



World Air Cargo Market Update

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Boeing Commercial Airplanes
Dubai, UAE
February 8, 2023



Agenda



- Current state of the world air cargo market
- World freighter fleet outlook
- Boeing freighter family overview

Recent years have taught us a few things, reminded us of others

The global economy relies on **highly integrated supply chains** across all modes

Disruption in one mode can cause **dramatic impact** to others

Geopolitical forces are **unpredictable and complicated**

US-China trade tension + pandemic shutdowns + Ukraine war + ... = ????????

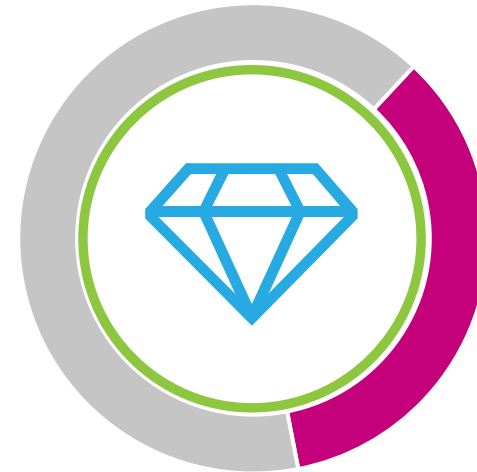
Air cargo is one of the **most resilient and reliable** tools for world trade



Air cargo has a unique place in global trade

<1%

of reported world trade
TONNAGE
is carried by
Air Cargo



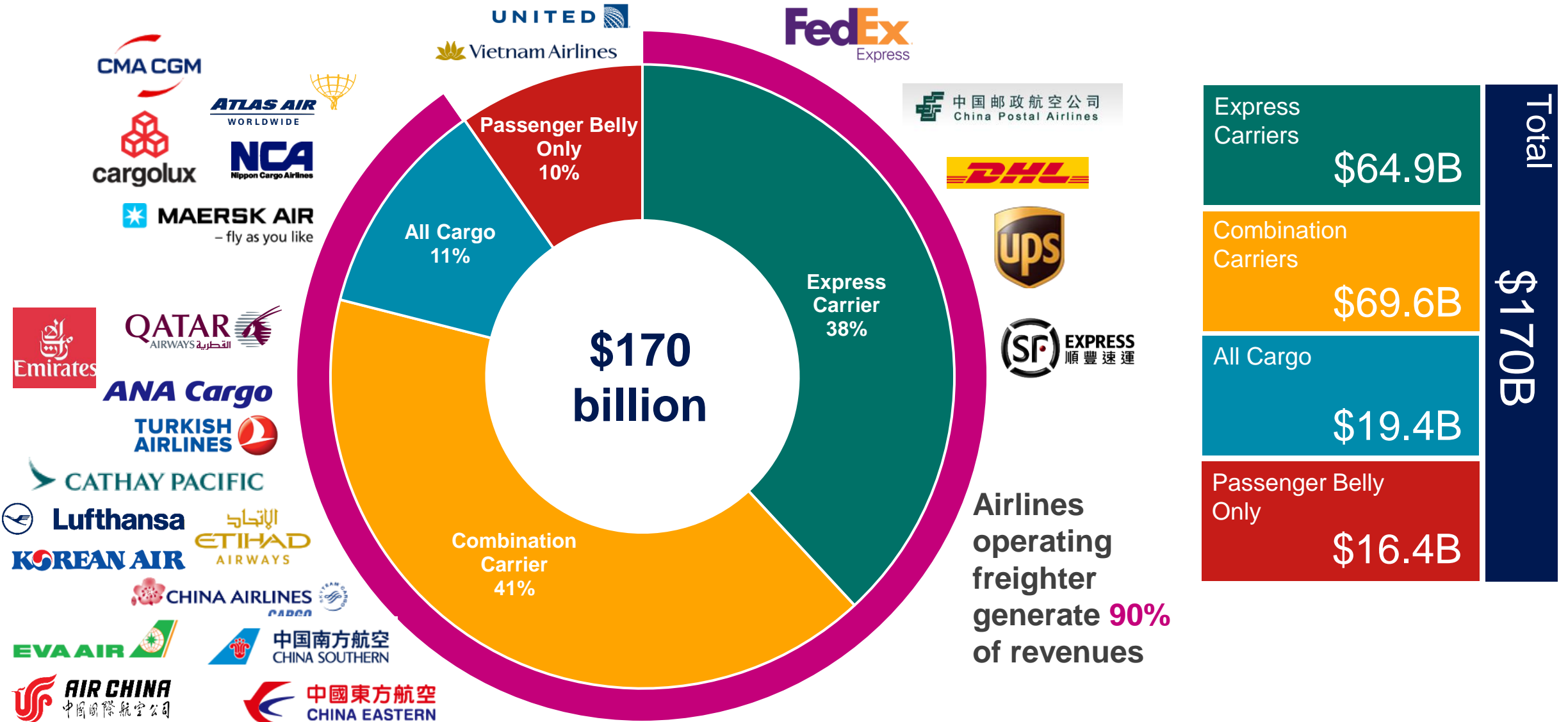
35%

of reported world trade
VALUE
is carried by
Air Cargo

SOURCES: IATA, ICAO, Flight Global, U.S. DOT, and airline financial reports, Boeing analysis

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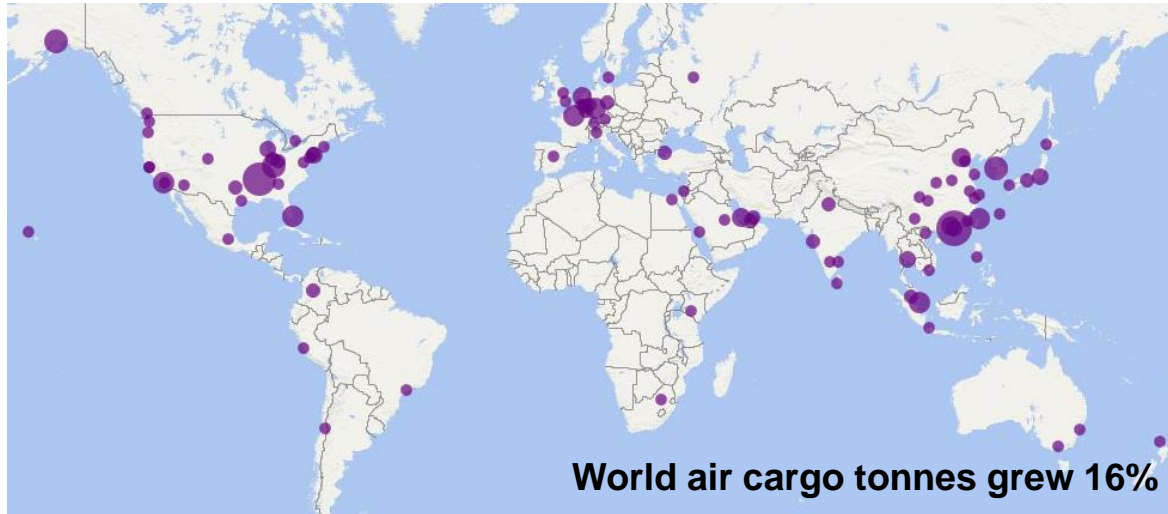
World air cargo industry is a \$170 billion a year industry



SOURCE: IATA, Cirium, U.S. DOT F41, and airline financial reports for 2021 cargo revenue

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DXB air cargo market grew 20% in 2021



North America		Tonnes
1 MEM	Memphis	2 4,480,465
2 ANC	Anchorage	4 3,555,160
3 SDF	Louisville	6 3,052,269
4 LAX	Los Angeles	8 2,691,830
5 ORD	Chicago	11 2,536,576
6 MIA	Miami	12 2,520,859
7 CVG	Cincinnati	21 1,536,998
8 JFK	New York	22 1,461,020
9 IND	Indianapolis	26 1,331,313
10 DFW	Dallas	32 910,623
11 ONT	Ontario	36 807,740
12 EWR	New York	37 780,295
13 ATL	Atlanta	42 734,771
14 OAK	Oakland	48 636,500
15 PHL	Philadelphia	51 583,441
16 HNL	Honolulu	55 533,954
17 SFO	San Francisco	56 528,791
18 IAH	Houston	57 511,814
19 SEA	Seattle	58 498,741
20 YYZ	Toronto	62 416,966

Middle East/Africa		Tonnes
1 DOH	Doha	10 2,620,095
2 DXB	Dubai	13 2,319,185
3 AUH	Abu Dhabi	43 719,976
4 TLV	Tel Aviv	68 375,641
5 NBO	Nairobi	72 363,204
6 CAI	Cairo	76 333,536
7 RUH	Riyadh	78 312,048
8 JNB	Johannesburg	80 304,018
9 ADD	Addis Ababa	98 216,417
10 JED	Jeddah	99 216,284
11 KWI	Kuwait	102 208,721
12 BAH	Bahrain	103 207,976
13 DWC	Dubai	106 205,367
14 LOS	Lagos	107 204,649
15 MCT	Muscat	141 112,733
16 SHJ	Sharjah	143 110,605
17 THR	Tehran	174 80,564
18 BEY	Beirut	193 66,719
19 EBB	Entebbe	196 65,115
20 CMN	Casablanca	197 64,373

