



ICAO

ENVIRONMENT

ICAO Seminar on CORSIA

# Illustrative Exercise 1: Participation and Emissions Coverage in CORSIA

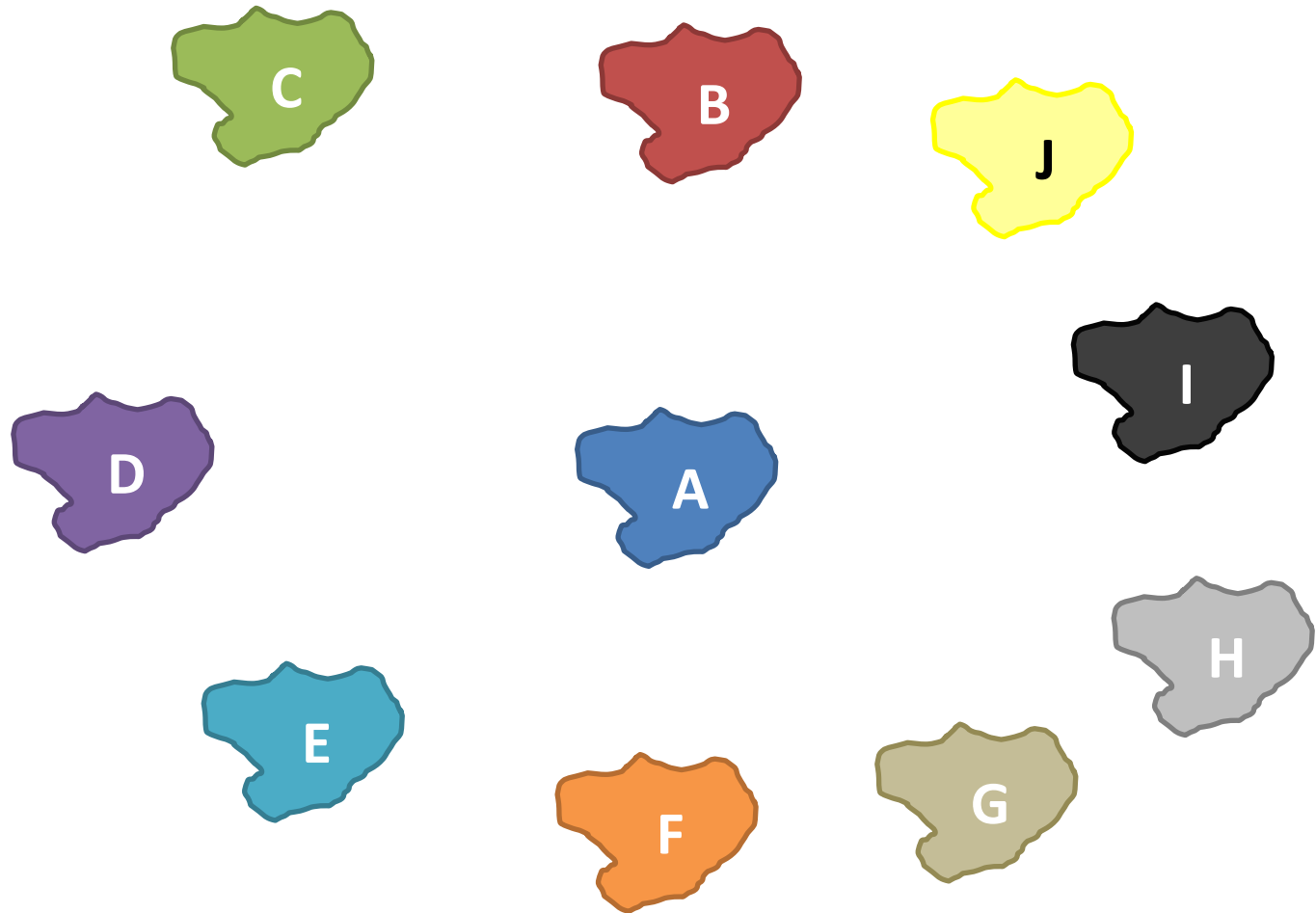
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ICAO Secretariat

