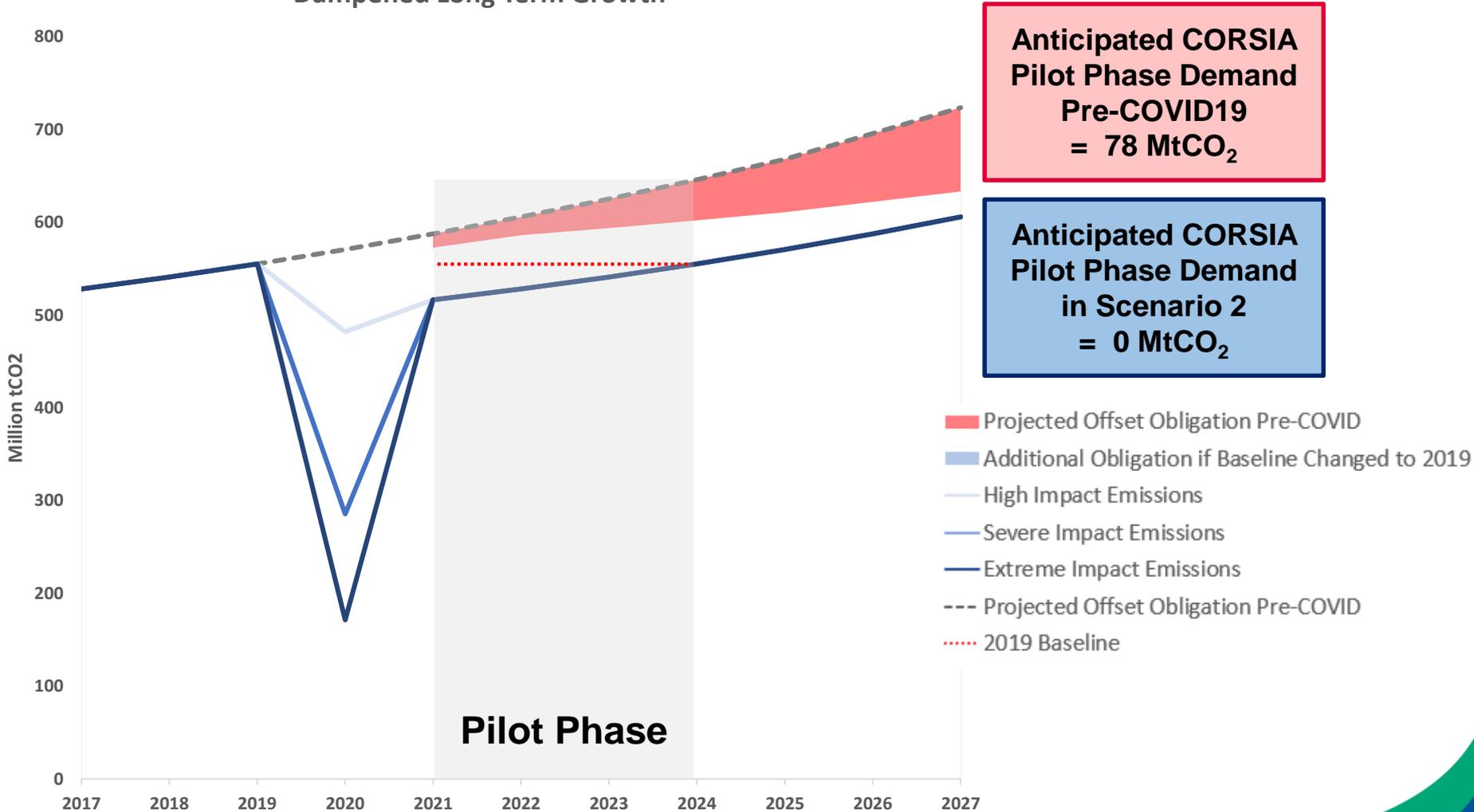


Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 2			
	High	Severe	Extreme
<b>2019-2020 Baseline</b>	19	195	298
<b>With Flexibility</b>	17	105	96

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- - - BAU

# The “V”: Dampened emissions, Baseline 2019 only: Offset obligation would vanish until 2024

Emissions Gap if Changed to 2019 Baseline  
Scenario 2: Slightly Attenuated Rebound,  
Dampened Long Term Growth



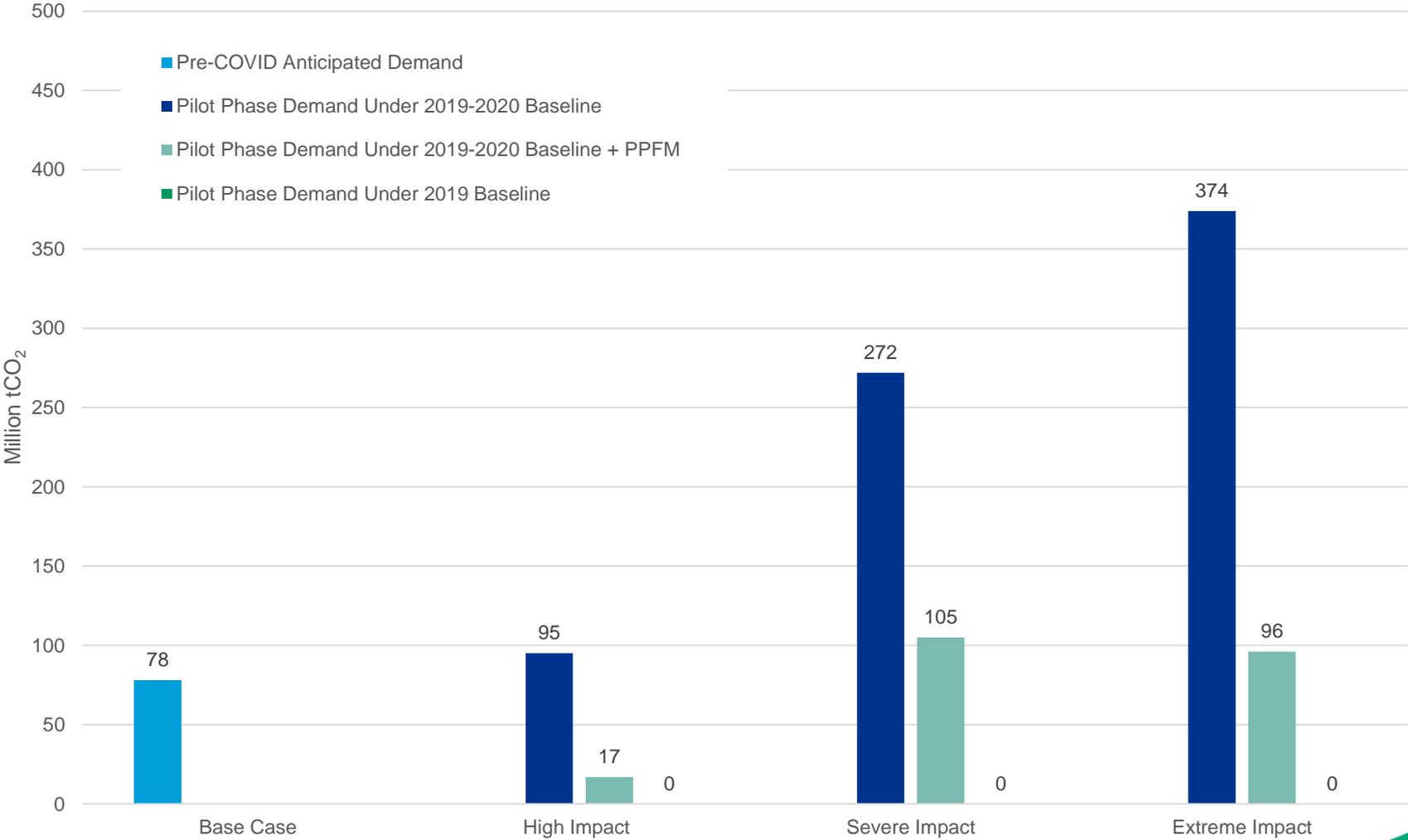
Anticipated CORSIA Pilot Phase Demand Pre-COVID19 = 78 MtCO<sub>2</sub>

