

Commercial Outlook for Asia

Key Driving Trends Shaping the Future of Commercial Engine Fleets & MRO

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COMMERCIAL
2025
FORECAST
OUTLOOK

Commercial Market Trends Drivers & KPI

What's Happened Since This Time in 2024?

OEMs

Boeing

- ✚ Rate-cap 38 - 737 line → Boeing 'Safety & Quality Plan' - not a limit now - still processing "inventory".
- ✚ New CEO → new culture principles doc released recently...
- ✚ 50+ day strike + production pause for re-training – leads to new 'ramp up' starting Dec 2024.
- ✚ 10% of workforce being laid off.
- ✚ \$25B liquidity 'issue' – some cash already in....sell off part of Boeing?
- ✚ 777X engine thrust link issue – re-started flights in Jan 2025.
- ✚ <350 aircraft delivered in 2024 – only just beat 2021 levels.

Airbus

- ✚ Lowered 2024 delivery forecast (800 to 770) – managed 766 – 820 for 2025 too aspirational?
 - ✚ Blame placed on CFM (supplies ~60% of A320neo engines), and Spirit AeroSystems (A220/A350).

Engine OEM

- ✚ P&W GTF peak aircraft on ground Q2 2024 – plateau continuing.
- ✚ LEAP fuel nozzle coking issue - RBS fix fielding for NEO, but not for MAX, yet, soon.
- ✚ Safran strike – 1-week shutdown of production.

What's Happened Since This Time in 2024?

Additional points

Supply chain fires add to woes

- ✚ SPS Technologies fastener factory fire
- ✚ Chicago Magnesium Casting Company fire