**CORSIA**

# Introduction - The "CORSA World"

The "CORSA World" consists of 10 States (A to J)



## 11 Aircraft Operators are registered in 8 States of the “CORSA World”

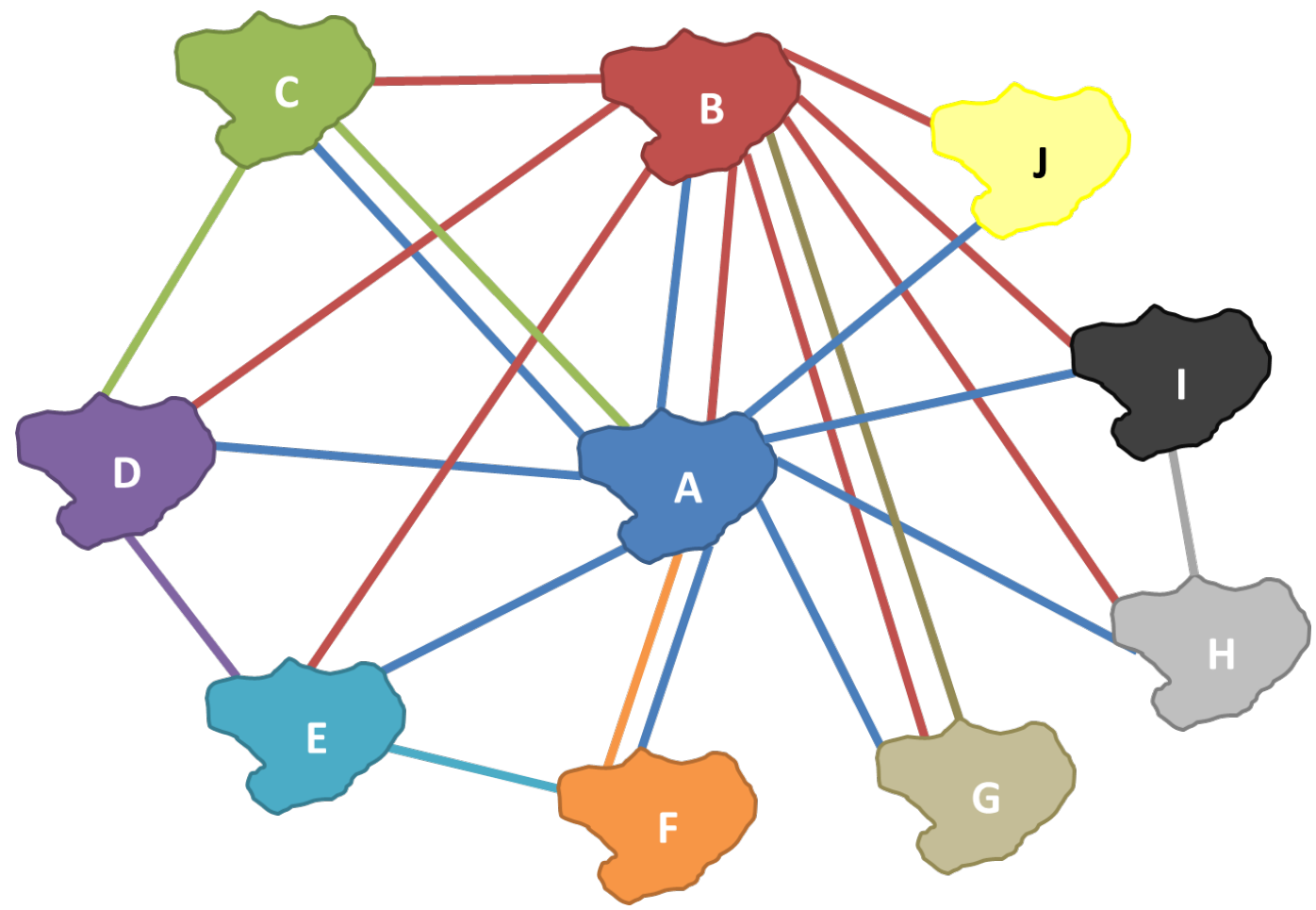


State	Airline
A	A1
A	A2
A	A3
B	B1
B	B2
C	C1
D	D1
E	E1
F	F1
G	G1
H	H1

(No Aircraft Operators registered in State I and Sate J)