Anticipated CORSIA Pilot Phase Demand in Scenario 2 = 0 MtCO<sub>2</sub>

- Projected Offset Obligation Pre-COVID
- Additional Obligation if Baseline Changed to 2019
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- Projected Offset Obligation Pre-COVID
- 2019 Baseline

# The “V”: PPFM reduces offset obligation to pre-COVID levels; 2019-only baseline eliminates offset obligation

Scenario 2: Slightly Attenuated Rebound, Dampened Long Term Growth  
2019-2020 Baseline Obligation vs. 2019 Changed Baseline Obligation



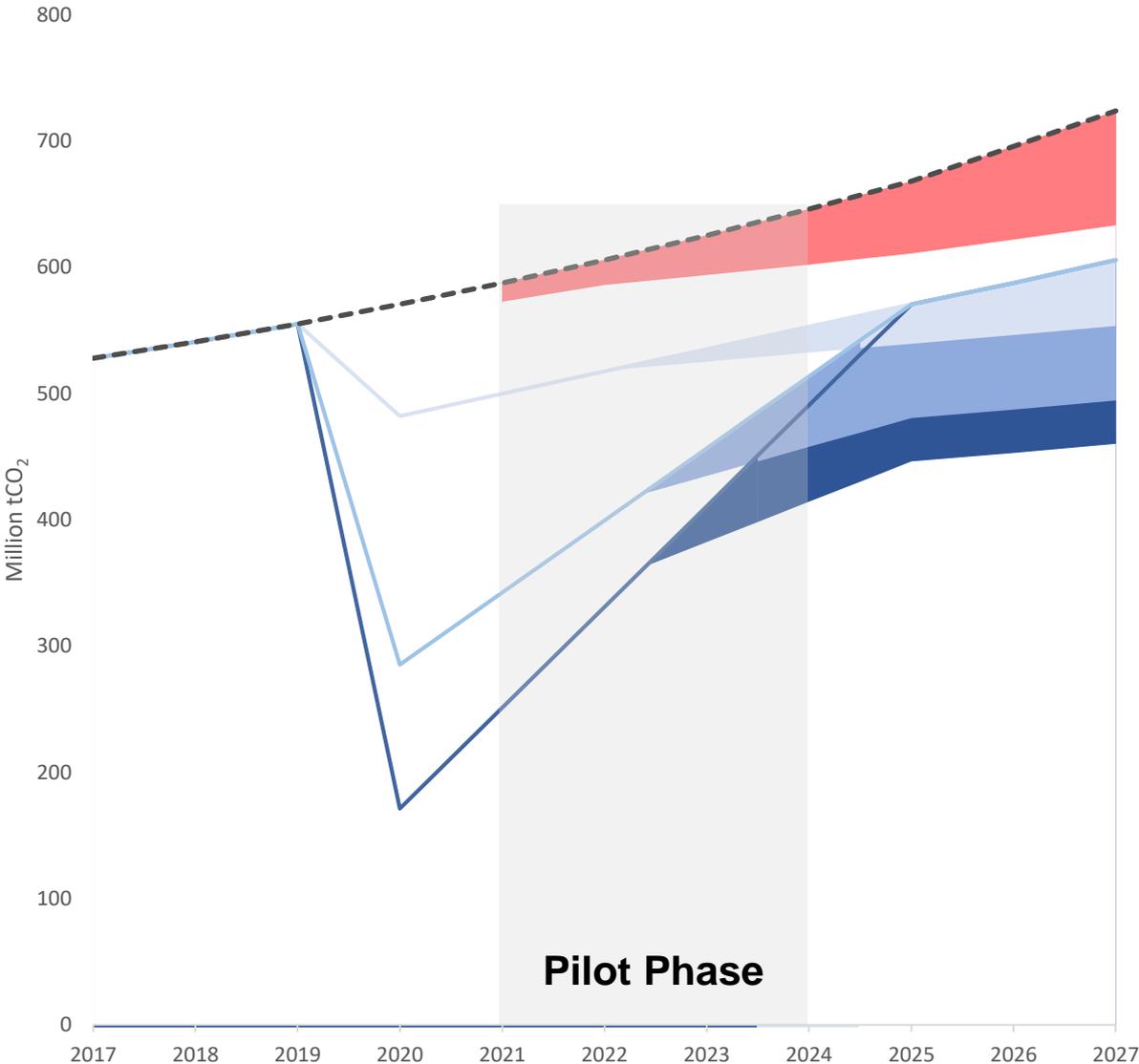
## Scenario 3

**The “U”: Slow Recovery,  
Dampened Long Term Growth**



# The “U”: Baseline 2019-2020: Pilot Phase Offset Obligation Greatly Reduced

Scenario 3: Slow Recovery, Dampened Long Term Growth



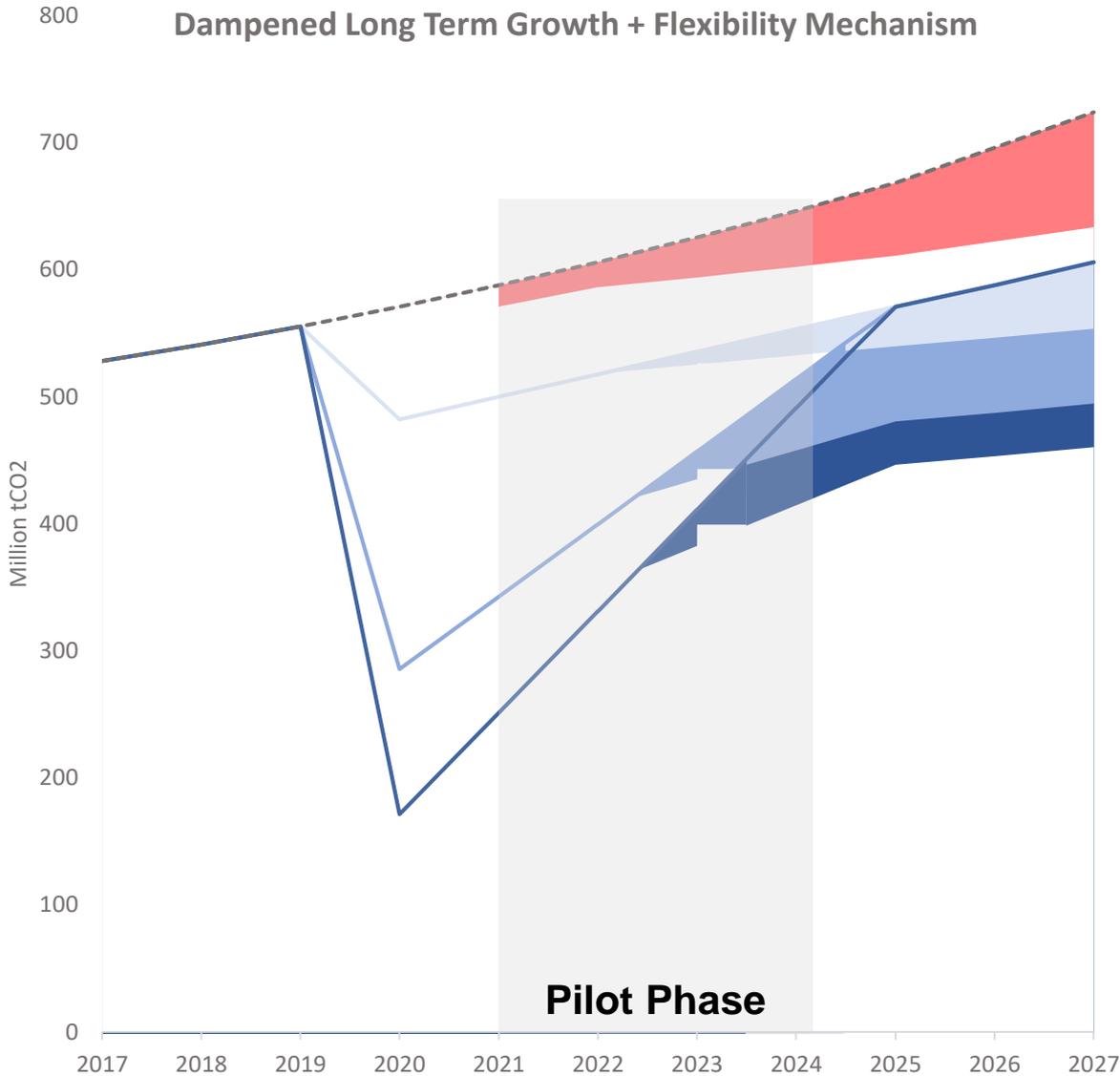
Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 3