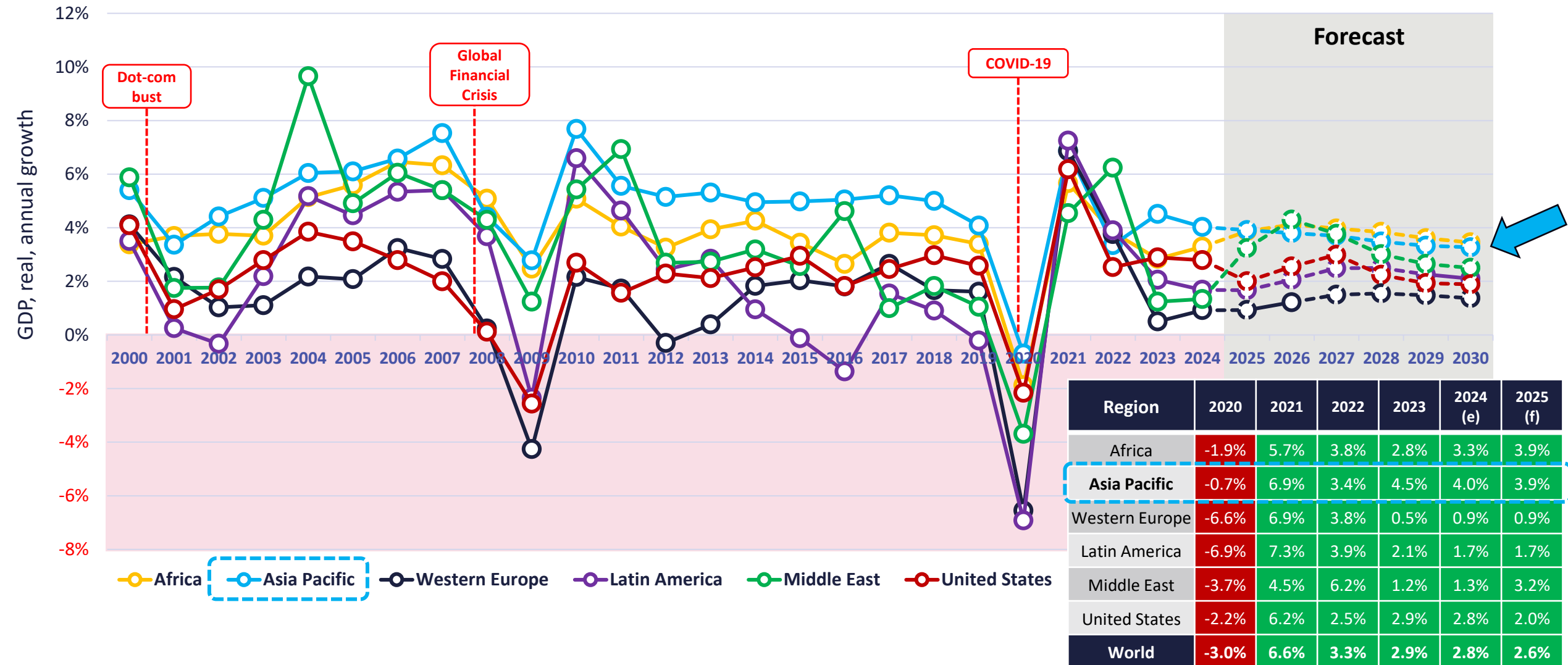
Profitability & MRO

- ✚ Increased demand
- ✚ Lack of USM, PMAs rising...
- ✚ Supply chain struggles

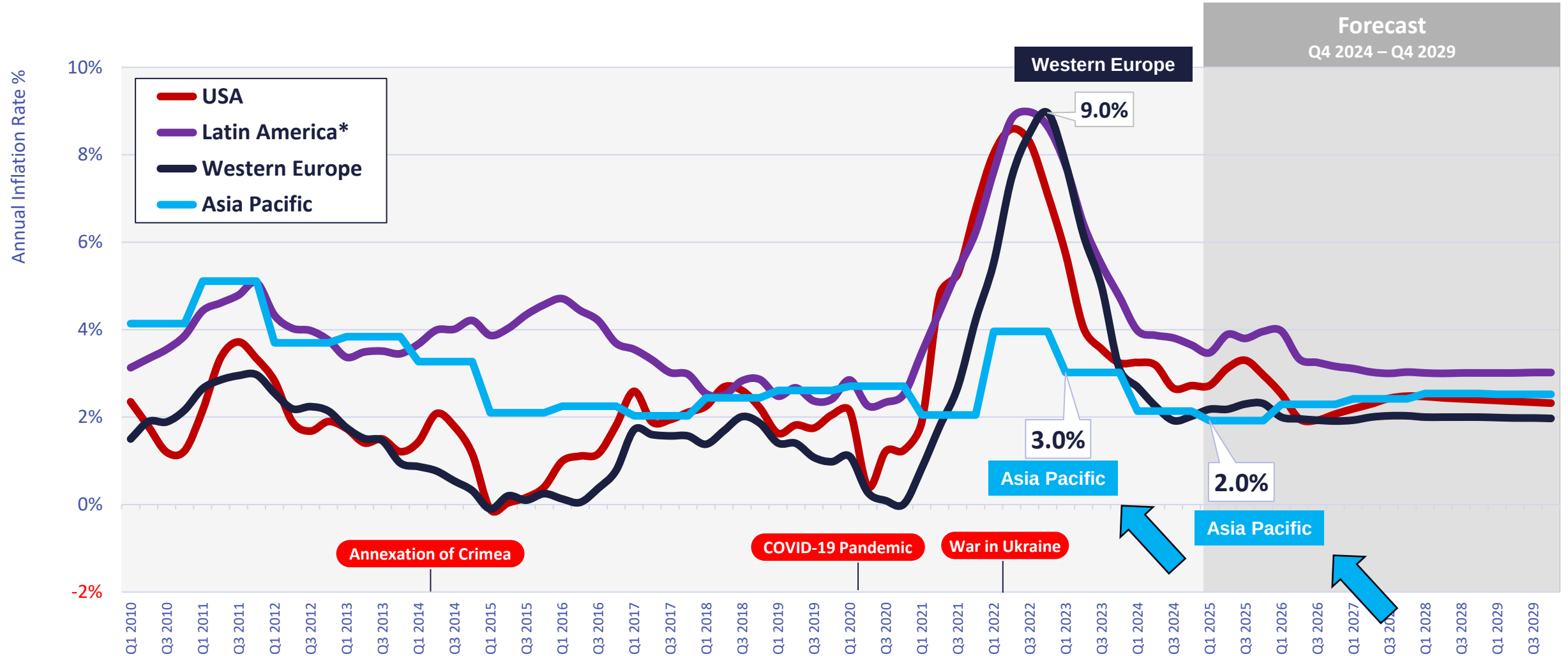
Tariffs

- ✚ Tariffs on/off?
 - (2) Xiamen Airlines 737-8s returned to Boeing from COMAC/Boeing facility in Zhoushan.
- [AWIN - https://aviationweek.com/air-transport/aircraft-propulsion/boeing-737-max-jets-flown-back-china-amid-tariff-tensions](https://aviationweek.com/air-transport/aircraft-propulsion/boeing-737-max-jets-flown-back-china-amid-tariff-tensions)
- ✚ Inflation?
- ✚ Carriers lowering outlook
- ✚ Uncertainty...

GDP, Recent Economic Shocks & Forecast



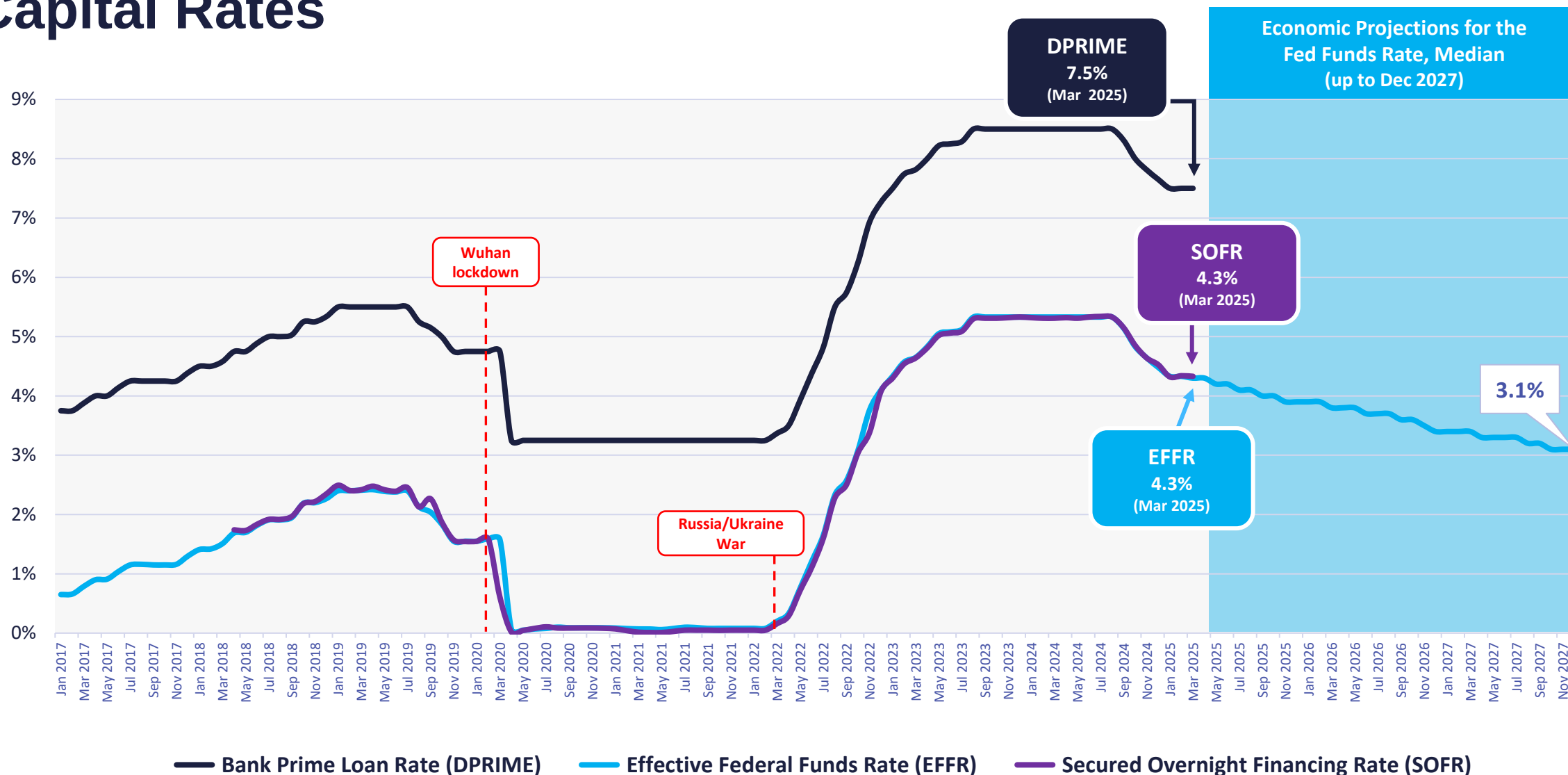
Inflation, Consumer Price Index % year-on-year