# Introduction - The "CORSA World"

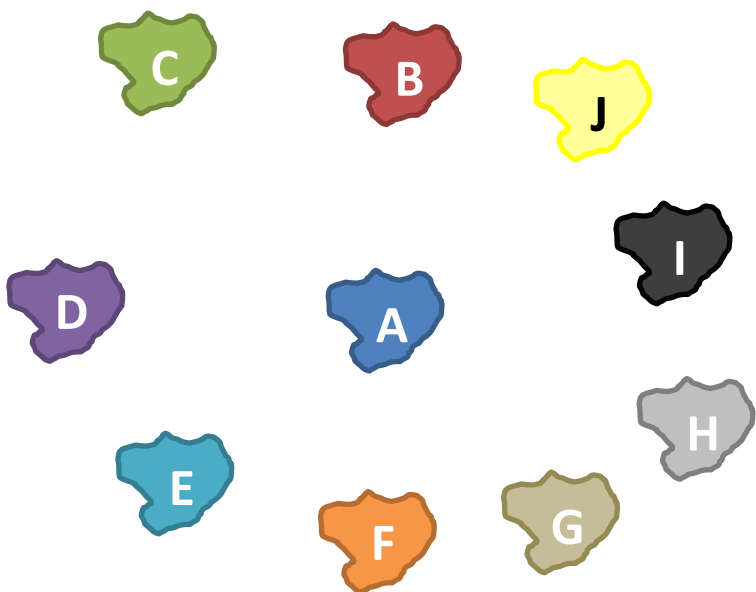
24 Routes flown by the Aircraft Operators in the "CORSA World"



# Introduction - The “CORsIA World”



Relevant assumption data for States in the “CORsIA World” are provided for the purpose of illustrative exercises



State	RTK (2018)	Note	Pilot phase (2021-2023)	First phase (2024-2026)
A	450		Voluntary Participant	Voluntary Participant
B	400		Voluntary Participant	Voluntary Participant
C	100	SIDs	-	-
D	30		Voluntary Participant	Voluntary Participant
E	8		-	-
F	6		-	Voluntary Participant
G	4		-	Voluntary Participant
H	2	LLDC	-	-
I	0	LDC	Voluntary Participant	Voluntary Participant
J	0		-	-

# Introduction - The “CORSA World”

For Aircraft Operators in the “CORSA World”, emissions data for selected years are assumed for the purpose of illustrative exercises



State	Airline	From	To	CO <sub>2</sub> (2018)	CO <sub>2</sub> (2019)	CO <sub>2</sub> (2020)	CO <sub>2</sub> (2021)	CO <sub>2</sub> (2024)	CO <sub>2</sub> (2027)
A	A1	A	B	50	52	54	55	60	66
A	A1	A	C	50	52	54	55	60	66
A	A1	A	D	50	52	54	55	60	66
A	A2	A	E	50	53	56	58	68	78
A	A2	A	F	50	53	56	58	68	78
A	A2	A	G	50	53	56	58	68	78
A	A3	A	H	50	54	59	63	80	100
A	A3	A	I	50	54	59	63	80	100
A	A3	A	J	50	54	59	63	80	100
B	B1	B	A	50	52	54	55	60	66
B	B1	B	C	50	52	54	55	60	66
B	B1	B	D	50	52	54	55	60	66
B	B1	B	E	50	52	54	55	60	66
B	B2	B	G	50	54	59	63	80	100
B	B2	B	H	50	54	59	63	80	100
B	B2	B	I	50	54	59	63	80	100
B	B2	B	J	50	54	59	63	80	100
C	C1	C	A	50	53	56	58	68	78
C	C1	C	D	50	53	56	58	68	78
D	D1	D	E	30	32	34	35	41	47
E	E1	E	F	8	9	10	11	14	17
F	F1	F	A	6	7	8	9	12	15
G	G1	G	B	4	5	6	7	10	13
H	H1	H	I	2	2	3	3	5	6

