RDC

Aviation Emissions Report
February 23

RDC Emissions analysis for largest markets - February 23 vs prior years

25 largest markets by total emissions

Date / Origin Country	February 2019 Total CO2 (Tonnes)	February 2022 Total CO2 (Tonnes)	February 2023 Total CO2 (Tonnes)
United States	12,798,630	10,366,497	11,858,808
China	7,240,848	5,461,978	6,086,877
United Kingdom, UK	2,312,245	1,233,355	1,879,859
India	1,711,484	1,201,951	1,819,514
United Arab Emirates	1,753,718	1,096,475	1,508,996
Japan	2,050,795	847,747	1,469,408
Australia	1,592,199	569,738	1,196,461
Germany	1,653,898	832,699	1,154,799
Spain and Canary Islands	1,232,917	903,804	1,144,624
France	1,306,905	835,821	1,085,647
Canada	1,317,376	670,819	1,078,763
Brazil	1,239,459	884,324	1,043,428
Mexico	902,984	826,472	944,423
Turkey	843,731	693,925	917,814
Russian Federation	1,244,386	992,136	896,007
Indonesia	989,731	573,576	788,788
Republic of Korea	1,043,133	357,464	766,108
Thailand	1,256,890	313,665	760,675
Qatar	723,895	578,990	694,409
Saudi Arabia	651,412	438,597	687,068
Singapore	893,427	324,946	671,176
Italy	799,786	423,843	618,049
Netherlands	639,141	412,832	501,920
Vietnam	521,292	319,212	495,777
Malaysia	622,841	206,725	427,405

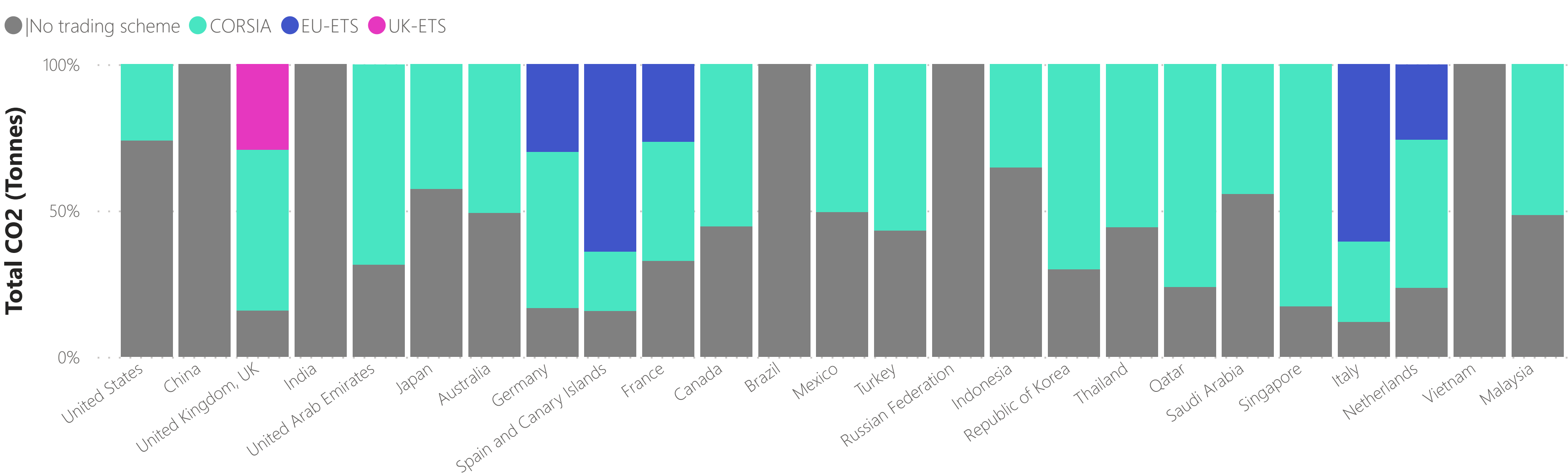
Change in Emissions - Current month vs prior years