	High	Severe	Extreme
<b>2019-2020 Baseline</b>	10	22	29
<b>With Flexibility</b>	9	14	12

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- - - BAU

# The “U”: Baseline 2019-2020: Pilot Phase Offset Obligation Greatly Reduced

Scenario 3: Slow Recovery,  
Dampened Long Term Growth + Flexibility Mechanism



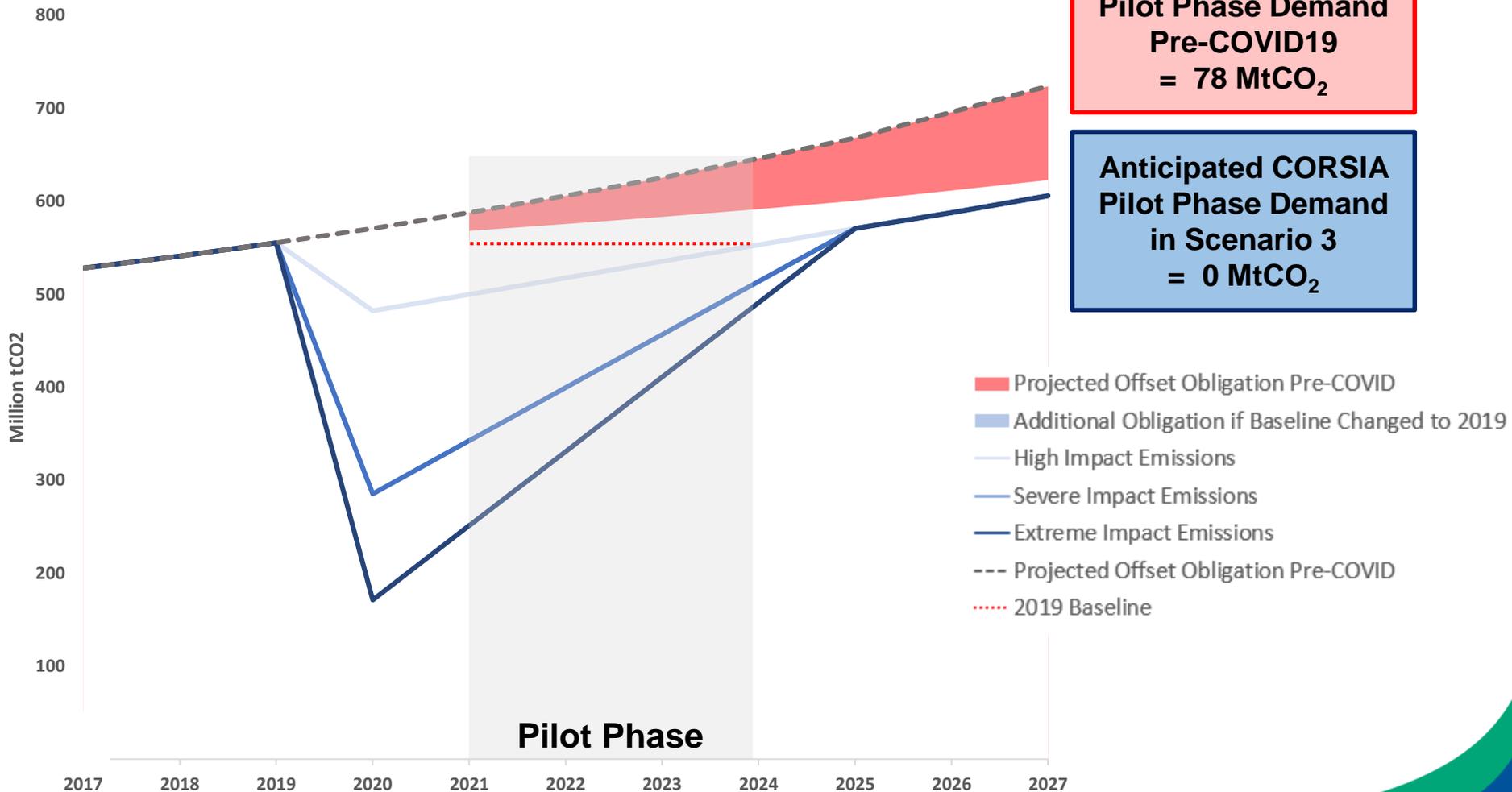
## Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 3

	High	Severe	Extreme
<b>2019-2020 Baseline</b>	10	22	29
<b>With Flexibility</b>	9	14	12

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- BAU

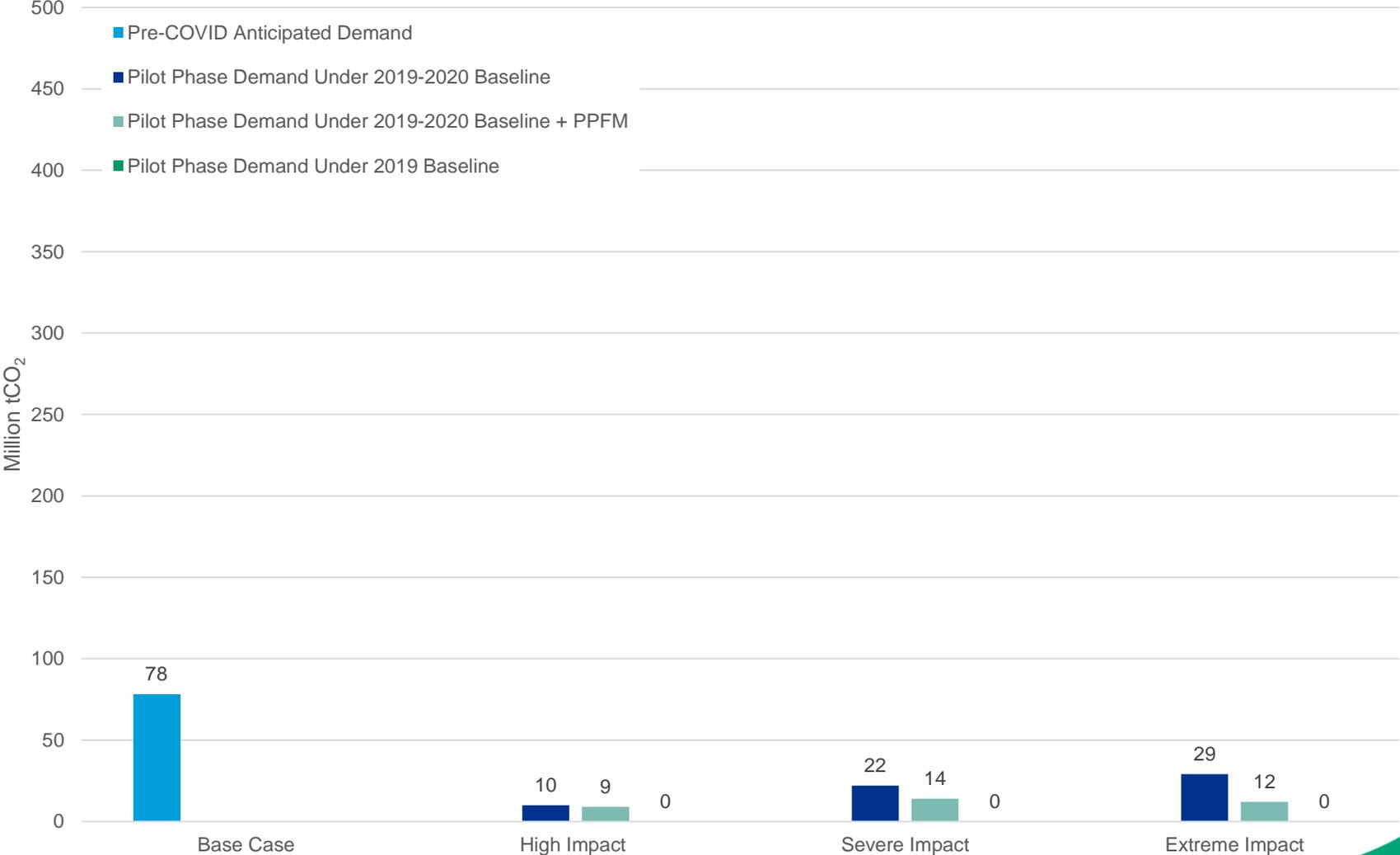
# The “U”: Baseline 2019-only: Offset Obligation would vanish until 2025