Source: Oxford Economics Ltd (26 March 2025 update)

Note: *CPI for Latin America is an average of the following countries: Brazil, Chile, Colombia, Dominican Republic, Ecuador, Mexico and Peru. Argentina & Venezuela excluded.

Capital Rates



Source: US Federal Reserve Economic Data, ICE Benchmark Administration Limited (IBA)
Note: As of January 1st 2022, Libor, or the London Interbank Offered Rate, was no longer be used for new derivatives and loans.

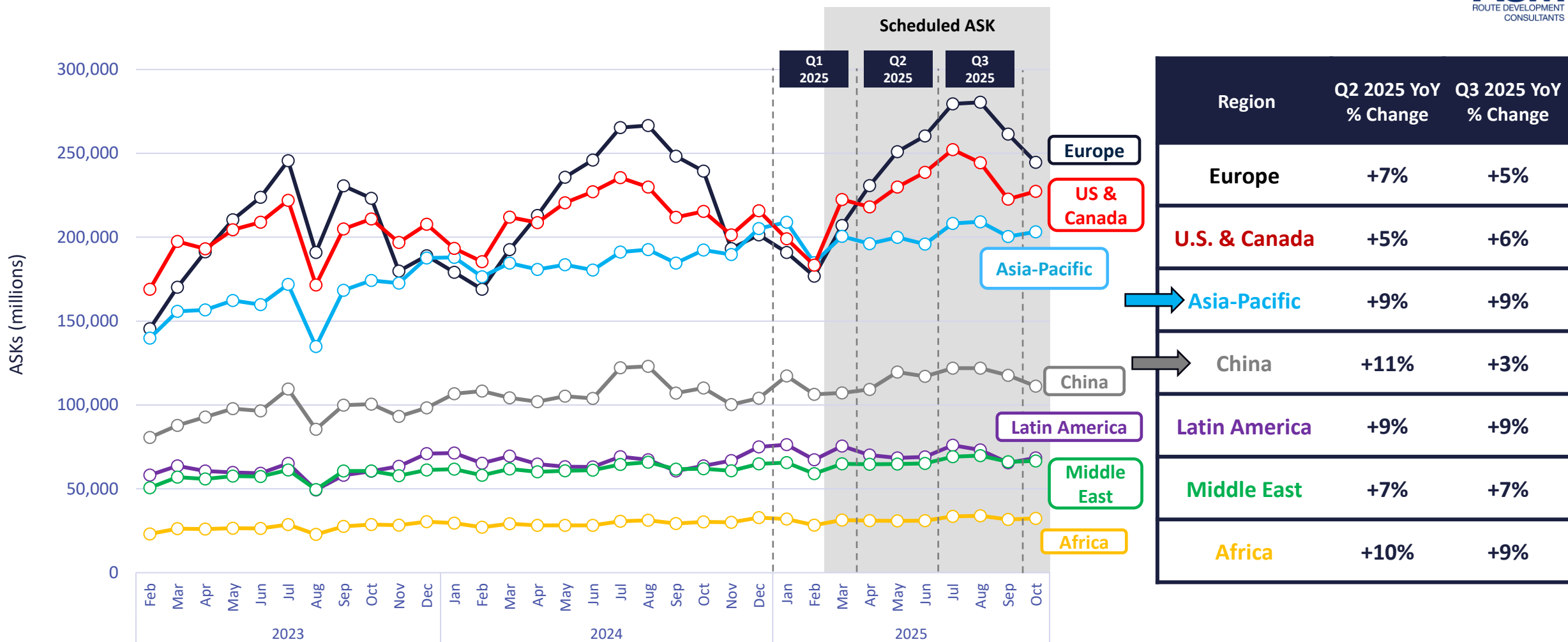
Leading Asian Airlines by Traffic 2024 (RPKs)

+80% Load factors!