Asia		Tonnes
1 HKG	Hong Kong	1 5,025,495
2 PVG	Shanghai	3 3,982,616
3 ICN	Incheon	5 3,329,292
4 TPE	Taipei	7 2,812,065
5 NRT	Tokyo Narita	9 2,644,074
6 CAN	Guangzhou	16 2,044,909
7 SIN	Singapore	17 1,969,800
8 SZX	Shenzhen	20 1,568,293
9 PEK	Beijing	25 1,401,313
10 BKK	Bangkok	27 1,120,357
11 HGH	Hangzhou	31 914,063
12 HND	Tokyo Haneda	33 893,093
13 KIX	Osaka	34 843,662
14 HAN	Hanoi	39 749,428
15 CGK	Jakarta	44 702,939
16 SGN	Ho Chi Minh City	46 663,166
17 KUL	Kuala Lumpur	47 652,596
18 CTU	Chengdu	49 629,422
19 MNL	Manila	50 588,371
20 SYD	Sydney	52 582,614
21 CKG	Chongqing	59 476,723
22 XIY	Xi An	65 395,604
23 SHA	Shanghai	66 383,406
24 KMG	Kunming	67 377,245
25 NKG	Nanjing	74 359,139

SW Asia		Tonnes
1 DEL	Delhi	30 947,536
2 BOM	Mumbai	38 776,934
3 BLR	Bangalore	63 406,540
4 MAA	Chennai	73 361,525
5 CMB	Colombo Banda	108 201,639
6 CCU	Calcutta	128 144,134
7 HYD	Hyderabad	129 142,051
8 AMD	Ahmedabad	166 88,002
9 KHI	Karachi	170 84,728
10 LHE	Lahore	172 82,883

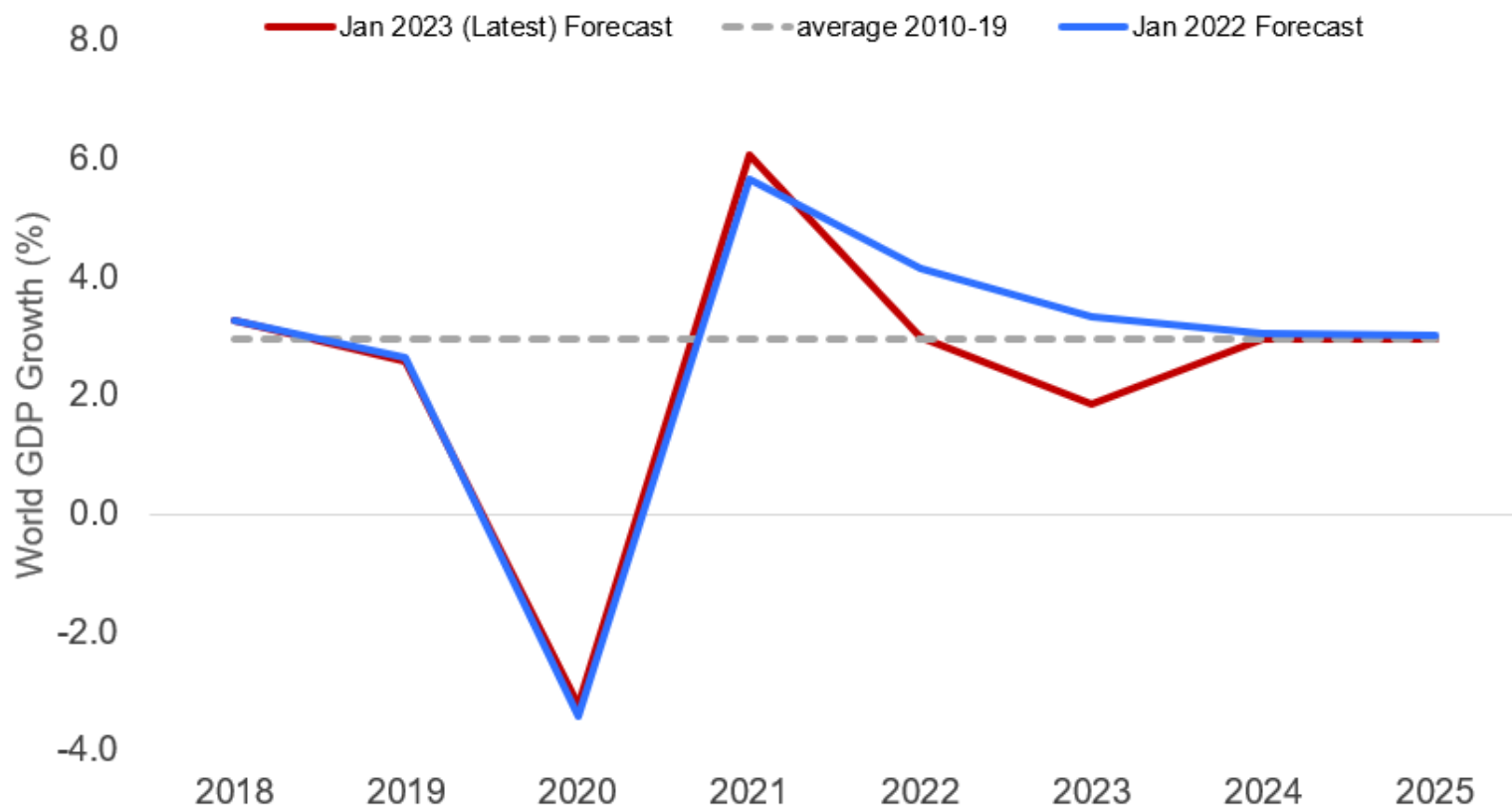
Europe		Tonnes
1 FRA	Frankfurt	14 2,274,969
2 CDG	Paris	15 2,062,433
3 AMS	Amsterdam	18 1,680,854
4 LEJ	Leipzig	19 1,588,815
5 LHR	London	23 1,453,723
6 LGG	Liege	24 1,412,206
7 LUX	Luxembourg	28 1,088,530
8 CGN	Cologne/Bonn	29 967,440
9 ISL	Istanbul	35 826,338
10 MXP	Milan	40 747,242
11 BRU	Brussels	45 668,110
12 MAD	Madrid	54 535,796
13 EMA	Nottingham	61 454,095
14 SVO	Moscow	81 302,033
15 CPH	Copenhagen	85 286,708
16 STN	London	86 283,719
17 ZRH	Zurich	91 237,565
18 HHN	Frankfurt Hahn	94 233,175
19 ZAZ	Zaragoza	110 194,453
20 OSL	Oslo	113 180,744

Latin America		Tonnes
1 BOG	Bogota	41 741,809
2 MEX	Mexico City	53 571,328
3 SCL	Santiago	60 475,014
4 GRU	Sao Paulo	69 374,397
5 VCP	Sao Paulo	71 364,367
6 UIO	Quito	84 288,397
7 SJU	San Juan	89 242,020
8 LIM	Lima	97 219,203
9 GDL	Guadalajara	109 197,227
10 EZE	Buenos Aires	118 170,474

Top 25 cargo airlines account for 73% of the world air cargo traffic

Ranking	Airline	2021 CTKs (000)	2021 Growth
1	FEDERAL EXPRESS	20,737,956	4.5%
2	QATAR AIRWAYS	16,102,310	17.2%
3	UPS	15,577,470	8.1%
4	EMIRATES	11,842,165	23.8%
5	KOREAN AIR	10,675,362	23.6%
6	ATLAS AIR	10,059,601	24.0%
7	TURKISH AIRLINES	9,223,590	32.2%
8	CARGOLUX	9,122,611	12.8%
9	CATHAY PACIFIC	8,219,977	0.6%
10	CHINA SOUTHERN AIRLINES	8,099,323	22.4%
11	CHINA AIRLINES	7,551,100	18.6%
12	AIR CHINA	7,014,005	14.1%
13	KALITTA AIR	6,576,232	26.2%
14	CHINA EASTERN AIRLINES	6,440,501	38.8%
15	UNITED AIRLINES	5,828,728	47.3%
16	AIRBRIDGE CARGO	5,549,656	20.4%
17	SINGAPORE AIRLINES	5,462,743	31.5%
18	LUFTHANSA	5,325,838	10.2%
19	ALL NIPPON AIRWAYS	5,118,366	58.2%
20	ASIANA	4,970,434	10.9%
21	EVA AIRWAYS	4,785,143	23.1%
22	KLM	4,736,098	-2.0%
23	ETHIOPIAN	4,580,174	30.9%
24	ETIHAD AIRWAYS	3,713,414	25.4%
25	AIR FRANCE	3,597,706	41.2%