Emissions Gap if Changed to 2019 Baseline  
Scenario 3: Slow Recovery, Dampened Long Term Growth



# The “U”: Baseline 2019-only: Pilot Phase offset obligation would vanish

**Scenario 3: Slow Recovery, Dampened Long Term Growth**  
2019-2020 Baseline Obligation vs. 2019 Changed Baseline Obligation



# If baseline were changed to 2019, offset obligation in the “U” Scenario would be delayed beyond the Pilot Phase

## Scenario 3: (“U”)

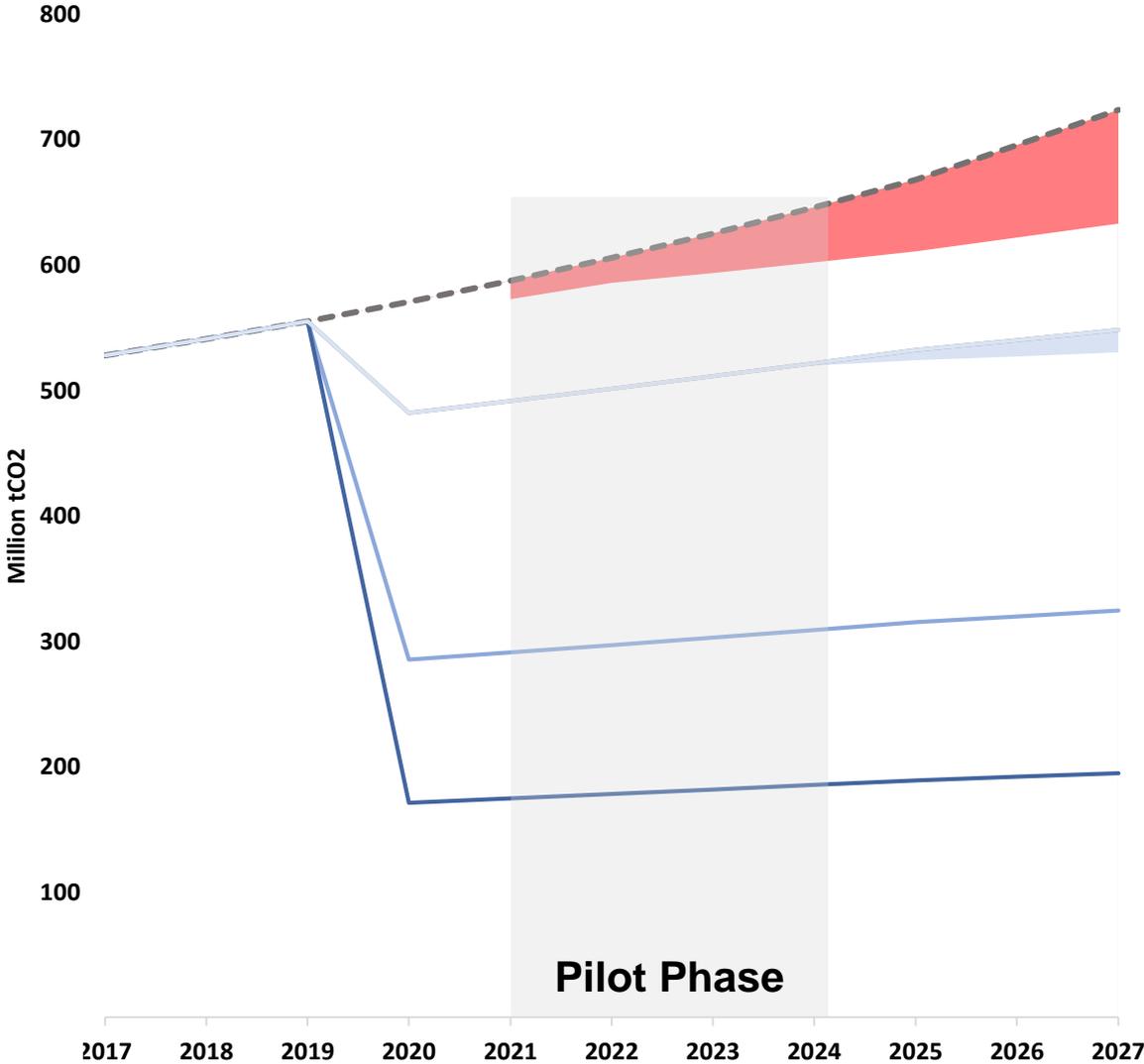


Scenario 4

**The “L”:** Emissions Fall, then  
Level Off

# The L: Emissions Level Off. Under Baseline 2019-2020, no offset obligations

Scenario 4: Emissions Fall, then Level Off

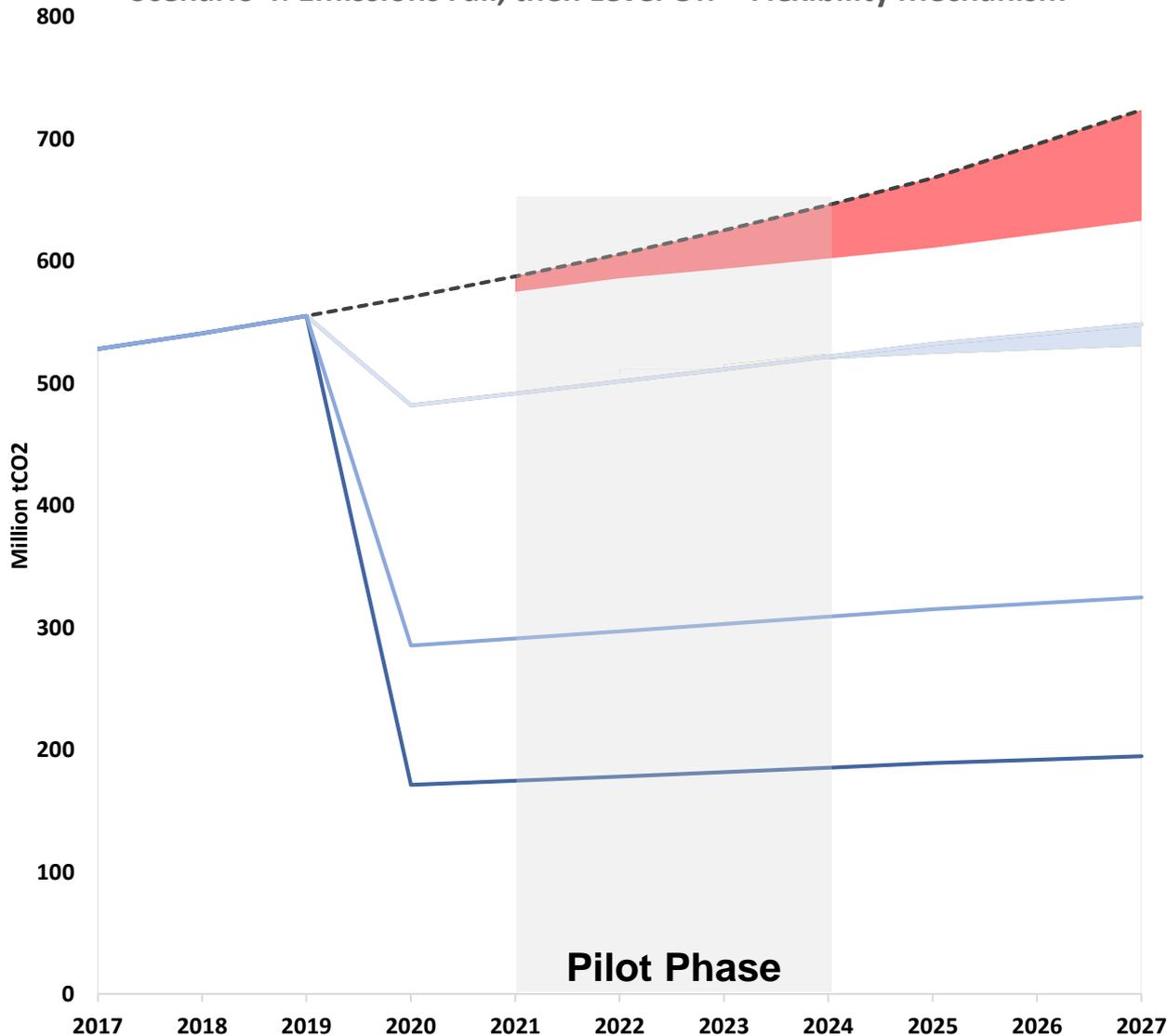


Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 4			
	High	Severe	Extreme
2019-2020 Baseline	0	0	0
With Flexibility	0	0	0

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- BAU

# The L: Emissions Level Off. Under Baseline 2019-2020, no offset obligations

Scenario 4: Emissions Fall, then Level Off + Flexibility Mechanism



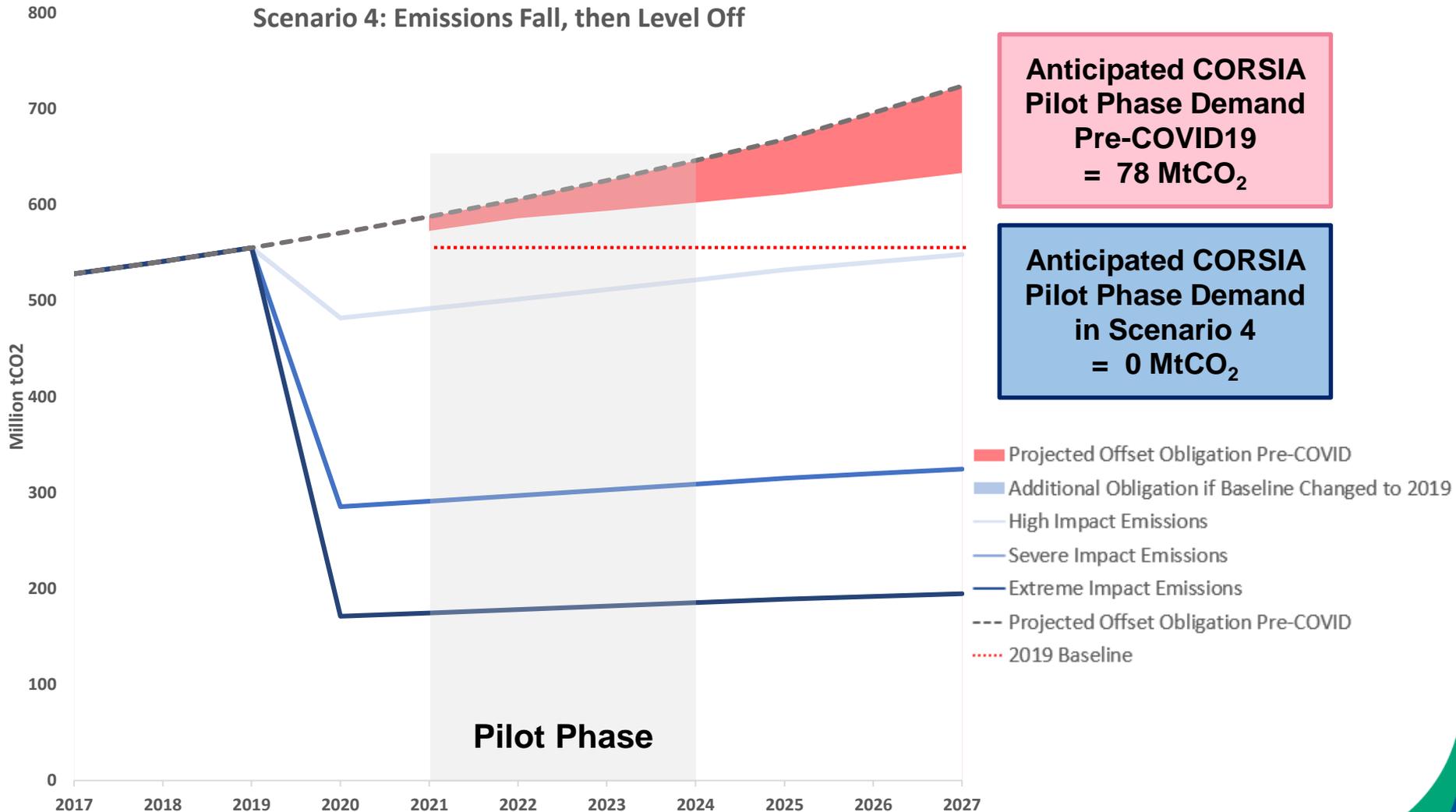
Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 4