Rank 2024	Airline Group	Country	RPK (m)			ASK (m)			Load Factor		Passengers (thousand)		
			2024	2023	Change	2024	2023	Change	2024	2023	2024	2023	Change
1	 中国南方航空 CHINA SOUTHERN	China	305,991	246,947	24%	362,646	316,217	15%	84%	78%	164,749	142,201	16%
2	 AIR CHINA	China	284,332	218,807	30%	356,113	298,692	19%	80%	73%	155,311	128,478	21%
3	 中國東方航空 CHINA EASTERN	China	245,894	182,295	35%	296,909	244,975	21%	83%	74%	140,583	115,640	22%
4	 SINGAPORE AIRLINES	Singapore	152,100	138,758	10%	175,645	157,101	12%	87%	88%	39,021	34,602	13%
5	 IndiGo	India	128,610	115,284	12%	150,177	134,898	11%	86%	85%	113,179	103,441	9%
6	 海南航空 HAINAN AIRLINES	China	123,854	102,223	21%	148,343	125,548	18%	83%	81%	68,025	59,484	14%
7	 QANTAS	Australia	116,895	97,693	20%	141,357	117,258	21%	83%	83%	51,798	45,725	13%
8	 AIR INDIA	India	96,869	73,951	31%	115,903	87,860	32%	84%	84%	42,013	27,642	52%
9	 CATHAY	Hong Kong	93,015	73,342	27%	111,789	85,607	31%	83%	86%	22,827	17,985	27%
10	 KOREAN AIR	South Korea	76,665	68,053	13%	91,055	80,777	13%	84%	84%			

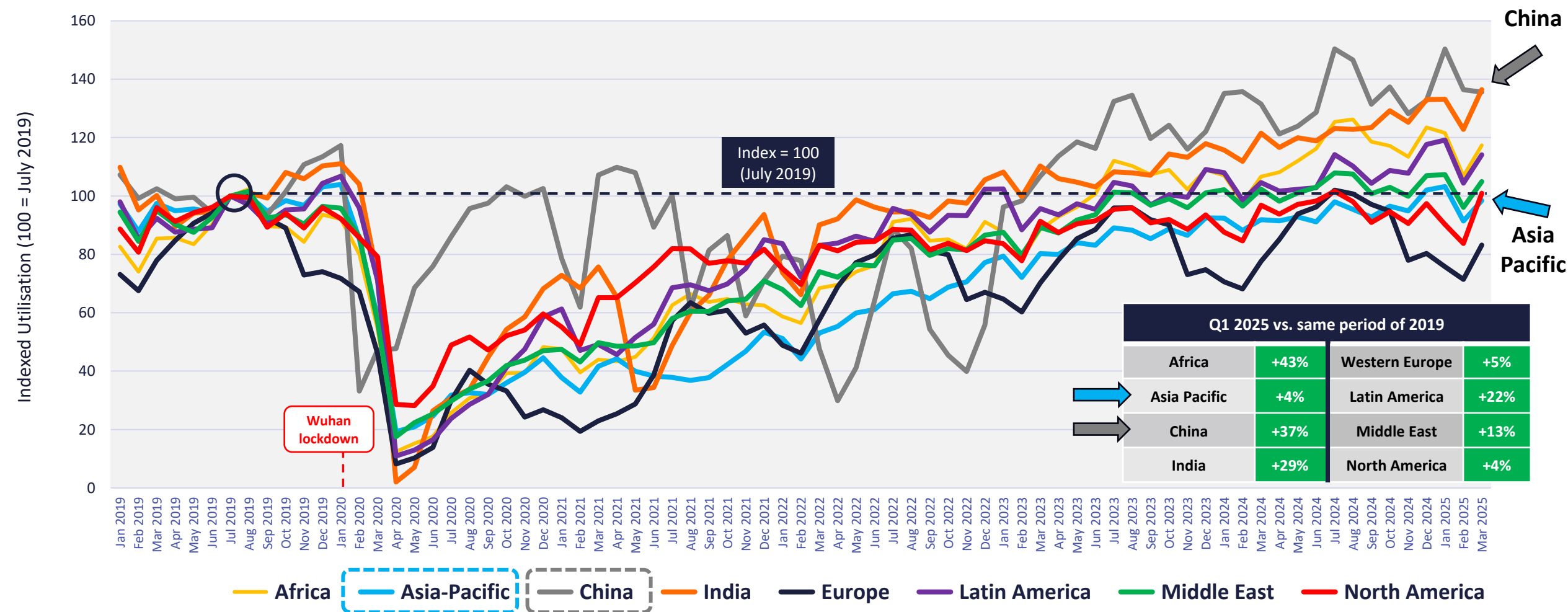
Scheduled & Historic Available Seat Kilometres – By Region