# Exercise 1-A / Assumption

**Assumption Table 1: Voluntary participating States in the pilot and the first phase**

State	Pilot phase (2021-2023)	First phase (2024-2026)
A	Voluntary Participant	Voluntary Participant
B	Voluntary Participant	Voluntary Participant
C	—	—
D	Voluntary Participant	Voluntary Participant
E	—	—
F	—	Voluntary Participant
G	—	Voluntary Participant
H	—	—
I	Voluntary Participant	Voluntary Participant
J	—	—

**Assumption Table 2: Emissions of individual airlines for different routes in selected years**

State	Airline	From	To	CO <sub>2</sub> (2019)	CO <sub>2</sub> (2020)	CO <sub>2</sub> (2021)	CO <sub>2</sub> (2024)
A	A1	A	B	52	54	55	60
A	A1	A	C	52	54	55	60
A	A1	A	D	52	54	55	60
A	A2	A	E	53	56	58	68
A	A2	A	F	53	56	58	68
A	A2	A	G	53	56	58	68
A	A3	A	H	54	59	63	80
A	A3	A	I	54	59	63	80
A	A3	A	J	54	59	63	80
B	B1	B	A	52	54	55	60
B	B1	B	C	52	54	55	60
B	B1	B	D	52	54	55	60
B	B1	B	E	52	54	55	60
B	B2	B	G	54	59	63	80
B	B2	B	H	54	59	63	80
B	B2	B	I	54	59	63	80
B	B2	B	J	54	59	63	80
C	C1	C	A	53	56	58	68
C	C1	C	D	53	56	58	68
D	D1	D	E	32	34	35	41
E	E1	E	F	9	10	11	14
F	F1	F	A	7	8	9	12
G	G1	G	B	5	6	7	10
H	H1	H	I	2	3	3	5
<b>Total international aviation CO<sub>2</sub></b>				<b>1062</b>	<b>1132</b>	<b>1181</b>	<b>1402</b>

# Exercise 1-A / Instruction

- a) Identify the routes that are covered by CORSIA in the pilot phase (2021) and first phase (2024)
- b) Identify CO<sub>2</sub> emissions covered on these routes
- c) Calculate the total CO<sub>2</sub> emissions covered by CORSIA in 2021 and 2024

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B				
A	C				
A	D				
A	E				
A	F				
A	G				
A	H				
A	I				
A	J				
B	A				
B	C				
B	D				
B	E				
B	G				
B	H				
B	I				
B	J				
C	A				
C	D				
D	E				
E	F				
F	A				
G	B				
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—		—	



# Exercise 1-A / Solution

a) Identify the routes that are covered by CORSIA in the pilot phase (2021) and first phase (2024)

**Assumption Table 1:** Voluntary participating States from the pilot and the first phase

State	Pilot phase (2021-2023)	First phase (2024-2026)
A	Voluntary Participant	Voluntary Participant
B	Voluntary Participant	Voluntary Participant
C	—	—
D	Voluntary Participant	Voluntary Participant
E	—	—
F	—	Voluntary Participant
G	—	Voluntary Participant
H	—	—
I	Voluntary Participant	Voluntary Participant
J	—	—

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B				
A	C				
A	D				
A	E				
A	F				
A	G				
A	H				
A	I				
A	J				
B	A				
B	C				
B	D				
B	E				
B	G				
B	H				
B	I				
B	J				
C	A				
C	D				
D	E				
E	F				
F	A				
G	B				
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—		—	

# Exercise 1-A / Solution

a) Identify the routes that are covered by CORSIA in the pilot phase (2021) and first phase (2024)

**Assumption Table 1:** Voluntary participating States from the pilot and the first phase

State	Pilot phase (2021-2023)	First phase (2024-2026)
A	Voluntary Participant	Voluntary Participant
B	Voluntary Participant	Voluntary Participant
C	—	—
D	Voluntary Participant	Voluntary Participant
E	—	—
F	—	Voluntary Participant
G	—	Voluntary Participant
H	—	—
I	Voluntary Participant	Voluntary Participant
J	—	—