	High	Severe	Extreme
2019-2020 Baseline	0	0	0
With Flexibility	0	0	0

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- - - BAU

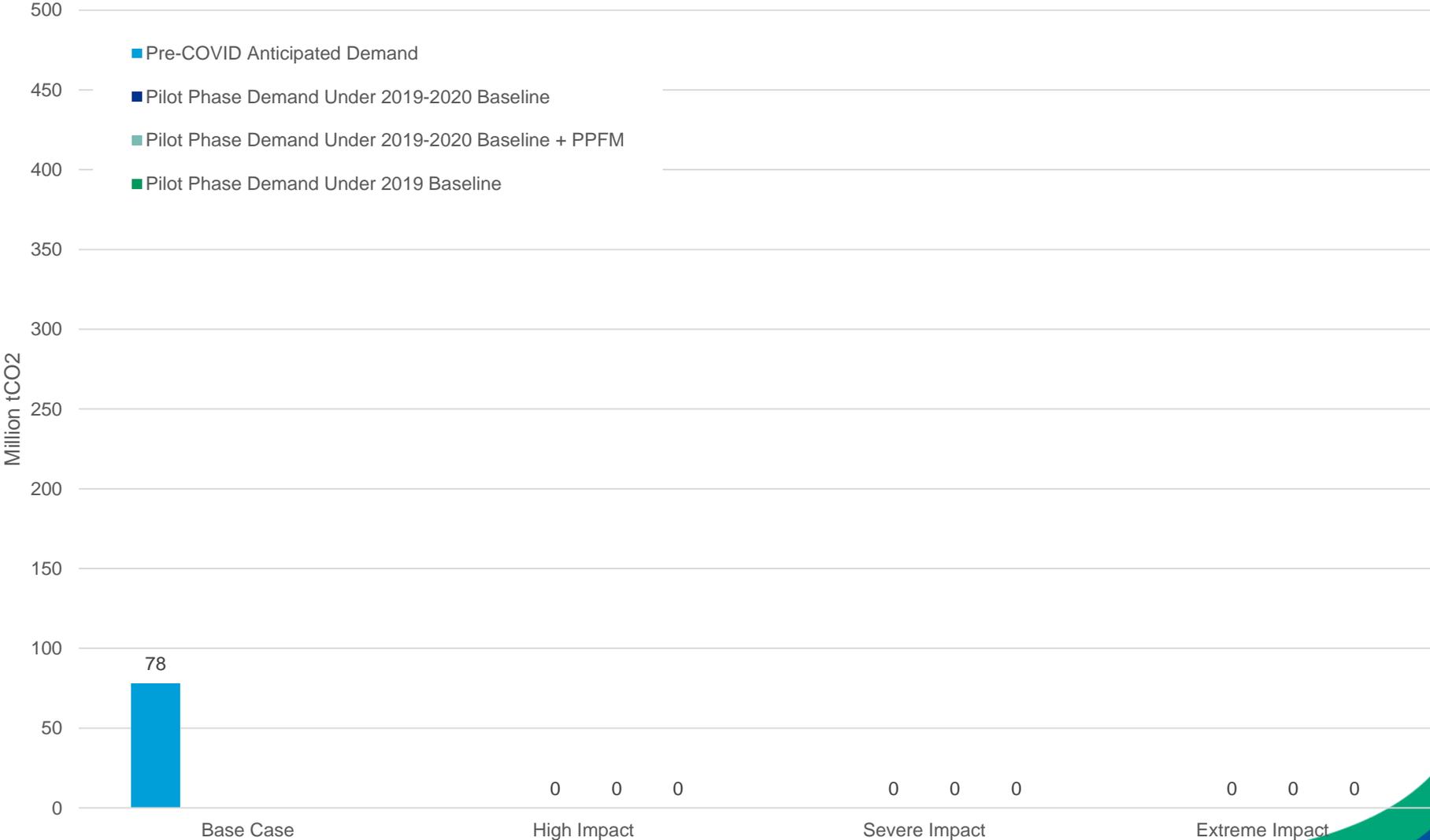
# The “L”: Emissions Level Off. Baseline 2019-only: Offset obligations would vanish beyond the Pilot Phase

Emissions Gap if Baseline Changed to 2019  
Scenario 4: Emissions Fall, then Level Off



# The L: Regardless of baseline, there will be no offset obligation in the Pilot Phase

Scenario 4: Slow Recovery, Dampened Long Term Growth  
2019-2020 Baseline Obligation vs. 2019 Changed Baseline Obligation