This year vs last year	This year vs 2019
14%	-7%
11%	-16%
52%	-19%
51%	6%
38%	-14%
73%	-28%
110%	-25%
39%	-30%
27%	-7%
30%	-17%
61%	-18%
18%	-16%
14%	5%
32%	9%
-10%	-28%
38%	-20%
114%	-27%
143%	-39%
20%	-4%
57%	5%
107%	-25%
46%	-23%
22%	-21%
55%	-5%
107%	-31%

Percent of Emissions covered by Compliance Programmes

February 2019 % covered	February 2022 % covered	February 2023 % covered
-	20.77%	26.13%
-	-	-
27.63%	84.89%	84.24%
-	-	-
-	66.62%	68.46%
-	35.29%	42.62%
-	41.16%	50.78%
32.77%	84.62%	83.21%
60.87%	84.96%	84.31%
24.51%	69.14%	67.14%
-	53.28%	55.38%
-	-	-
-	51.23%	50.54%
-	54.70%	56.85%
-	-	-
-	10.44%	35.36%
-	62.55%	70.08%
-	53.89%	55.69%
-	72.85%	76.13%
-	26.91%	44.43%
-	85.55%	82.78%
51.97%	93.43%	88.03%
22.63%	74.86%	76.44%
-	-	-
-	33.03%	51.59%

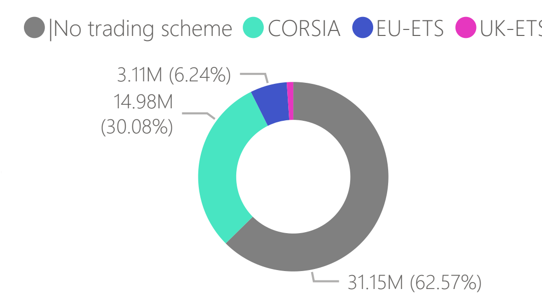
25 largest markets - emissions by Compliance Programme (current month)



Global emissions (tonnes)

49.79M

Emissions by compliance programme

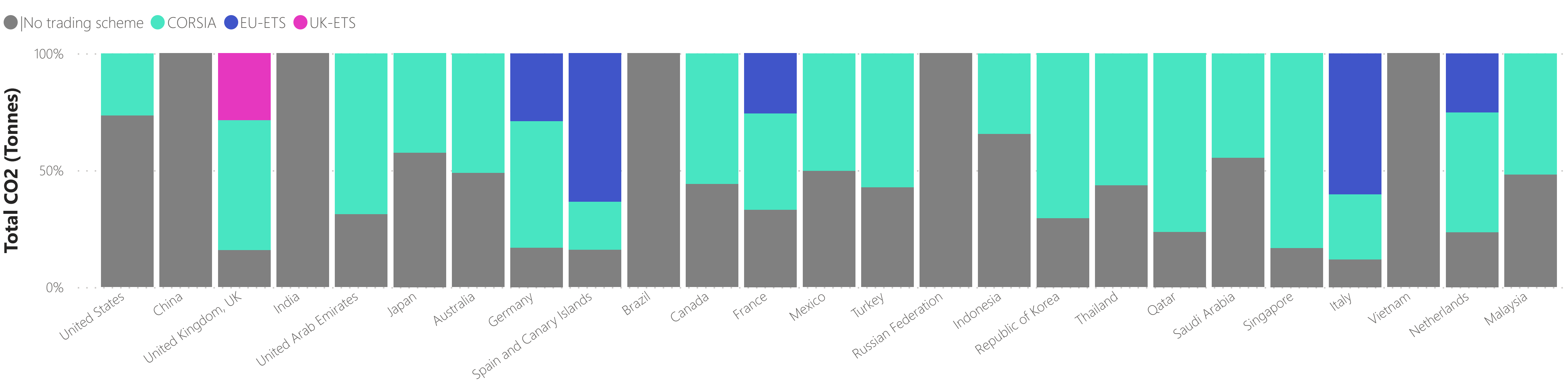


Emissions analysis for largest markets - YTD to Feb 23 vs prior years

25 largest markets by total emissions | Change in Emissions - Current month vs prior years | Percent of Emissions covered by Compliance Programmes