Scheduled airline capacity (updated 8 Apr 2025)

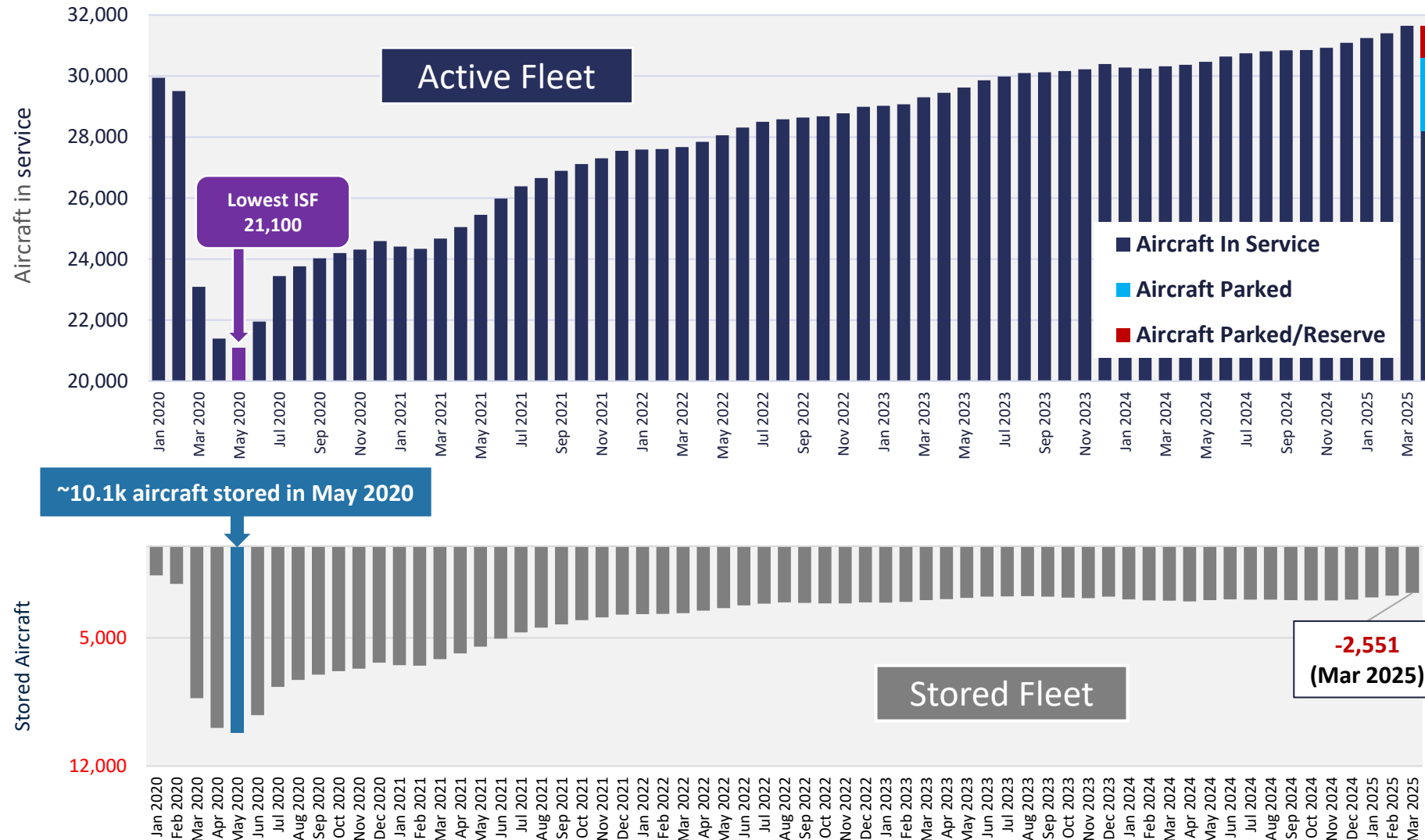


Utilization Change – Region

Indexed flight hour utilization for commercial aircraft fleets by operator region vs. July 2019