World GDP growth back to trend in 2024

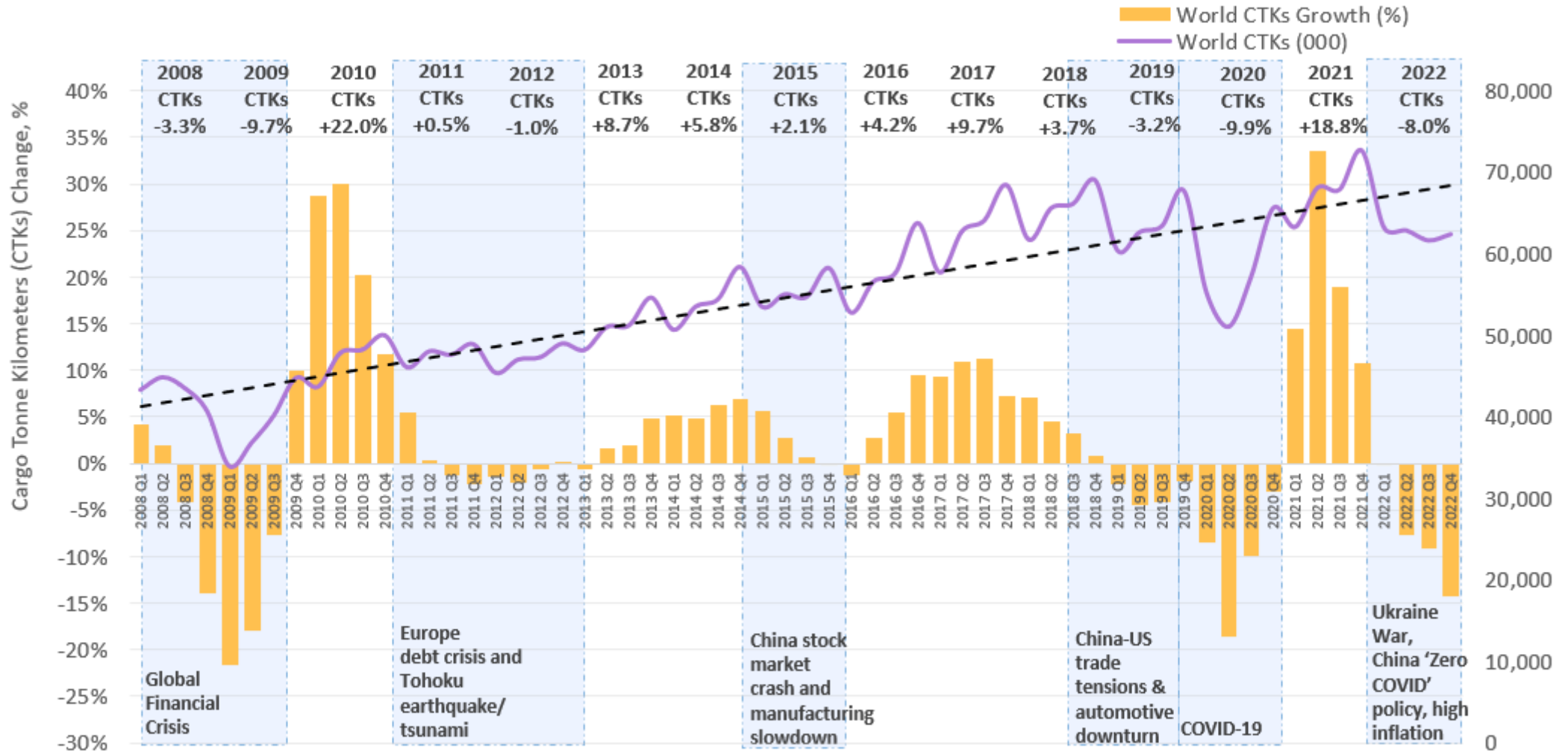


Source: S&P Global dated January 2023

- 2021: Strong world trade and GDP growth
 - World trade: 106% of 2019
 - World GDP: 102% of 2019
- 2022/2023: Risks impacting near term economic outlook
 - China and COVID
 - Europe and Ukraine impact
 - High inflation in part due to supply chain stress and energy price increase
- US economic indicators supportive of growth
 - Strong labor market
 - Consumer spending growth remains positive
 - Personal income growth continues

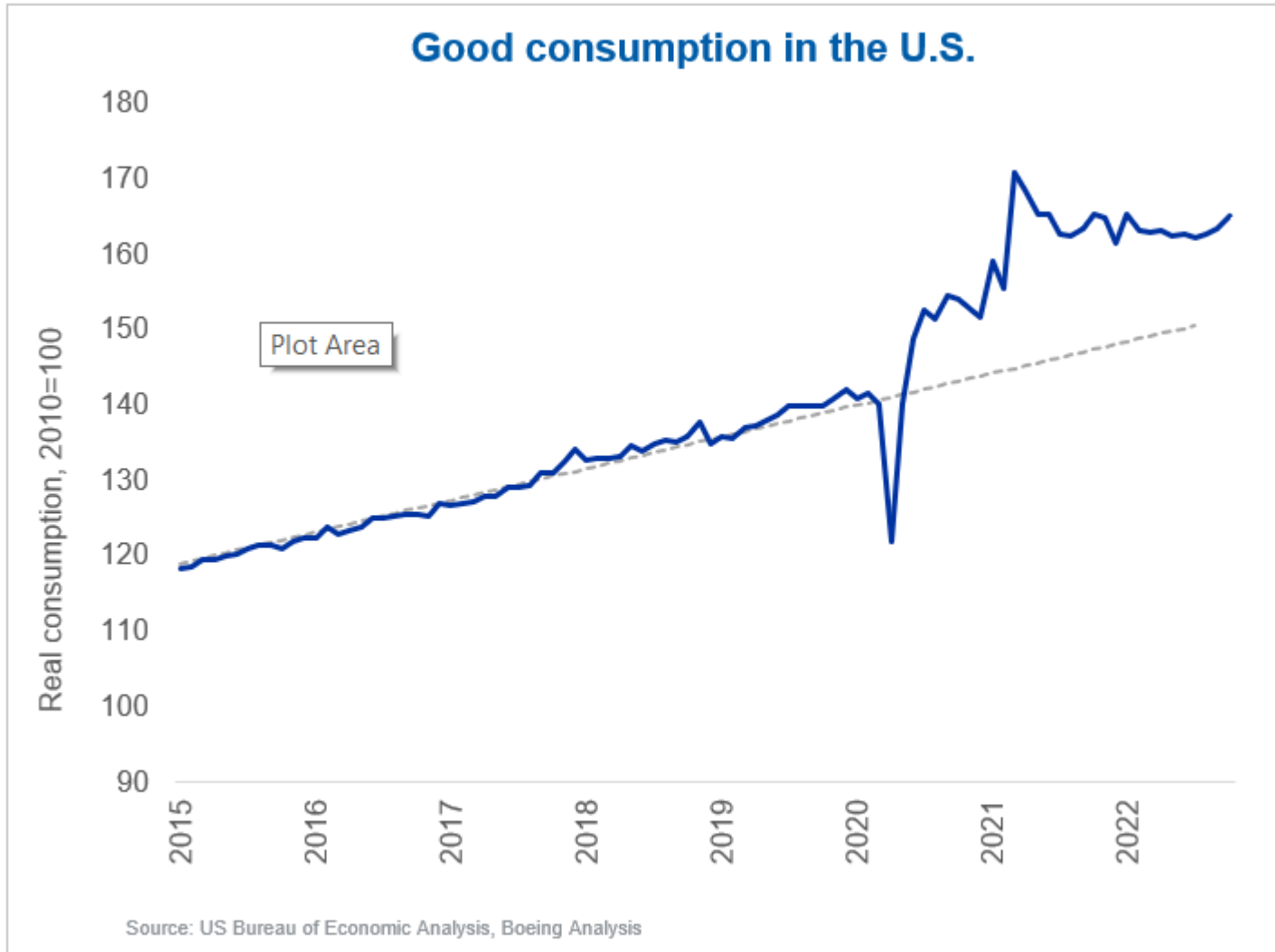
World air cargo market is resilient

World air cargo market grew 1.1% in 2022 versus 2019



Source: IATA Monthly Tracker

US consumer spending continues to grow despite high inflation



WORLD ECONOMIC FORUM

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RETAIL, CONSUMER GOODS AND LIFESTYLE

US consumers are spending more, despite rising inflation

Oct 12, 2022

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U.S. Markets

2 minute read · December 26, 2022 5:18 AM PST · Last Updated 7 days ago

U.S. retail sales grows 7.6% in holiday season - Mastercard data

Reuters

\$9.12 billion spent in a day: New Black Friday online spending record set in 2022, report says