YTD Period / Origin Country	YTD 2019 Total CO2 (Tonnes)	YTD Last Year Total CO2 (Tonnes)	YTD This Year Total CO2 (Tonnes)	This YTD vs Last YTD	This YTD vs YTD 2019	YTD 2019 Trading scheme %	YTD Last Year Trading scheme %	YTD This Year Trading scheme %
United States	27,019,290	21,908,687	24,786,582	13%	-8%	-	21.55%	26.55%
China	14,978,931	11,362,186	12,376,771	9%	-17%	-	-	-
United Kingdom, UK	4,831,625	2,540,924	3,899,258	53%	-19%	26.84%	84.34%	84.07%
India	3,647,520	2,583,254	3,739,402	45%	3%	-	-	-
United Arab Emirates	3,743,466	2,296,391	3,170,350	38%	-15%	-	66.65%	68.74%
Japan	4,296,086	1,938,736	3,083,531	59%	-28%	-	32.80%	42.52%
Australia	3,434,631	1,272,424	2,544,968	100%	-26%	-	37.75%	51.06%
Germany	3,471,443	1,815,251	2,413,899	33%	-30%	32.10%	84.25%	83.16%
Spain and Canary Islands	2,597,513	1,870,777	2,383,971	27%	-8%	60.40%	84.94%	83.97%
Brazil	2,719,116	1,980,457	2,306,273	16%	-15%	-	-	-
Canada	2,779,953	1,496,555	2,262,627	51%	-19%	-	53.00%	55.80%
France	2,766,718	1,734,321	2,254,049	30%	-19%	23.98%	69.21%	66.90%
Mexico	1,924,190	1,791,691	2,015,997	13%	5%	-	50.70%	50.23%
Turkey	1,779,372	1,489,575	1,937,322	30%	9%	-	55.82%	57.24%
Russian Federation	2,679,315	2,178,744	1,876,523	-14%	-30%	-	-	-
Indonesia	2,119,976	1,205,366	1,676,228	39%	-21%	-	10.24%	34.41%
Republic of Korea	2,191,650	757,612	1,602,876	112%	-27%	-	64.05%	70.51%
Thailand	2,643,124	677,624	1,583,280	134%	-40%	-	53.68%	56.40%
Qatar	1,522,960	1,216,348	1,463,153	20%	-4%	-	72.54%	76.39%
Saudi Arabia	1,391,607	921,172	1,423,635	55%	2%	-	27.75%	44.64%
Singapore	1,887,974	674,282	1,416,310	110%	-25%	-	85.50%	83.32%
Italy	1,693,809	884,960	1,300,155	47%	-23%	50.96%	93.64%	88.20%
Vietnam	1,071,260	607,518	1,062,610	75%	-1%	-	-	-
Netherlands	1,344,050	884,600	1,050,613	19%	-22%	22.26%	74.94%	76.55%
Malaysia	1,302,815	419,732	898,381	114%	-31%	-	33.83%	51.81%

25 largest markets - emissions by Compliance Programme (current YTD)



Origin Country

RDC CARE Index by carrier and home continent - February 23

Top 25 European Carriers

Carrier Name	CARE Index
TUIfly Nordic	7.6
World 2 Fly	7.5
SmartLynx Airlines Estonia	7.5
PLAY	7.4
French Bee	7.3
Wizz Air Malta	7.1
La Compagnie	7.0
Jonair	7.0
Norse Atlantic Airways	7.0
Wizz Air UK	7.0
TUI Airways	6.9
SmartLynx Airlines	6.8
Iberojet	6.8
Enter Air	6.7
Corendon Dutch Airlines	6.7
Georgian Airways	6.7
Avion Express	6.6
Sundair	6.6
Wizz Air	6.6
Azores Airlines	6.5
SunExpress	6.5
TUIfly Deutschland	6.5
Titan Airways	6.5
Sunclass Airlines	6.4

Top 25 North American Carriers

Carrier Name	CARE Index
Swoop	7.0
Volaris	7.0
Flair Airlines	7.0
Sunwing Airlines	6.9
Lynx Air	6.9
Frontier Airlines	6.8
Air Transat	6.7
Spirit Airlines	6.2
WestJet	6.0
Sun Country	6.0
Aeromexico	5.8
Delta Air Lines	5.6
VivaAerobus	5.5
American Airlines	5.5
Air Canada	5.4
Air Saint-Pierre	5.4
United Airlines	5.3
Allegiant Air	5.2
Air Canada Rouge	5.2
ConocoPhillips Alaska Inc	5.2
Southwest Airlines	5.2
Avelo Air	5.2
Alaska Airlines	5.1
Breeze Airways	5.0