Global Historic Trends: In-Service Fleet & Storage



11% of the global fleet temporarily parked or under-utilized, Apr 2025



Parked Aircraft During Pandemic

Commercial Fleet of
~31,600 in April 2025
(2019 peak = +30,200)



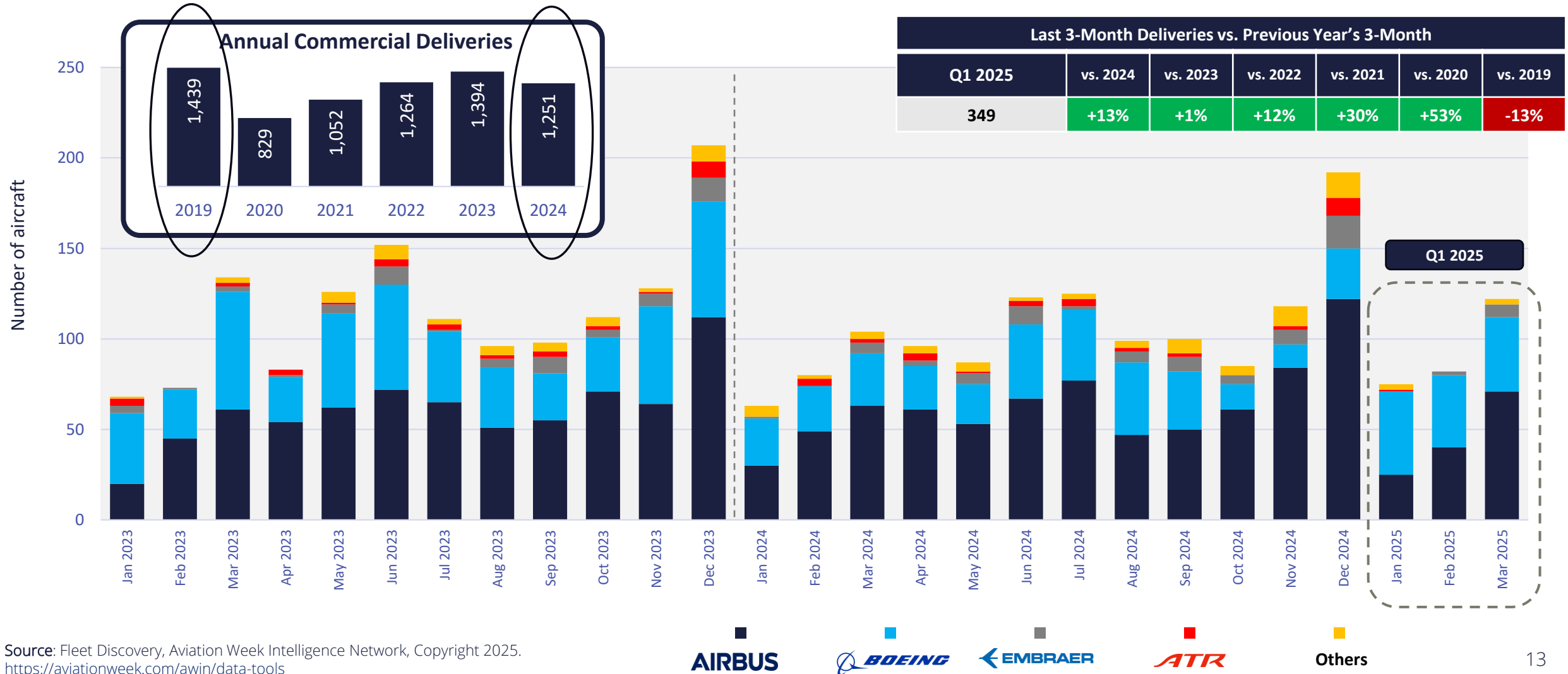
Source: Fleet Discovery, Aviation Week Intelligence Network, Copyright 2025.