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B	✓			
A	C				
A	D	✓			
A	E				
A	F				
A	G				
A	H				
A	I	✓			
A	J				
B	A	✓			
B	C				
B	D	✓			
B	E				
B	G				
B	H				
B	I	✓			
B	J				
C	A				
C	D				
D	E				
E	F				
F	A				
G	B				
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—		—	

# Exercise 1-A / Solution

a) Identify the routes that are covered by CORSIA in the pilot phase (2021) and first phase (2024)

**Assumption Table 1:** Voluntary participating States from the pilot and the first phase

State	Pilot phase (2021-2023)	First phase (2024-2026)
A	Voluntary Participant	Voluntary Participant
B	Voluntary Participant	Voluntary Participant
C	—	—
D	Voluntary Participant	Voluntary Participant
E	—	—
F	—	Voluntary Participant
G	—	Voluntary Participant
H	—	—
I	Voluntary Participant	Voluntary Participant
J	—	—

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B	✓		✓	
A	C				
A	D	✓		✓	
A	E				
A	F			✓	
A	G			✓	
A	H				
A	I	✓		✓	
A	J				
B	A	✓		✓	
B	C				
B	D	✓		✓	
B	E				
B	G			✓	
B	H				
B	I	✓		✓	
B	J				
C	A				
C	D				
D	E				
E	F				
F	A			✓	
G	B			✓	
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—		—	

# Exercise 1-A / Solution

b) Identify CO<sub>2</sub> emissions covered on these routes

State	Airline	From	To	CO <sub>2</sub> (2019)	CO <sub>2</sub> (2020)	CO <sub>2</sub> (2021)	CO <sub>2</sub> (2024)
A	A1	A	B	52	54	55	60
A	A1	A	C	52	54	55	60
A	A1	A	D	52	54	55	60
A	A2	A	E	53	56	58	68
A	A2	A	F	53	56	58	68
A	A2	A	G	53	56	58	68
A	A3	A	H	54	59	63	80
A	A3	A	I	54	59	63	80
A	A3	A	J	54	59	63	80
B	B1	B	A	52	54	55	60
B	B1	B	C	52	54	55	60
B	B1	B	D	52	54	55	60
B	B1	B	E	52	54	55	60
B	B2	B	G	54	59	63	80
B	B2	B	H	54	59	63	80
B	B2	B	I	54	59	63	80
B	B2	B	J	54	59	63	80
C	C1	C	A	53	56	58	68
C	C1	C	D	53	56	58	68
D	D1	D	E	32	34	35	41
E	E1	E	F	9	10	11	14
F	F1	F	A	7	8	9	12
G	G1	G	B	5	6	7	10
H	H1	H	I	2	3	3	5
<b>Total international aviation CO<sub>2</sub></b>				<b>1062</b>	<b>1132</b>	<b>1181</b>	<b>1402</b>

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B	✓		✓	
A	C				
A	D	✓		✓	
A	E				
A	F			✓	
A	G			✓	
A	H				
A	I	✓		✓	
A	J				
B	A	✓		✓	
B	C				
B	D	✓		✓	
B	E				
B	G			✓	
B	H				
B	I	✓		✓	
B	J				
C	A				
C	D				
D	E				
E	F				
F	A			✓	
G	B			✓	
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—		—	