Top 25 Asian Carriers

Carrier Name	CARE Index
Thai AirAsia X	6.8
AirAsia X	6.8
ZIPAIR Tokyo	6.6
STARLUX Airlines	6.3
airblue	6.3
Nordwind Airlines	6.3
T'Way Air	6.3
Air Premia	6.3
Aero Nomad Airlines	6.2
Pobeda	6.2
Air India Express	6.2
Ural Airlines	6.2
Philippine Airlines	6.1
Tigerair Taiwan	6.1
Greater Bay Airlines	6.1
MIAT Mongolian Airlines	6.1
Hong Kong Express	6.1
Serene Air	6.1
NordStar Airlines	6.0
Spring Airlines	6.0
West Air	6.0
Himalaya Airlines	6.0
Longjiang Airlines	5.9
Qingdao Airlines	5.9

Top 25 RoW Carriers

Carrier Name	CARE Index
Wizz Air Abu Dhabi	7.2
Arajet	7.1
SalamAir	6.5
flydubai	6.5
Air Tahiti Nui	6.4
Jazeera Airways	6.3
El Al	6.2
Syrian Air	6.2
Flynas	6.1
Bonza Airline	6.1
LATAM Paraquay	6.0
UR Airlines	6.0
Sudan Airways	6.0
OYA International Airline	5.9
Tarco Aviation	5.9
FlyEgypt	5.9
Badr Airlines	5.9
Nouvelair Tunisie	5.9
Viva Air Peru	5.9
JetSmart Airlines S.A.	5.9
Flybondi	5.8
Copa Airlines	5.8
Nesma Airlines	5.7
Sky Pearl Aviation	5.7

The CARE Index is a measure of airline route sustainability, based around our emissions methodology and various other factors, that has been developed to give business and consumers the best information on which to make their purchasing decisions - particularly when it comes to making more environmentally friendly choices. Most 'efficiency measures' use CO2 per passenger, per seat or per available seat kilometre (ASK), which can be hard to understand for consumers. The CARE Index creates a score between 0 (worst) to 10 (best) for any air route, airline and aircraft combination, taking into account:

- fuel burn and **efficiency of the aircraft type**
- **efficiency of the airline** – using specific seat capacity, configuration and overall occupancy rates (load factor)
- use of **Sustainable Alternative Fuels (SAF)**
- if the route is part of a **compliance or regulatory emissions programme** such as EU ETS etc
- whether the **operator offsets any emissions over and above that which is legally required**

The CARE index has been designed to be a force for change, giving consumers better insight into the environmental impact of their chosen airline that will also help to shape airline sustainability strategies.