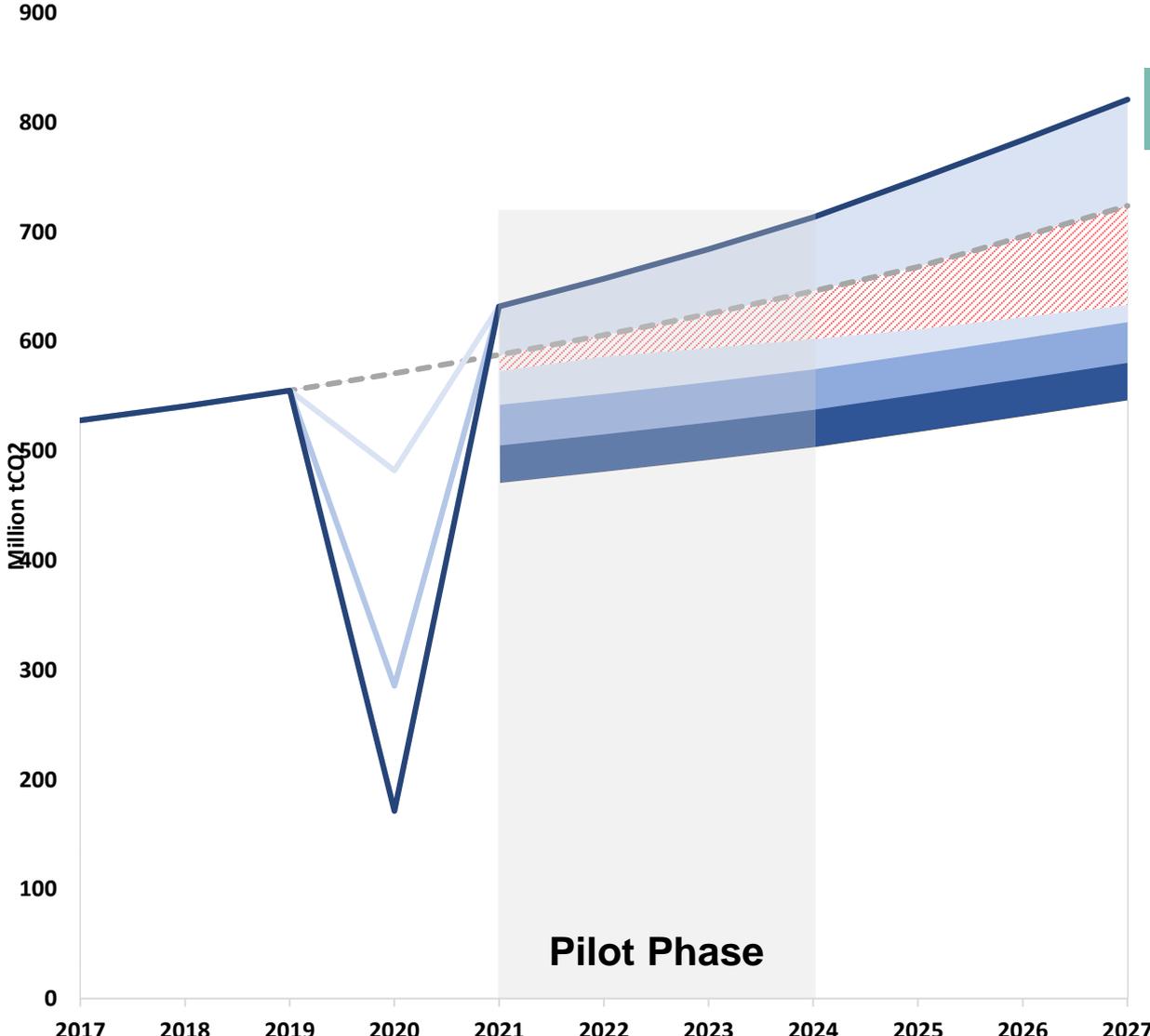
Scenario 5

**The Overshoot “v”: Emissions Exceed Pre-COVID Projections**



# The “v”: When emissions overshoot pre-COVID projections, all scenarios see increased obligation

Scenario 5: Emissions Exceed Pre-COVID Projections



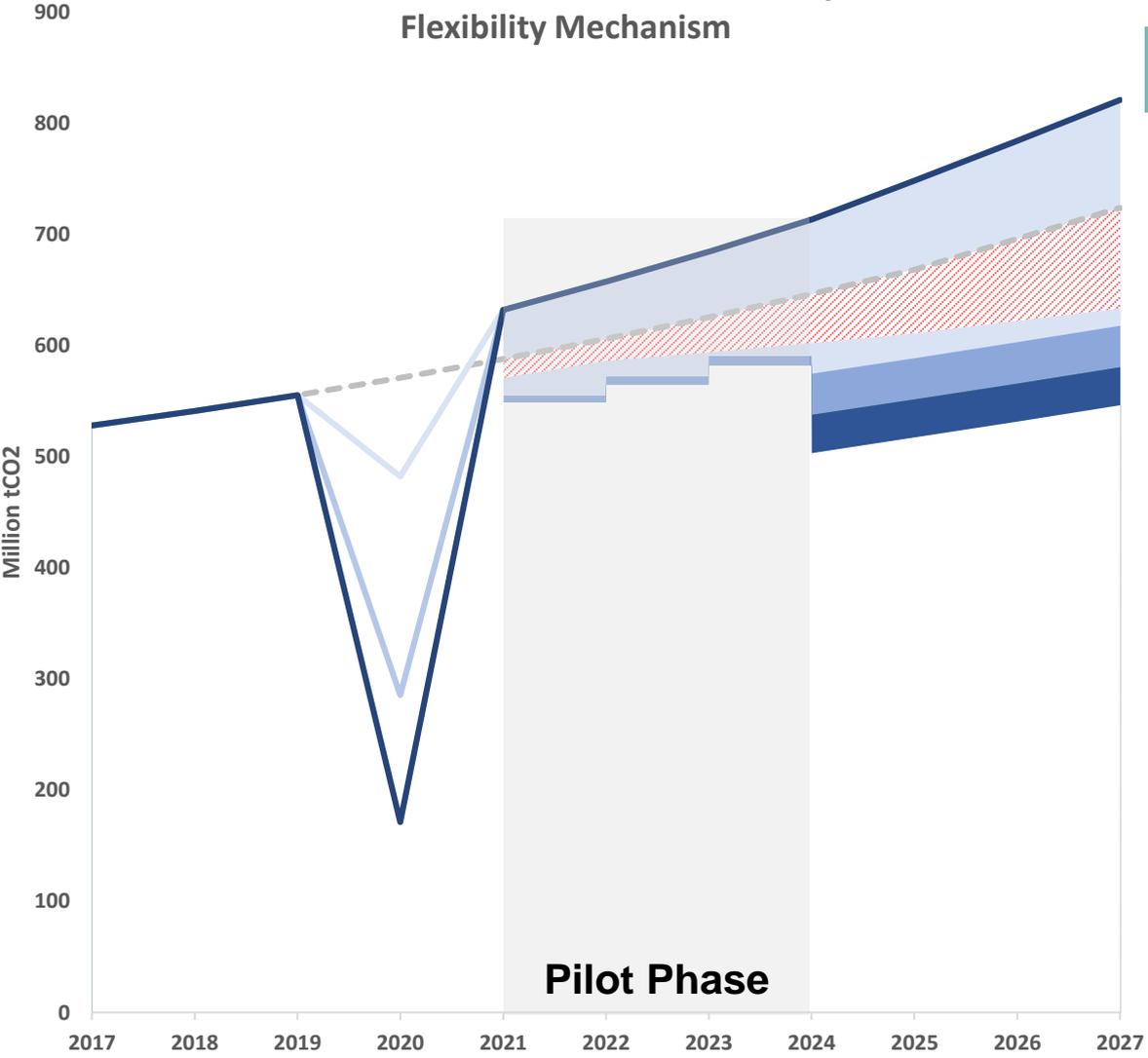
**Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 5**

	High	Severe	Extreme
<b>2019-2020 Baseline</b>	205	382	485
<b>With Flexibility</b>	156	172	131

- Pre-COVID Anticipated Demand
- Additional Offset Obligation, High Impact Scenario
- Additional Offset Obligation, Severe Impact Scenario
- Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- - - BAU