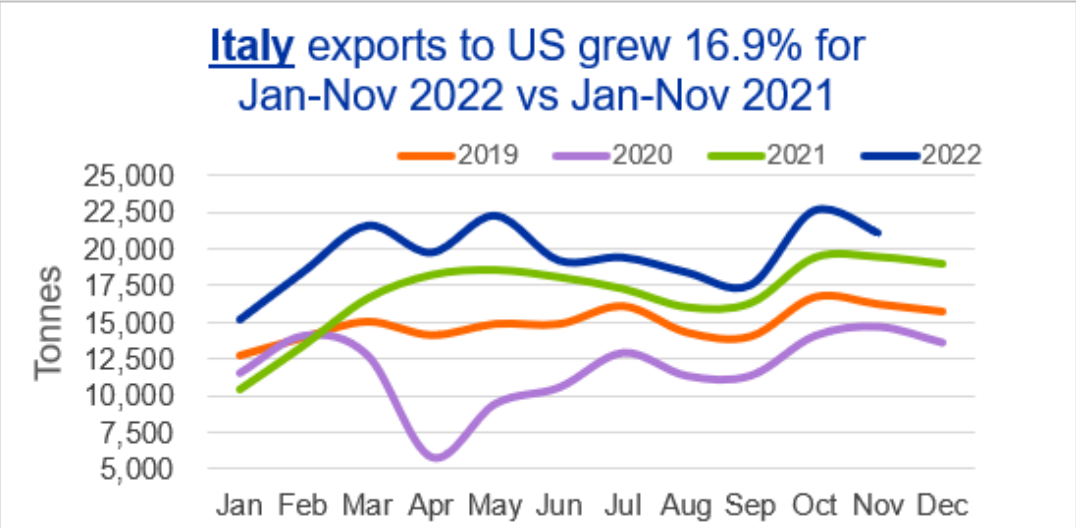
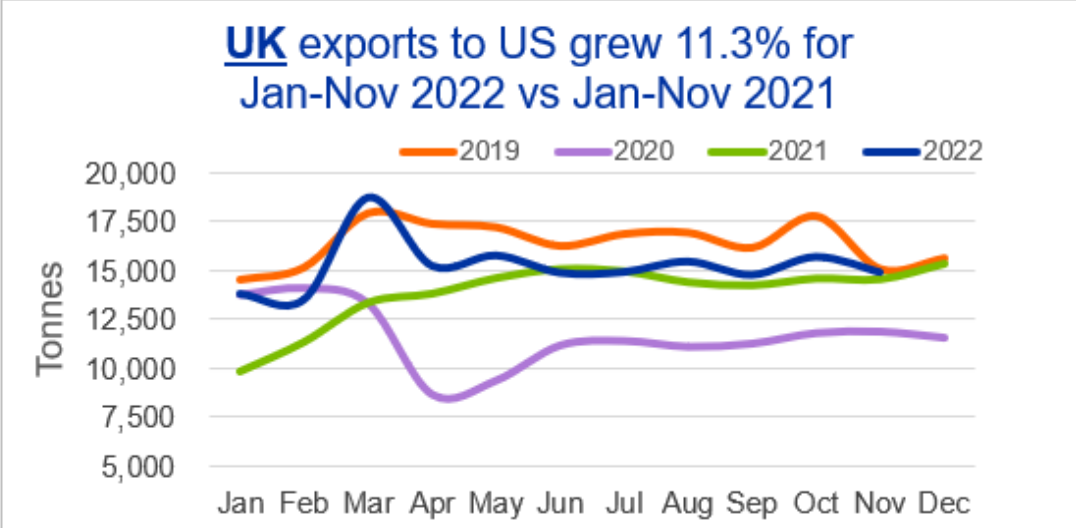
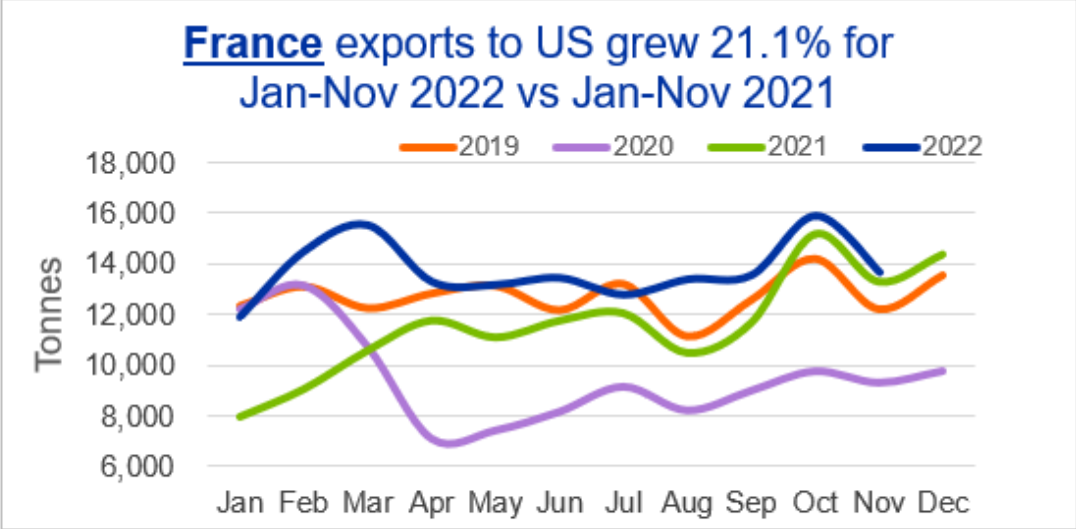
Mike Snider
USA TODAY

Published 4:19 p.m. ET Nov. 26, 2022

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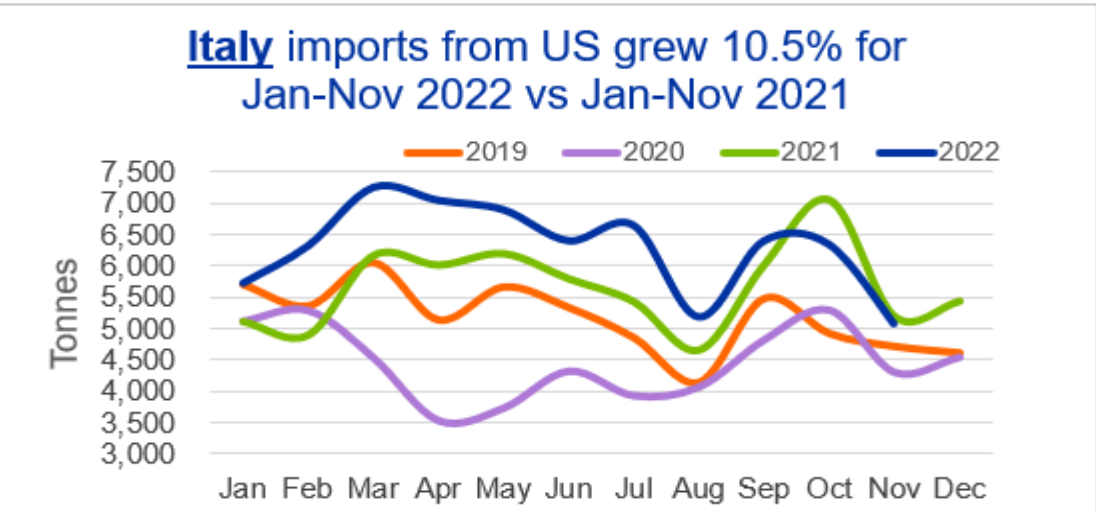
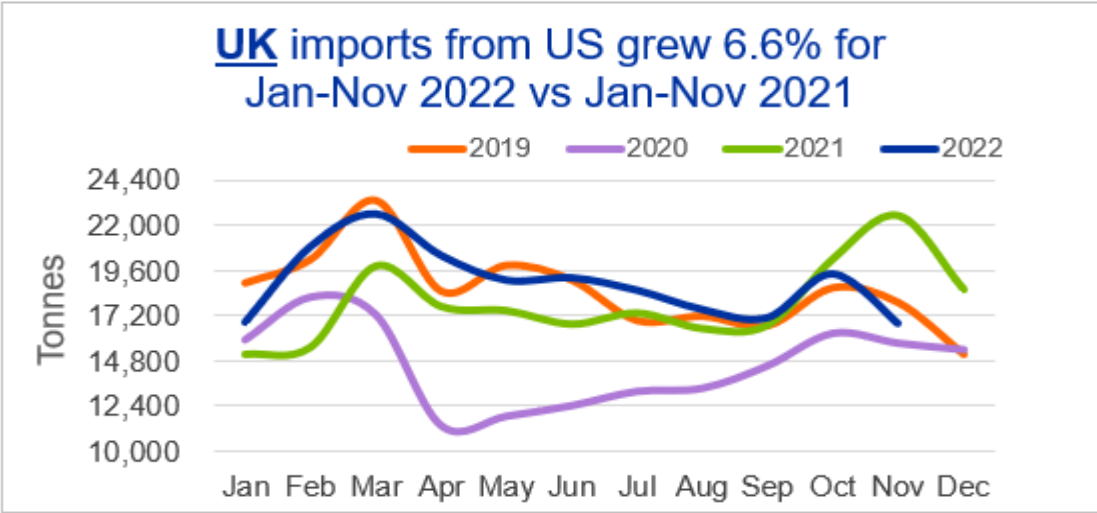
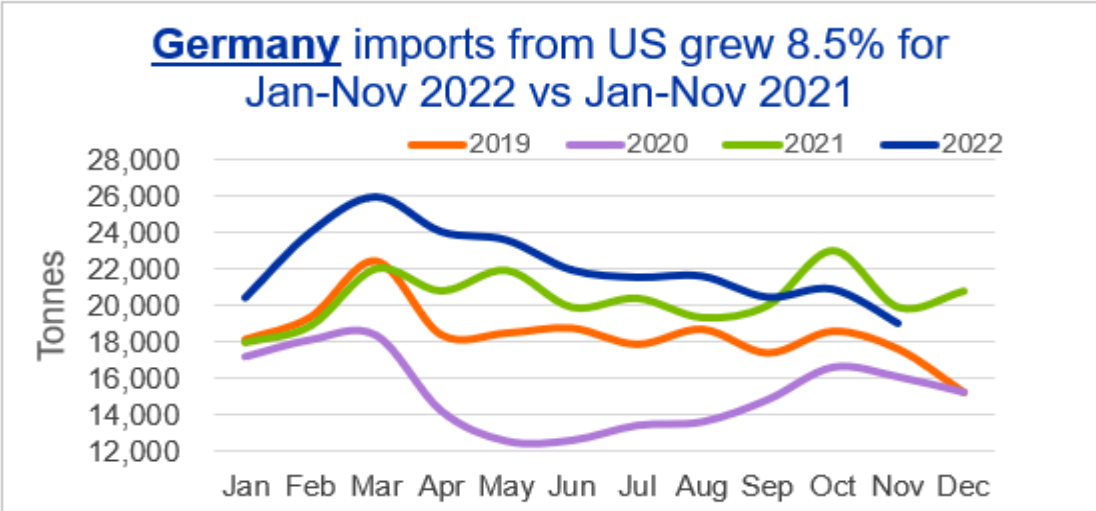
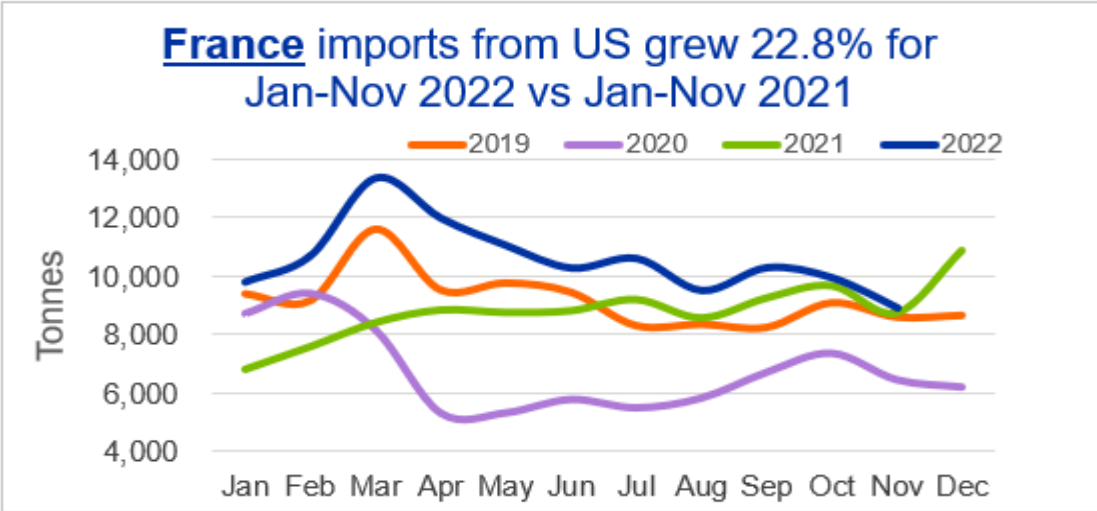