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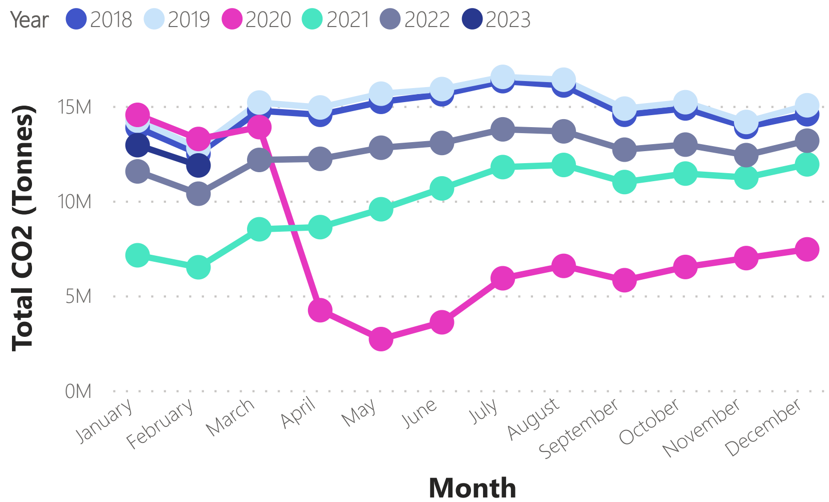
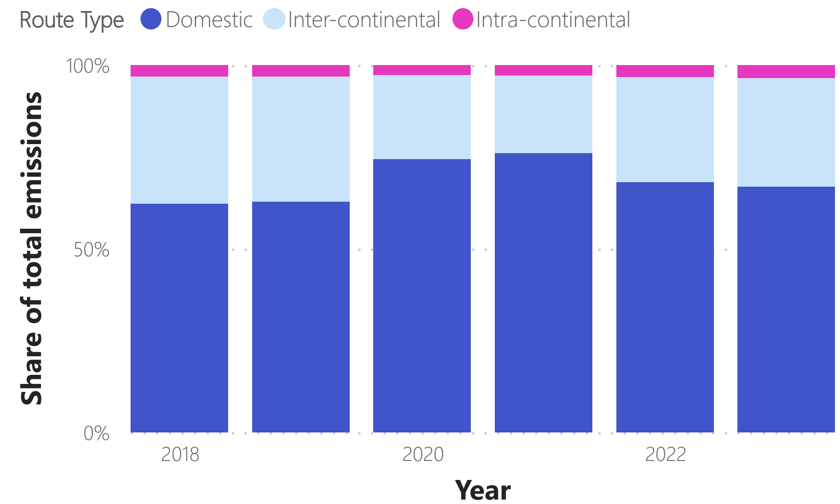
This month's focus country: United States