# Exercise 1-A / Solution

b) Identify CO<sub>2</sub> emissions covered on these routes

State	Airline	From	To	CO <sub>2</sub> (2019)	CO <sub>2</sub> (2020)	CO <sub>2</sub> (2021)	CO <sub>2</sub> (2024)
A	A1	A	B	52	54	55	60
A	A1	A	C	52	54	55	60
A	A1	A	D	52	54	55	60
A	A2	A	E	53	56	58	68
A	A2	A	F	53	56	58	68
A	A2	A	G	53	56	58	68
A	A3	A	H	54	59	63	80
A	A3	A	I	54	59	63	80
A	A3	A	J	54	59	63	80
B	B1	B	A	52	54	55	60
B	B1	B	C	52	54	55	60
B	B1	B	D	52	54	55	60
B	B1	B	E	52	54	55	60
B	B2	B	G	54	59	63	80
B	B2	B	H	54	59	63	80
B	B2	B	I	54	59	63	80
B	B2	B	J	54	59	63	80
C	C1	C	A	53	56	58	68
C	C1	C	D	53	56	58	68
D	D1	D	E	32	34	35	41
E	E1	E	F	9	10	11	14
F	F1	F	A	7	8	9	12
G	G1	G	B	5	6	7	10
H	H1	H	I	2	3	3	5
<b>Total international aviation CO<sub>2</sub></b>				<b>1062</b>	<b>1132</b>	<b>1181</b>	<b>1402</b>

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B	✓	55	✓	
A	C				
A	D	✓	55	✓	
A	E				
A	F			✓	
A	G			✓	
A	H				
A	I	✓	63	✓	
A	J				
B	A	✓	55	✓	
B	C				
B	D	✓	55	✓	
B	E				
B	G			✓	
B	H				
B	I	✓	63	✓	
B	J				
C	A				
C	D				
D	E				
E	F				
F	A			✓	
G	B			✓	
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—		—	

# Exercise 1-A / Solution

b) Identify CO<sub>2</sub> emissions covered on these routes

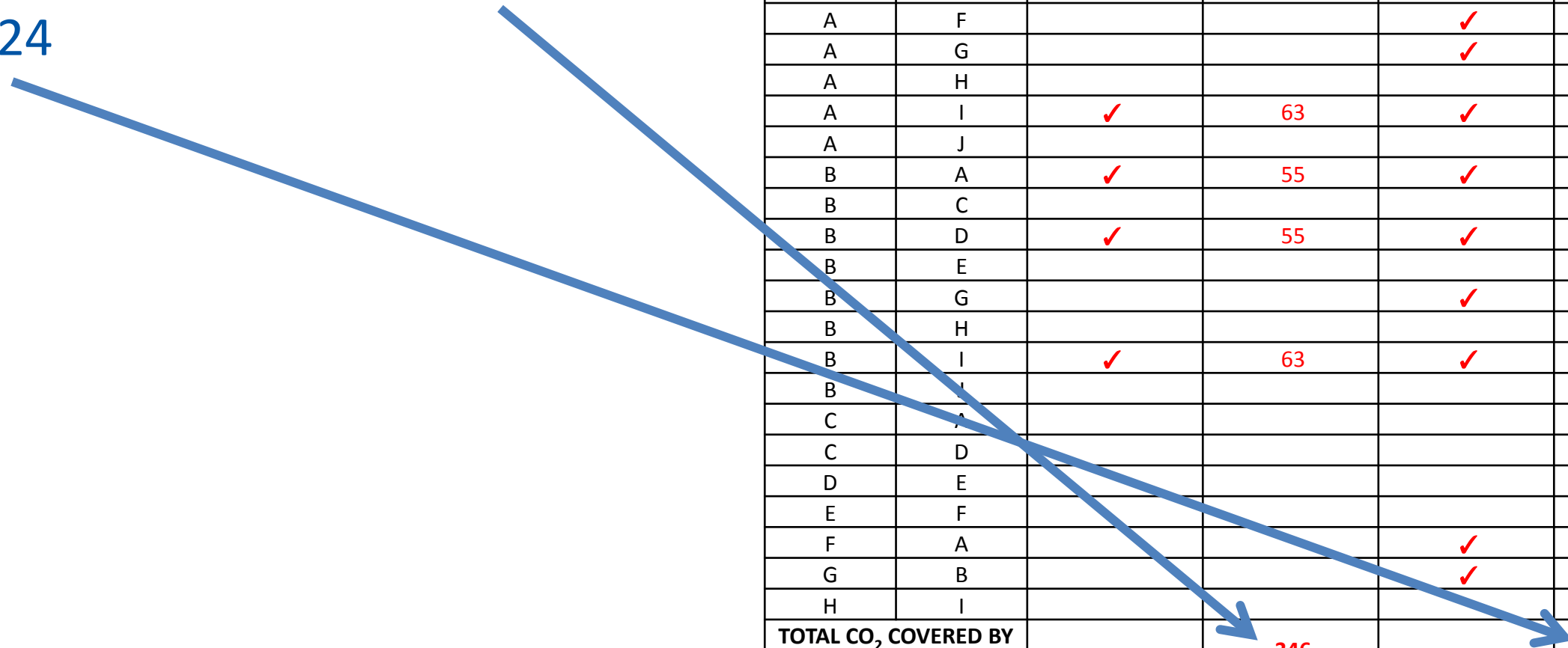
State	Airline	From	To	CO <sub>2</sub> (2019)	CO <sub>2</sub> (2020)	CO <sub>2</sub> (2021)	CO <sub>2</sub> (2024)
A	A1	A	B	52	54	55	60
A	A1	A	C	52	54	55	60
A	A1	A	D	52	54	55	60
A	A2	A	E	53	56	58	68
A	A2	A	F	53	56	58	68
A	A2	A	G	53	56	58	68
A	A3	A	H	54	59	63	80
A	A3	A	I	54	59	63	80
A	A3	A	J	54	59	63	80
B	B1	B	A	52	54	55	60
B	B1	B	C	52	54	55	60
B	B1	B	D	52	54	55	60
B	B1	B	E	52	54	55	60
B	B2	B	G	54	59	63	80
B	B2	B	H	54	59	63	80
B	B2	B	I	54	59	63	80
B	B2	B	J	54	59	63	80
C	C1	C	A	53	56	58	68
C	C1	C	D	53	56	58	68
D	D1	D	E	32	34	35	41
E	E1	E	F	9	10	11	14
F	F1	F	A	7	8	9	12
G	G1	G	B	5	6	7	10
H	H1	H	I	2	3	3	5
<b>Total international aviation CO<sub>2</sub></b>				<b>1062</b>	<b>1132</b>	<b>1181</b>	<b>1402</b>