# The “V”: When emissions overshoot pre-COVID projections, all scenarios see increased obligation

Scenario 5: Emissions Exceed Pre-COVID Projections + Flexibility Mechanism



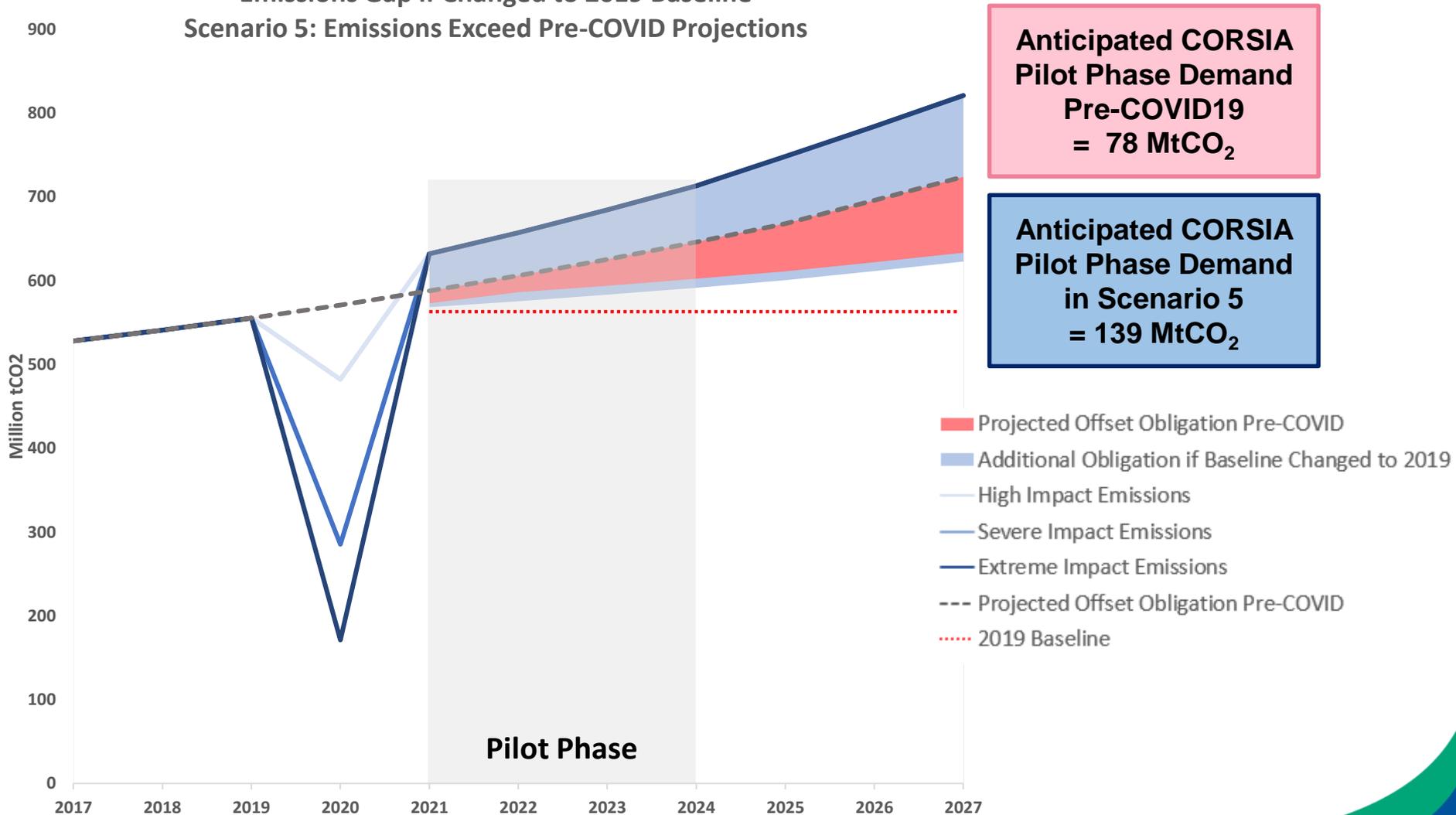
Anticipated CORSIA Pilot Phase (2021-2023) Demand in Scenario 5

	High	Severe	Extreme
<b>2019-2020 Baseline</b>	205	382	485
<b>With Flexibility</b>	156	172	131

- █ Pre-COVID Anticipated Demand
- █ Additional Offset Obligation, High Impact Scenario
- █ Additional Offset Obligation, Severe Impact Scenario
- █ Additional Offset Obligation, Extreme Impact Scenario
- High Impact Emissions
- Severe Impact Emissions
- Extreme Impact Emissions
- BAU