US imports from France, Germany, UK, and Italy grew 12.3% for Jan-Nov 2022 vs Jan-Nov 2021



Source: US Census Bureau (FT920 US Merchandise Trade)

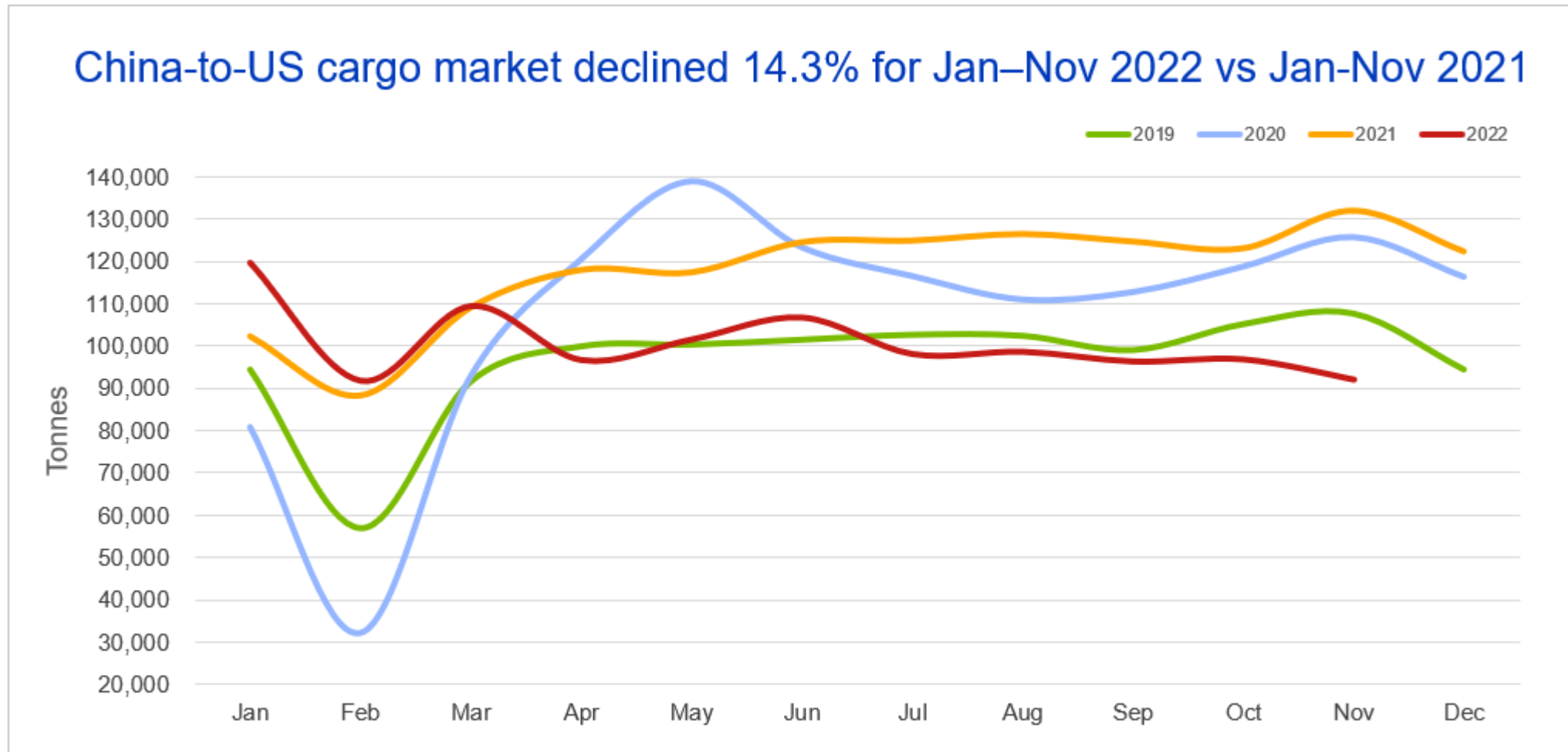
US exports to France, Germany, UK, and Italy grew 10.4% for Jan-Nov 2022 vs Jan-Nov 2021



Source: US Census Bureau (FT920 US Merchandise Trade)

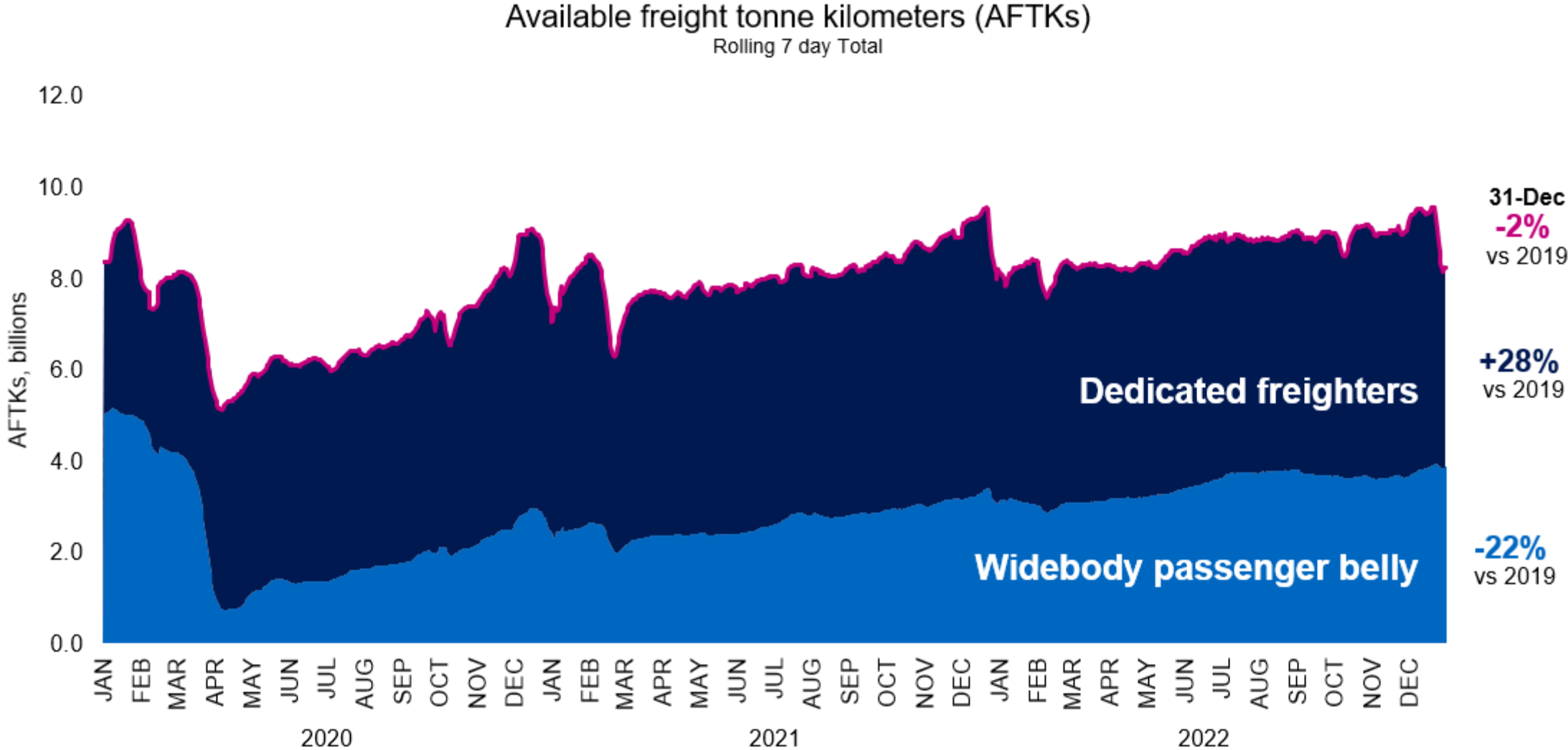
Impact of China 'zero COVID' policy: Asia-to-US market declined 7.8% for Jan-Nov 2022 vs Jan-Nov 2021

China accounts for 54% of Asia exports to US



Source: US Census Bureau (FT920 US Merchandise Trade)