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B	✓	55	✓	60
A	C				
A	D	✓	55	✓	60
A	E				
A	F			✓	68
A	G			✓	68
A	H				
A	I	✓	63	✓	80
A	J				
B	A	✓	55	✓	60
B	C				
B	D	✓	55	✓	60
B	E				
B	G			✓	80
B	H				
B	I	✓	63	✓	80
B	J				
C	A				
C	D				
D	E				
E	F				
F	A			✓	12
G	B			✓	10
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—		—	

# Exercise 1-A / Solution

c) Calculate the total CO<sub>2</sub> emissions covered by CORSIA in 2021 and 2024

Route based approach		Pilot Phase		First Phase	
From	To	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2021)	Covered? (Tick ✓ if YES)	CO <sub>2</sub> (2024)
A	B	✓	55	✓	60
A	C				
A	D	✓	55	✓	60
A	E				
A	F			✓	68
A	G			✓	68
A	H				
A	I	✓	63	✓	80
A	J				
B	A	✓	55	✓	60
B	C				
B	D	✓	55	✓	60
B	E				
B	G			✓	80
B	H				
B	I	✓	63	✓	80
B	J				
C	A				
C	D				
D	E				
E	F				
F	A			✓	12
G	B			✓	10
H	I				
<b>TOTAL CO<sub>2</sub> COVERED BY CORSIA</b>		—	<b>346</b>	—	<b>638</b>



# Exercise 1-B / Assumption and Instruction

Based on the Assumption Table 3,

- Calculate individual RTK share for each State
- Calculate cumulative RTK shares
- Identify States that are exempted from the CORSIA in the 2nd phase, and reasons why

**Assumption Table 3:** Revenue-Tonne Kilometres (RTKs) per State in 2018

State	RTK (2018)	Note
A	450	
B	400	
C	100	SIDS
D	30	
E	8	
F	6	
G	4	
H	2	LLDC
I	0	LDC
J	0	