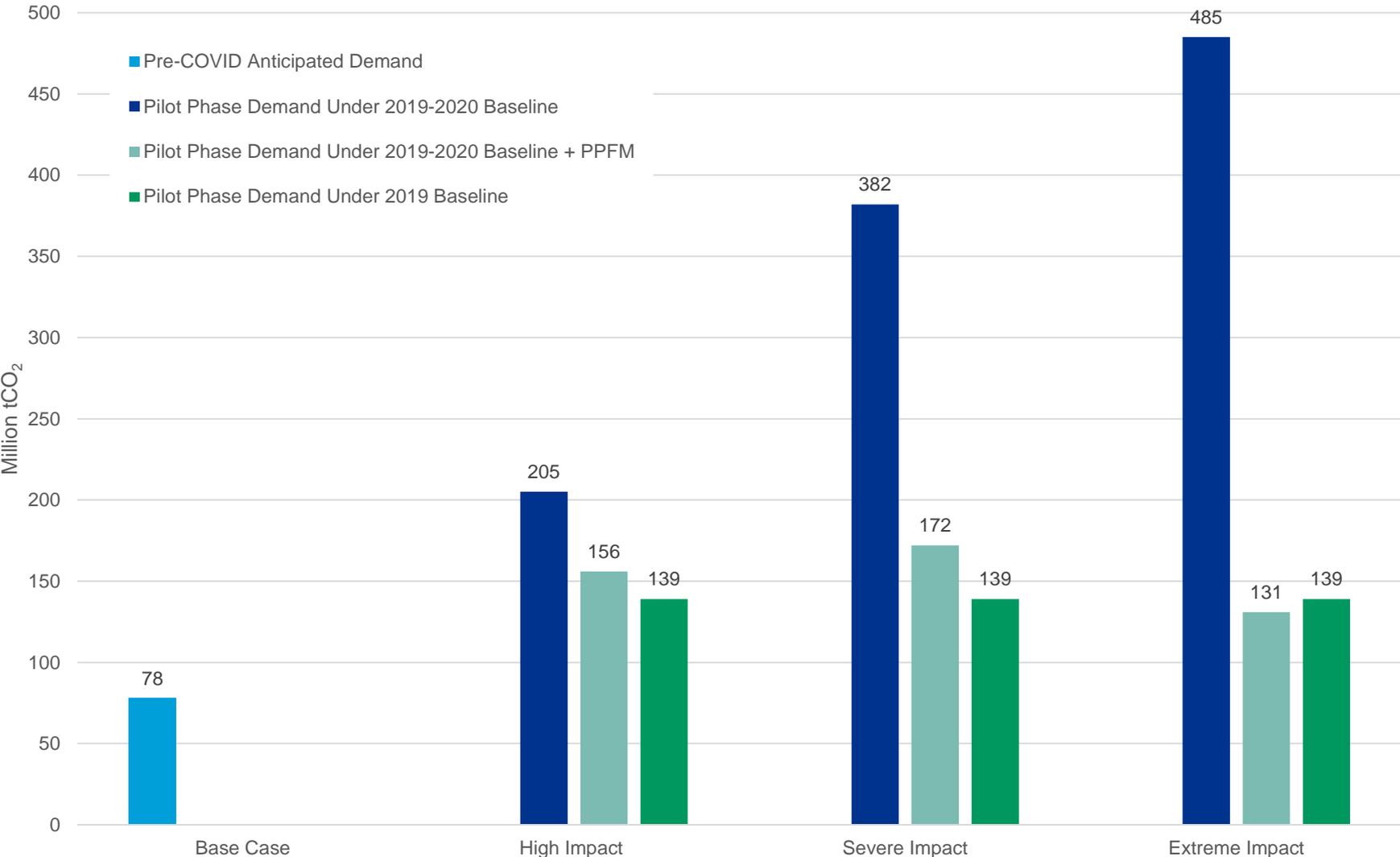
# The “v”: When emissions overshoot pre-COVID projections, a 2019 baseline would result in increased obligation

Emissions Gap if Changed to 2019 Baseline  
Scenario 5: Emissions Exceed Pre-COVID Projections



# The “√”: PPFM would mitigate offset obligation commensurate with 2019-only baseline

Scenario 5: Emissions Overshoot  
2019-2020 PPFM Obligation vs. 2019 Changed Baseline Obligation



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

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

\* All measurements in MMTCO<sub>2</sub>

# 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
<b>S1 (“V”)</b>	<b>78</b>	<b>+103%</b>	<b>+330%</b>	<b>+462%</b>	<b>+18%</b>	<b>+18%</b>	<b>+18%</b>
<i>S1+Flexibility</i>	-	+61%	+102%	+59%	-7%	-43%	-67%
<b>S2 (“V”)</b>	-	<b>-75%</b>	<b>+150%</b>	<b>+282%</b>	<b>-100%</b>	<b>-100%</b>	<b>-100%</b>
<i>S2+Flexibility</i>	-	-78%	+35%	+24%	-100%	-100%	-100%
<b>S3 (“U”)</b>	-	<b>-87%</b>	<b>-72%</b>	<b>-63%</b>	<b>-100%</b>	<b>-100%</b>	<b>-100%</b>
<i>S3+Flexibility</i>	-	-88%	-82%	-85%	-100%	-100%	-100%
<b>S4 (“L”)</b>	-	<b>-100%</b>	<b>-100%</b>	<b>-100%</b>	<b>-100%</b>	<b>-100%</b>	<b>-100%</b>
<i>S4+Flexibility</i>	-	-100%	-100%	-100%	-100%	-100%	-100%
<b>S5 (“V”)</b>	-	<b>+163%</b>	<b>+391%</b>	<b>+523%</b>	<b>+79%</b>	<b>+79%</b>	<b>+79%</b>
<i>S5+Flexibility</i>	-	+100%	+121%	+68%	+35%	-20%	-52%

\* All measurements in MMTCO<sub>2</sub>

# Full Program Demand Summary

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

\* All measurements in MMTCO<sub>2</sub>

# Q: What about Supply in the Pilot Phase?

A: With 2019-2020 Baseline, Supply is sufficient for Pilot Phase under all Scenarios

<b>CORSIA Eligible Supply</b>	<b>386-569 MMT*</b>
<b>Demand (Extreme Scenarios)</b>	<b>474-485 MMT</b>
<b>Demand (Extreme Scenarios with Flexibility Mechanism)</b>	<b>156-172 MMT</b>

- **Supply could increase further as ICAO TAB and Council consider second round of offset program applications for CORSIA Pilot Phase**

\*Findings from Ecosystem Marketplace's [March 2020 Analysis](#)

# Pilot Phase Post-COVID Scenarios

## Supply\* Relative to Demand

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

\* MMTCO<sub>2</sub>

\*Supply Scenarios from Ecosystem Marketplace [March 2020 Analysis](#)

**“Airline executives have warned of a slow recovery even after the virus is contained and have said demand may not recover to 2019 levels for years.”**

“U.S. Airline Shares Tumble as Buffett Sell-Off Adds to Worries,” 4 May 2020

**“...the world has changed for the airlines...”**

Warren Buffet, 2 May 2020



# CORSIA Baseline Conclusions

## Key Takeaways:

1

Changing the baseline to 2019 causes offset obligations in the Pilot Phase to vanish in most scenarios

2

Council has ensured CORSIA ample Pilot Phase supply; Flexibility Mechanism greatly reduces the Pilot Phase offset obligation

3

Changes to post-Pilot Phase offset obligation largely depend on timing and extent of aviation's rebound from COVID

## Bottom Line:

**A major change to CORSIA's structure should not be taken in a hurry.**

- *The question should be considered by ICAO's 190+ member Assembly at their next regular meeting in 2022, by which time there will be more information about aviation's rebound.*

Thank you!

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