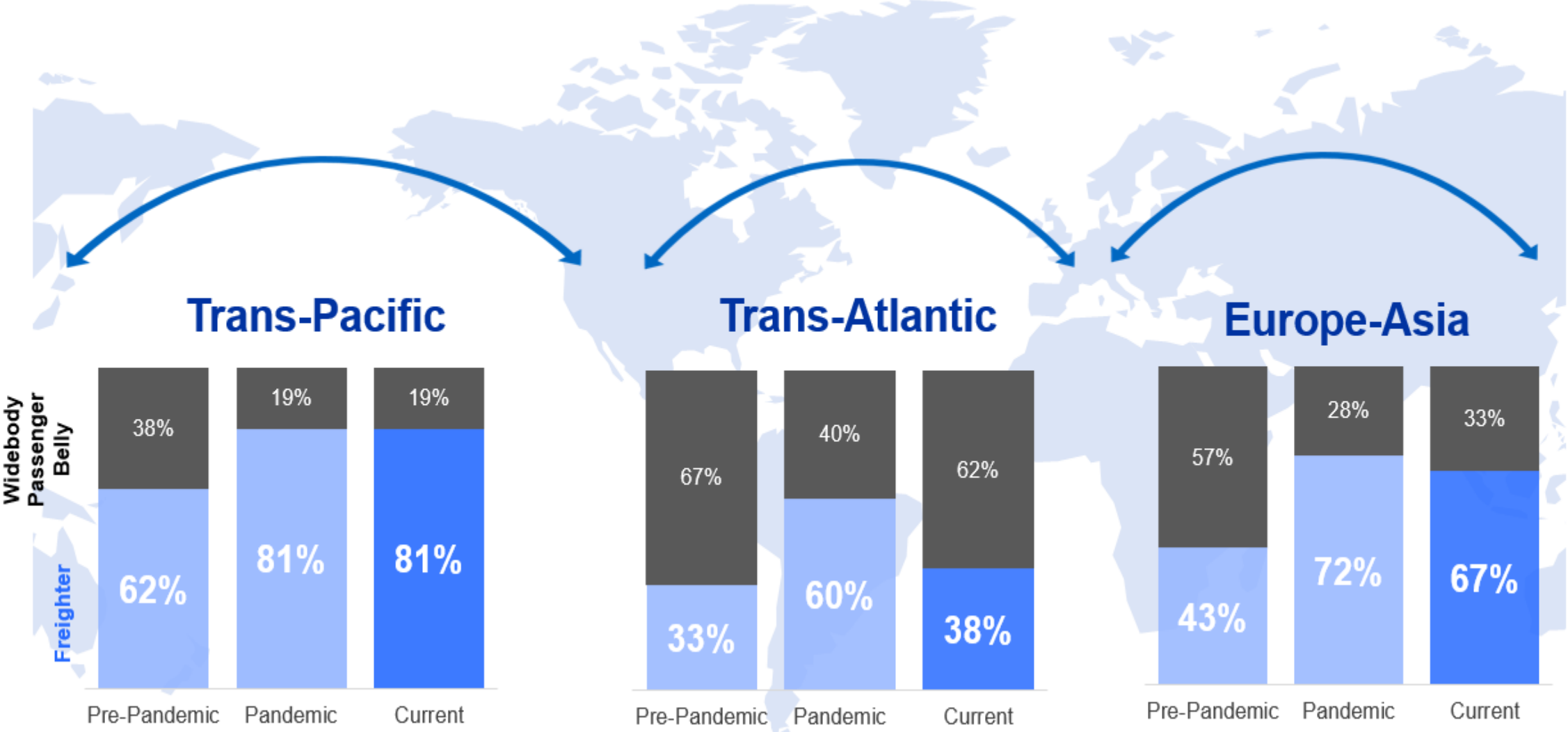
Passenger belly capacity slowly recovering, but industry remains reliant on freighters



SOURCES: BR&T-E ADAPT/FlightRadar24

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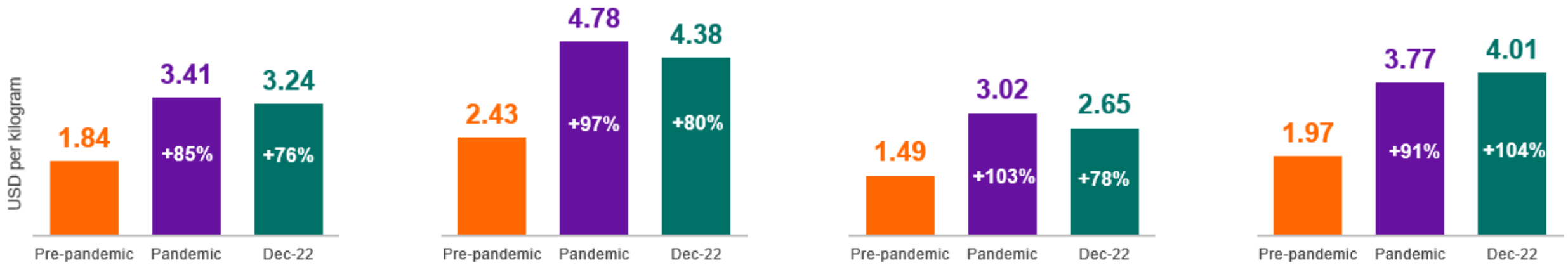
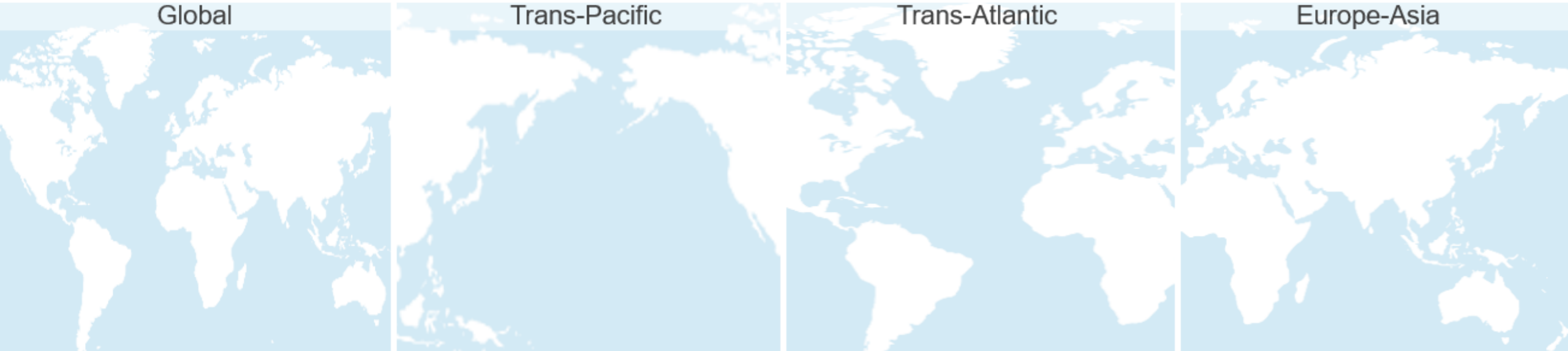
Industry remains reliant on freighters



SOURCES: BR&T-E ADAPT/FlightRadar24

Pre-Pandemic = March 2018 to February 2020 | Pandemic = March 2020 to February 2022
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Global cargo yields remain well above pre-pandemic levels

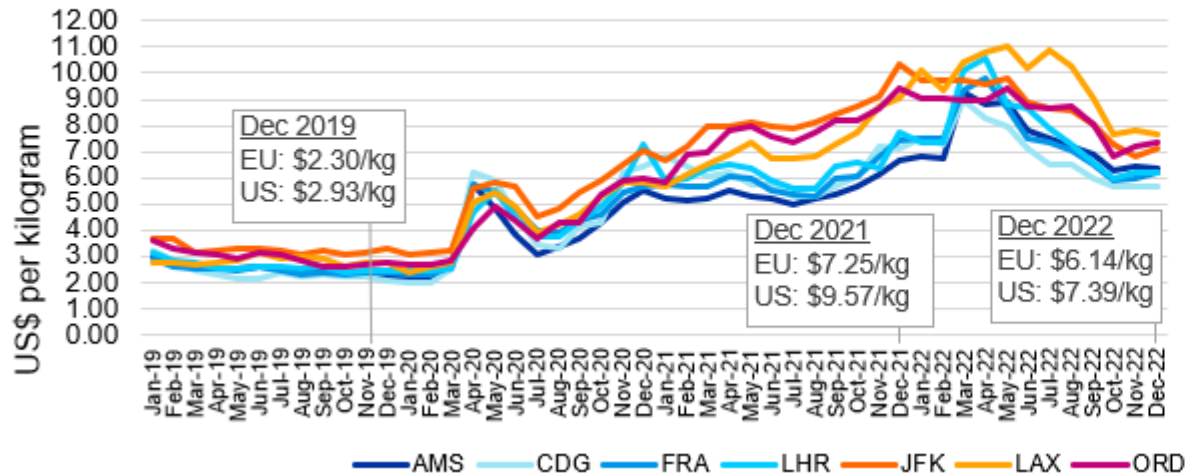


Pre-Pandemic = March 2018 to February 2020 | Pandemic = March 2020 to February 2022
SOURCE: IATA CargoIS

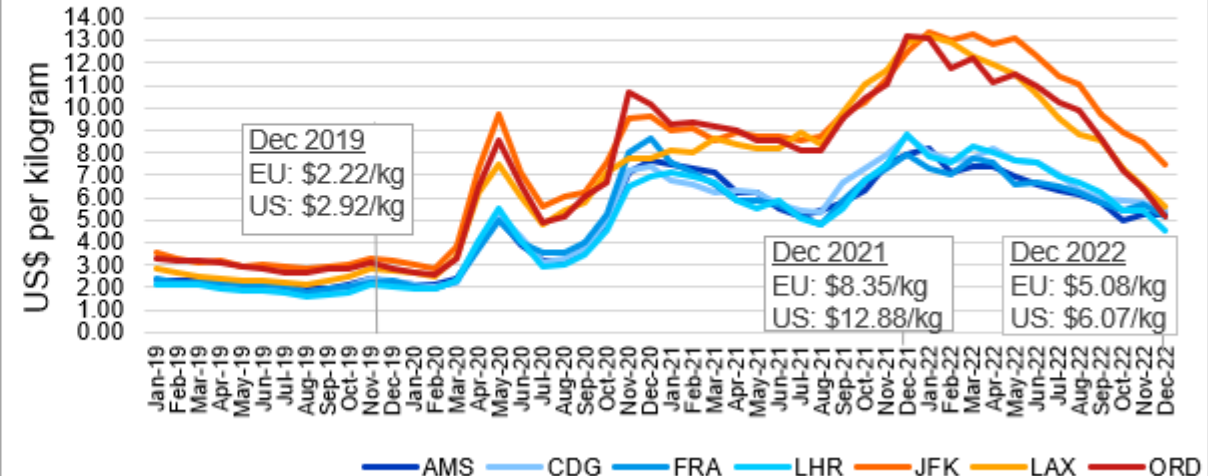
Asia air cargo rates to Europe and the USA increased 131% for December 2022 versus December 2019