State	RTK (2018)	Individual RTK share (2018)	Cumulative RTK share (2018)	Exempted (YES/NO)	If Exempted, Why?
A	450				
B	400				
C	100				
D	30				
E	8				
F	6				
G	4				
H	2				
I	0				
J	0		100.00%		
<b>Total</b>	<b>1000</b>	<b>100.00%</b>	—	—	—



# Exercise 1-B / Solution

Based on the Assumption Table 3,

- Calculate individual RTK share for each State ✓
- Calculate cumulative RTK shares
- Identify States that are exempted from the CORSIA in the 2nd phase, and reasons why

**Assumption Table 3:** Revenue-Tonne Kilometres (RTKs) per State in 2018

State	RTK (2018)	Note
A	450	
B	400	
C	100	SIDS
D	30	
E	8	
F	6	
G	4	
H	2	LLDC
I	0	LDC
J	0	

State	RTK (2018)	Individual RTK share (2018)	Cumulative RTK share (2018)	Exempted (YES/NO)	If Exempted, Why?
A	450	45.00%			
B	400	40.00%			
C	100	10.00%			
D	30	3.00%			
E	8	0.80%			
F	6	0.60%			
G	4	0.40%			
H	2	0.20%			
I	0	0.00%			
J	0	0.00%	100.00%		
<b>Total</b>	<b>1000</b>	<b>100.00%</b>	—	—	—

# Exercise 1-B / Solution

Based on the Assumption Table 3,

- Calculate individual RTK share for each State ✓
- Calculate cumulative RTK shares ✓
- Identify States that are exempted from the CORSIA in the 2nd phase, and reasons why

**Assumption Table 3:** Revenue-Tonne Kilometres (RTKs) per State in 2018

State	RTK (2018)	Note
A	450	
B	400	
C	100	SIDS
D	30	
E	8	
F	6	
G	4	
H	2	LLDC
I	0	LDC
J	0	

State	RTK (2018)	Individual RTK share (2018)	Cumulative RTK share (2018)	Exempted (YES/NO)	If Exempted, Why?
A	450	45.00%	45.00%		
B	400	40.00%	85.00%		
C	100	10.00%	95.00%		
D	30	3.00%	98.00%		
E	8	0.80%	98.80%		
F	6	0.60%	99.40%		
G	4	0.40%	99.80%		
H	2	0.20%	100.00%		
I	0	0.00%	100.00%		
J	0	0.00%	100.00%		
<b>Total</b>	<b>1000</b>	<b>100.00%</b>	—	—	—

# Exercise 1-B / Solution

Based on the Assumption Table 3,

- Calculate individual RTK share for each State ✓
- Calculate cumulative RTK shares ✓
- Identify States that are exempted from the CORSIA in the 2nd phase, and reasons why ✓

**Assumption Table 3:** Revenue-Tonne Kilometres (RTKs) per State in 2018

State	RTK (2018)	Note
A	450	
B	400	
C	100	SIDS
D	30	
E	8	
F	6	
G	4	
H	2	LLDC
I	0	LDC
J	0	

State	RTK (2018)	Individual RTK share (2018)	Cumulative RTK share (2018)	Exempted (YES/NO)	If Exempted, Why?
A	450	45.00%	45.00%	NO	
B	400	40.00%	85.00%	NO	
C	100	10.00%	95.00%	YES	SIDS
D	30	3.00%	98.00%	NO	
E	8	0.80%	98.80%	NO	
F	6	0.60%	99.40%	NO	
G	4	0.40%	99.80%	YES	Ind. RTK < 0.5%, Cum. RTK > 90%
H	2	0.20%	100.00%	YES	LLDC, Ind. RTK < 0.5%, Cum. RTK > 90%
I	0	0.00%	100.00%	YES	LDC, Ind. RTK < 0.5%, Cum. RTK > 90%
J	0	0.00%	100.00%	YES	Ind. RTK < 0.5%, Cum. RTK > 90%
<b>Total</b>	<b>1000</b>	<b>100.00%</b>	—	—	—