Total CO2 (Tonnes) by Month and Year



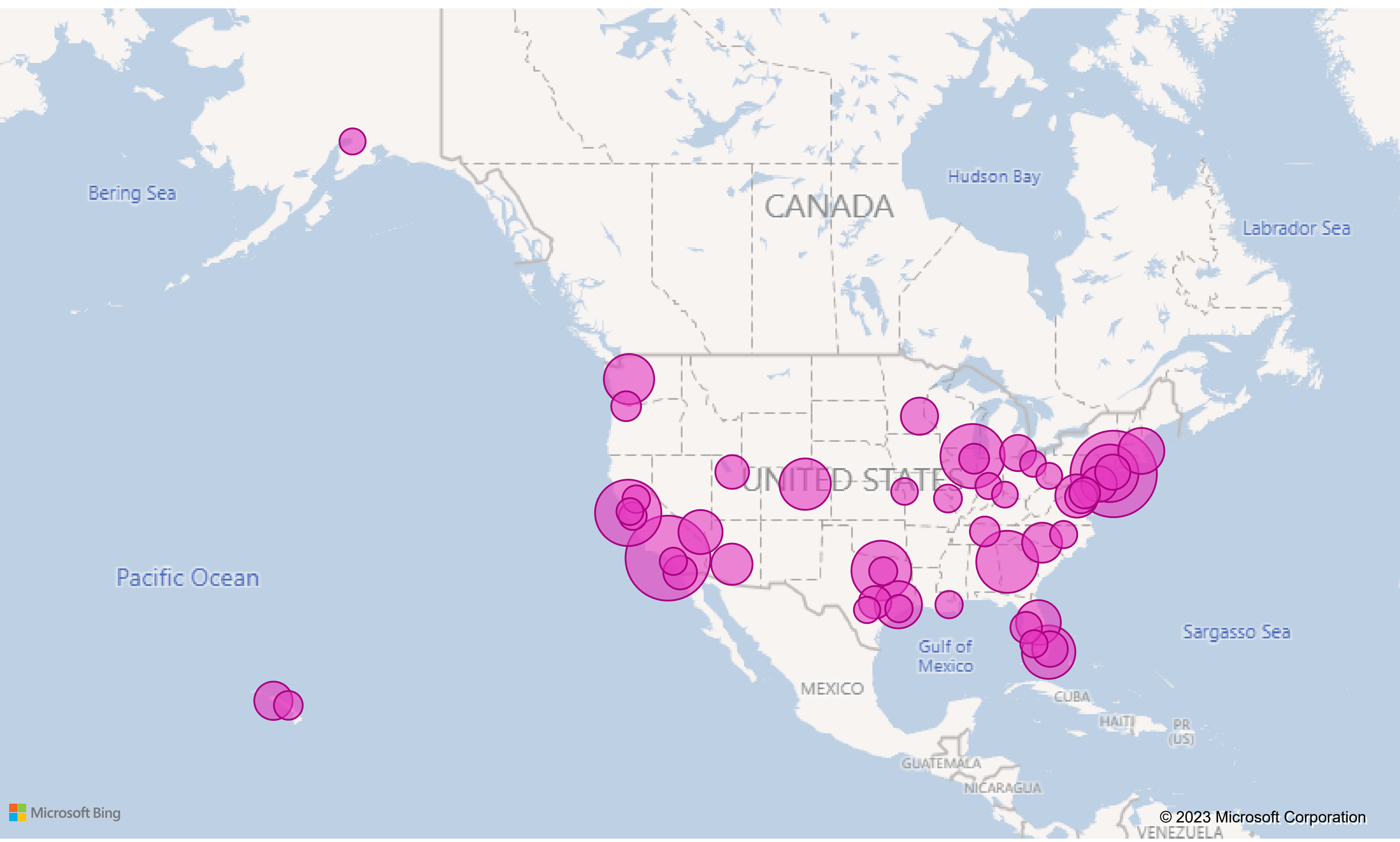
CO2 by Year and Route Type



10 largest markets by seat capacity ranked by lowest Emissions per ASK - last 12 months

Destination Country	Emissions per ASK (g)	Total CO2 (Tonnes)
Puerto Rico	60.11	878,062
Dominican Republic	61.06	714,169
Mexico	61.99	2,996,638
France	65.42	2,500,171
Netherlands	67.23	1,617,508
United States	69.50	103,427,825
Canada	70.43	1,968,804
United Kingdom, UK	76.16	6,143,374
Germany	78.08	3,647,236
Japan	78.29	2,572,085

Largest origin airports by total emissions - last 12 months



10 largest carrier by emissions ranked by highest total emissions - last 12 months

Carrier Name	Emissions per ASK (g)	Total CO2 (Tonnes)
American Airlines	65.06	23,061,275
Delta Air Lines	68.84	22,633,081
United Airlines	70.31	22,498,619
Southwest Airlines	67.48	17,326,284
JetBlue	64.03	6,286,325
Alaska Airlines	61.66	5,899,606
Skywest Airlines	109.82	4,756,662
Spirit Airlines	56.09	4,349,873
Frontier Airlines	52.79	2,714,598
Republic Airlines	119.51	2,443,881

10 most efficient routes according to RDC's CARE Index - current month

Carrier Name	Aircraft	Origin	Destination	CARE Index
SAS	A321neo	IAD	CPH	7.9
SAS	A321neo	EWR	ARN	7.8
SAS	A321neo	BOS	CPH	7.8
SAS	A321neo	JFK	CPH	7.8
Volaris	A320neo	JFK	GDL	7.8
Volaris	A320neo	PDX	GDL	7.8
Volaris	A320neo	SEA	GDL	7.8
SAS	A321neo	EWR	OSL	7.8
Volaris El Salvador	A320neo	LAX	SAL	7.8
Volaris	A320neo	MDW	AGU	7.7

RDC is a UK-based data and technology provider to the international air transport industry. The company has over 300 clients of its **Apex** and **AirportCharges.com** products, which provide market intelligence to operators of aircraft and airports, as well as investors, OEMs and regulators.

For decades RDC have been monitoring and modelling the CO2 emissions arising from the growing aviation industry. We have the ability to calculate and report detailed airline operating expenses - including fuel burn, which in turn gives us the CO2 output from flying. For accuracy on CO2 emissions data, our accredited and independent methodology can't be beaten.

We passionately believe that business and consumers should be armed with the best information on which to make their purchasing decisions - particularly when it comes to making more environmentally friendly choices - this is why we developed our **CO2 calculator** and **CARE Index.**

Two-dimensional output *Our output*

To find out more about how RDC can deliver CO2 emissions data for your business services, get in touch with:

Iain Smith
Global Account Director
iain.smith@rdcaviation.com

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