Source: IATA CargoIS

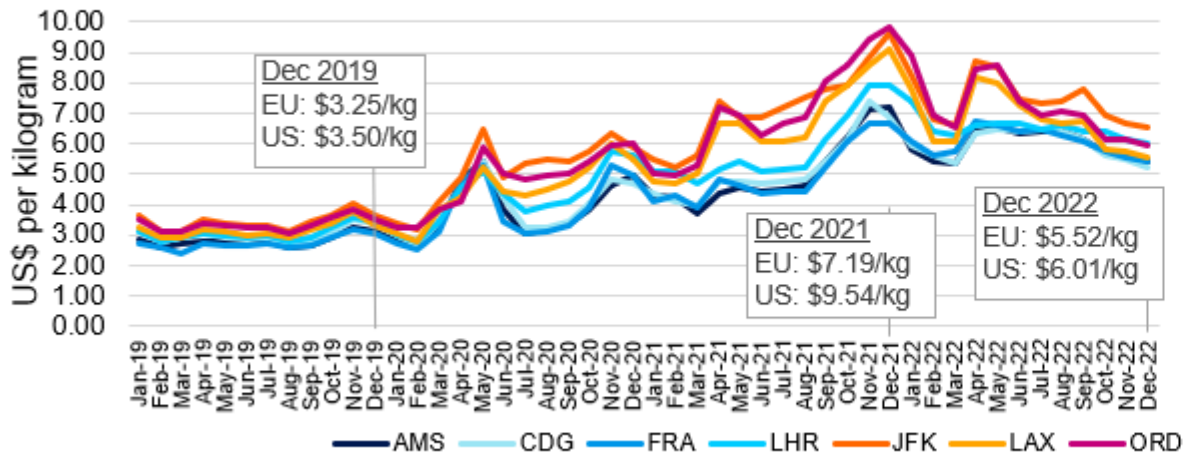
NRT-to-EU/US rates increased 160% for Dec 2022 vs Dec 2019



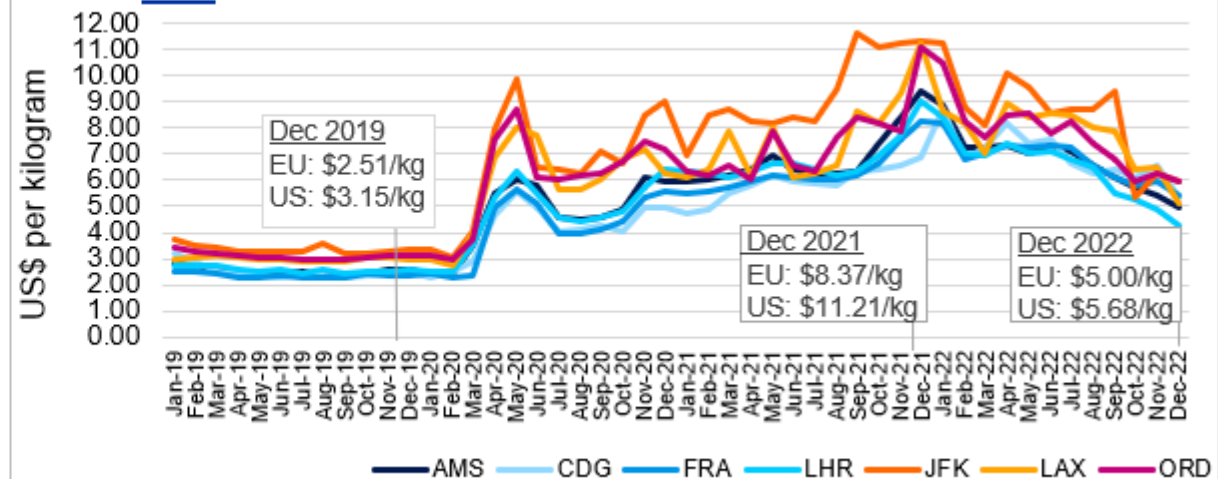
ICN-to-EU/US rates increased 118% for Dec 2022 vs Dec 2019



HKG-to-EU/US rates increased 71% for Dec 2022 vs Dec 2019



TPE-to-EU/US rates increased 90% for Dec 2022 vs Dec 2019



Agenda



- Current state of the world air cargo market
- **World freighter fleet outlook**
- Boeing freighter family overview

Long-term fundamentals remain intact

Forecast period 2022-2041



World Air Cargo Traffic (CTK)

4.1%



World GDP

2.6%



World Trade

2.8%

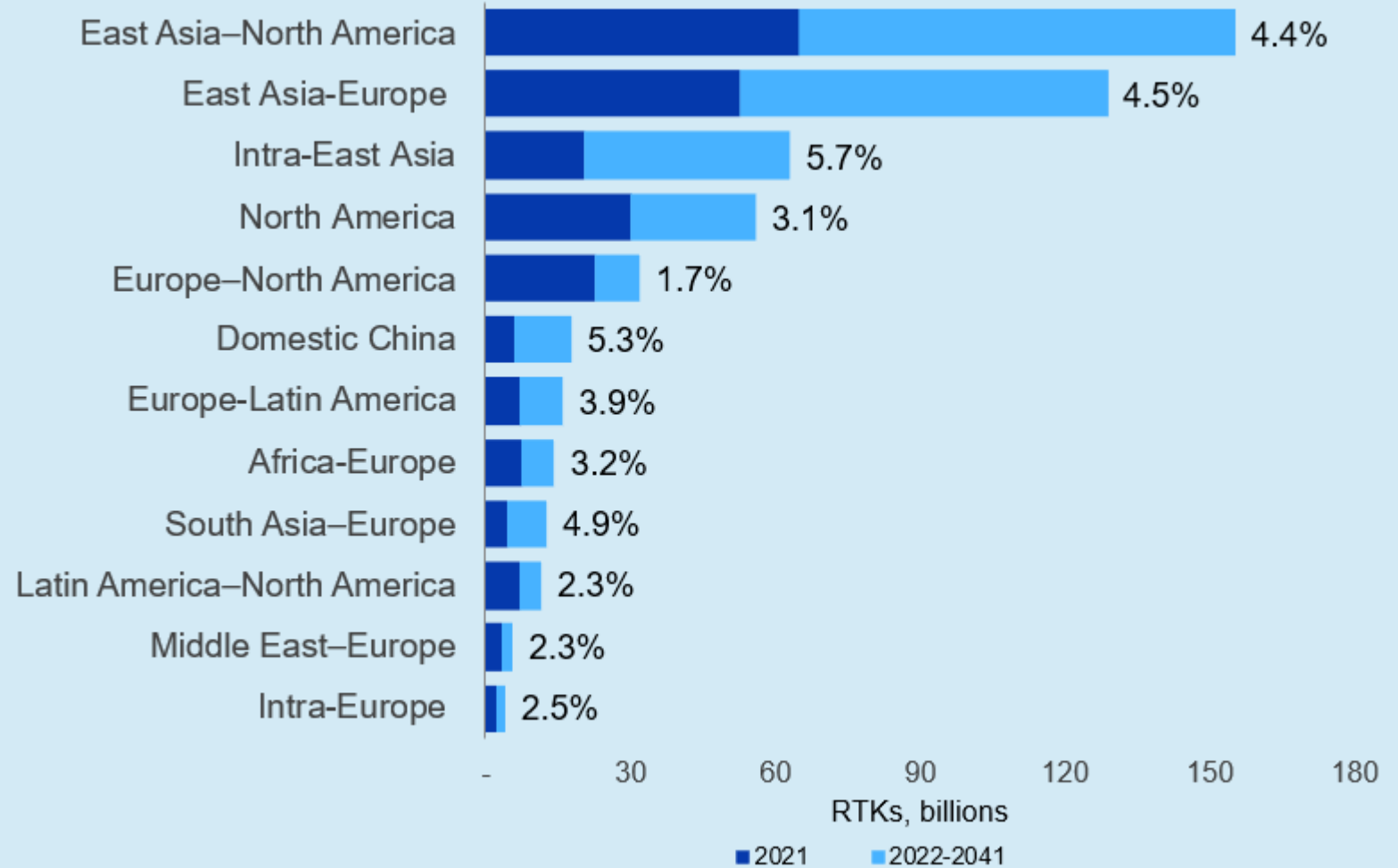


Industrial Production

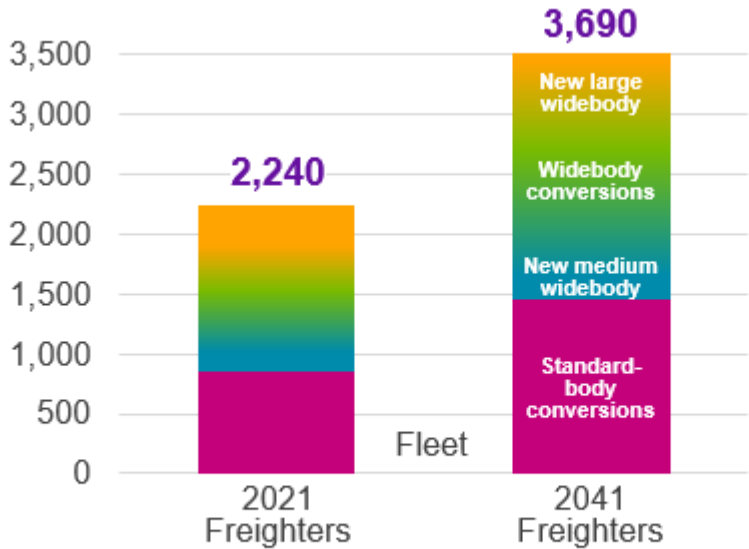
2.2%

Cargo Tonne-Kilometer (CTK)

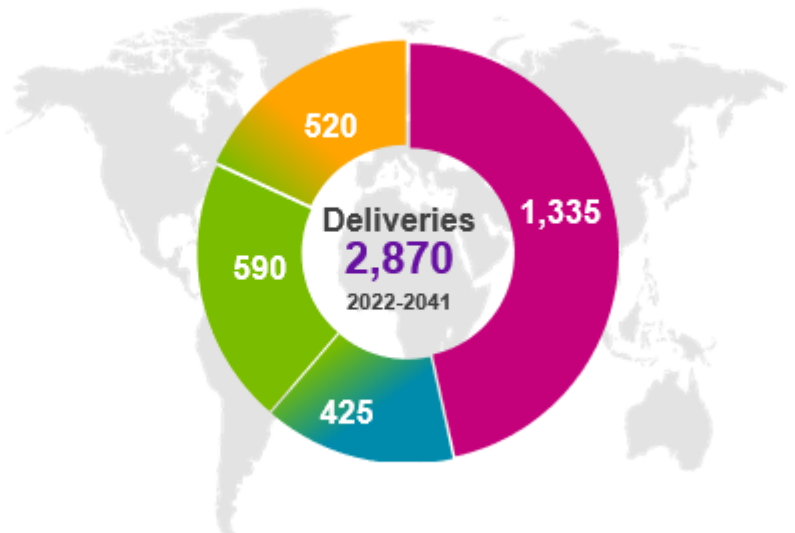
East Asia Markets will Continue to Lead Industry Growth



World freighter fleet to add 2,870 freighters to meet market demand

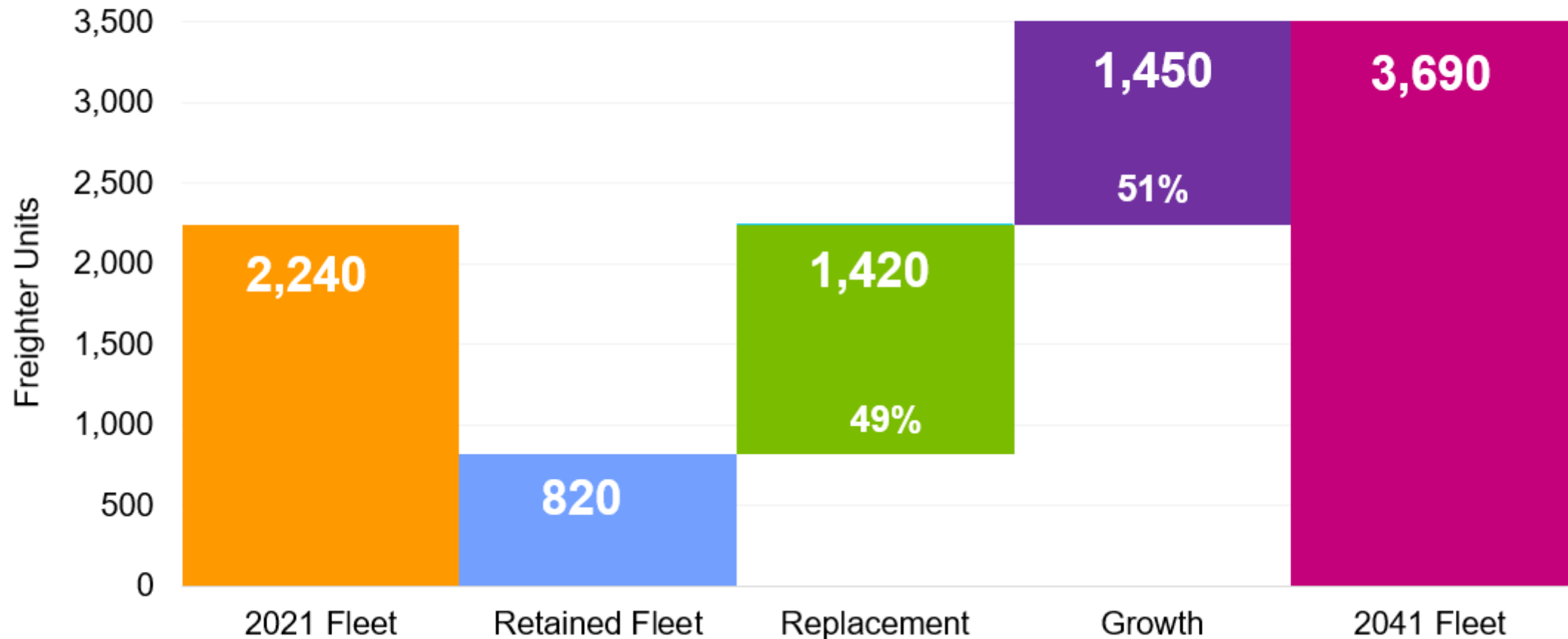


- New large >80 tonnes (777, 747, etc.)
- Widebody conversions 40-120 tonnes (767, 777, 747, A330, etc.)
- New medium widebody 40-80 tonnes (767, A330, etc.)
- Standard-body conversions <45 tonnes (737, 757, A320, A321, etc.)



Note: Russia domicile omitted for forecast period 2022-2041

2,870 Freighters are required for growth and replacement



Note: Russia domicile omitted for forecast period 2022-2041

Agenda



- Current state of the world air cargo market
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- Boeing freighter family overview

Boeing has the world's most complete family of freighters

Structural payload capability, tonnes [1,000 lb.]



737-800BCF and 767-300BCF shown with optional winglets
Maximum structural payload

747-8F | Forever the Queen of the skies...

747-8F Customer	Ordered	Delivered
AirBridgeCargo	7	7
Atlas Air	14	14
Cargolux	14	14
Cathay Pacific	14	14
Korean Air Lines	7	7
Nippon Cargo	8	8
Silkway Airlines	5	5
UPS	28	28
Volga-Dnepr	6	6
Unidentified	4	4
Total	107	107

Orders / Deliveries as of February 1, 2023



Long live the Queen: Last 747 takes its final Boeing bows



About 10,000 people attended the event.



Actor John Travolta was a surprise guest.

737-800BCF | The market-preferred standard-body freighter

250+ orders and commitments, 115+ redeliveries



AERCAP Cargo | AIR ALGERIE | ARMENIA AIR COMPANY | AFG AIRCRAFT FINANCE GERMANY | ASL AVIATION HOLDINGS | AviaAM LEASING | AVIATOR CAPITAL | BBAM AIRCRAFT LEASING & MANAGEMENT | 中国邮政航空公司 China Postal Airlines | 中州航空 Central Airlines | 南航租赁 CHINA SOUTHERN AIR LEASING

CHISHOLM ENTERPRISES | Copa Airlines | GENESIS | ICBC | ICELEASE | JD.COM | JLPS | LAS CARGO | 山东航空公司 SHANDONG AIRLINES | SPECTRE AIR CAPITAL | UNIDENTIFIED

As of December 31, 2022

767 Freighters are the preferred freighters in many markets

398 orders and commitments

767-300F 280 orders and 225 deliveries

767-300BCF 115+ orders and 60+ redeliveries



777F | World's most efficient twin-engine freighter



777F Customer	Ordered	Delivered
A/S Maersk Aviation Holding	2	0
Air Canada	2	0
Air China Cargo	13	8
Air France	5	5
Altavair LLC	3	3
ANA Cargo	2	2
Atlas Air Worldwide	4	1
Boeing Capital Corp	2	2
CES Leasing Corporation	7	7
China Airlines	10	5
China Cargo	2	2
China Southern Air	15	15
CMA CGM	2	2
DAE 4 Ireland Limited	1	1
Deucalion Capital Ltd	8	8
DHL	28	18
Dubai Aerospace Enterprise	13	13
Emirates	7	2

777F Customer	Ordered	Delivered
Ethiopian Airlines	13	8
Etihad Airways	6	6
EVA Air	9	8
FedEx	52	46
Hong Kong Aviation	6	0
Korean Air	10	10
LATAM Airlines Brasil	1	0
LATAM Airlines Group	2	2
Lufthansa Cargo	12	10
NAS Aviation Services LLC	10	10
Oak Hill	4	4
Qatar Airways	28	26
Silk Way West Airlines	5	0
Turkish Airlines	8	8
Volga-Dnepr UK Ltd	6	0
Western Global Airlines	2	0
Unidentified	19	6
Total	319	238

Orders / Deliveries as of December 31, 2022



777-8F operator base continues to expand



LUFTHANSA GROUP

ANA Cargo

2027 EIS

118t Structural payload



More volume
More payload
Lowest cost per tonne

84 orders and commitments



777-8F

31% lower CO₂ emissions per tonne
60% smaller noise footprint
vs 747-400F

Levers for sustainable aviation



Fleet
Renewal

15-30% more
efficient freighters



Operational
Efficiency

Up to **10%** in
fuel savings



Renewable
Energy

100% SAF
compatible
before 2030

Advanced
Technology

75%
sustainable
R&D spending



<https://www.boeing.com/commercial/market/cargo-forecast/>

World Air Cargo Forecast 2022–2041