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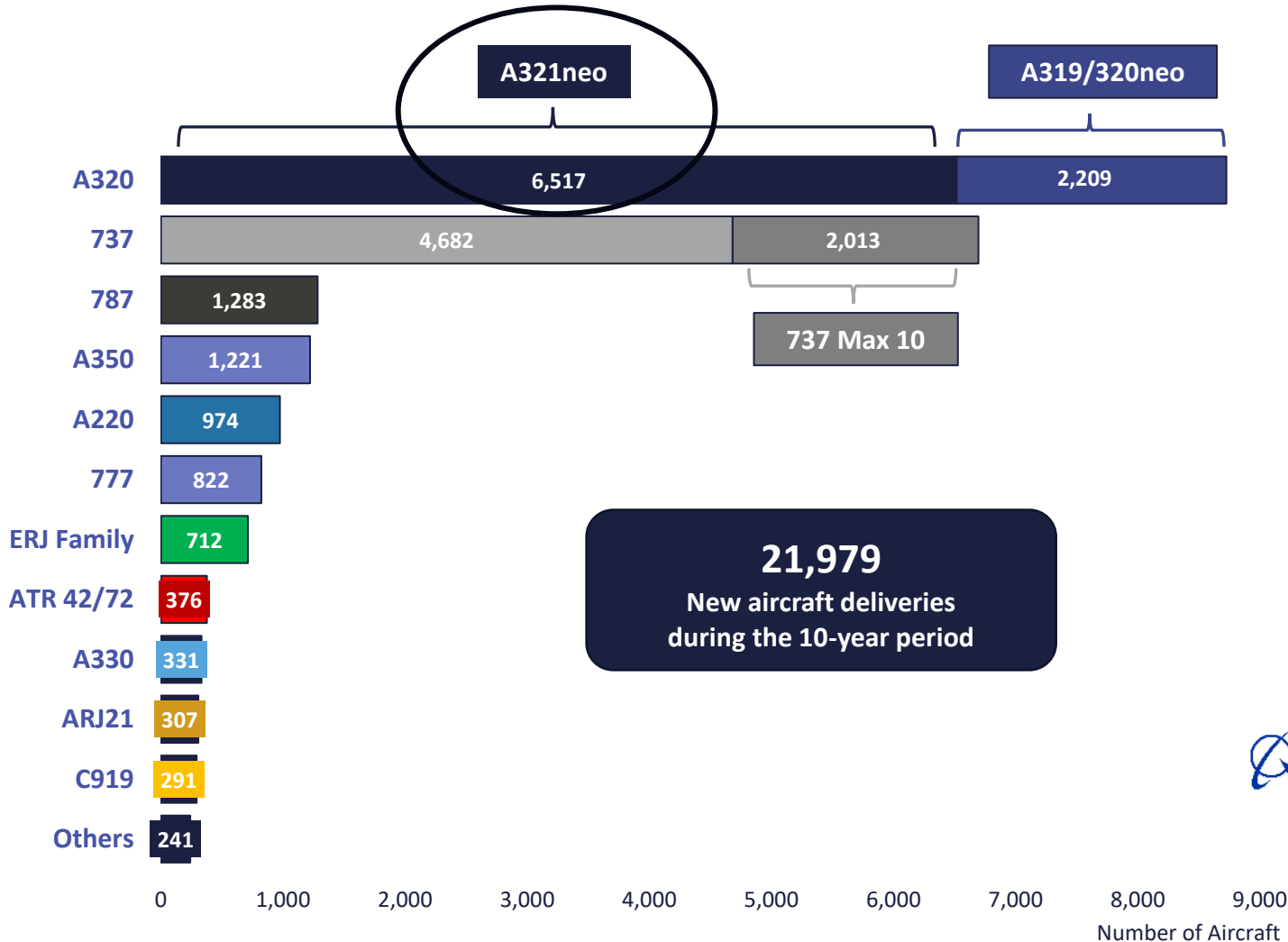
Fleet Forecast 2025-2034

Historical Deliveries – Commercial Aircraft by OEM

Monthly deliveries of commercial aircraft – all OEMs

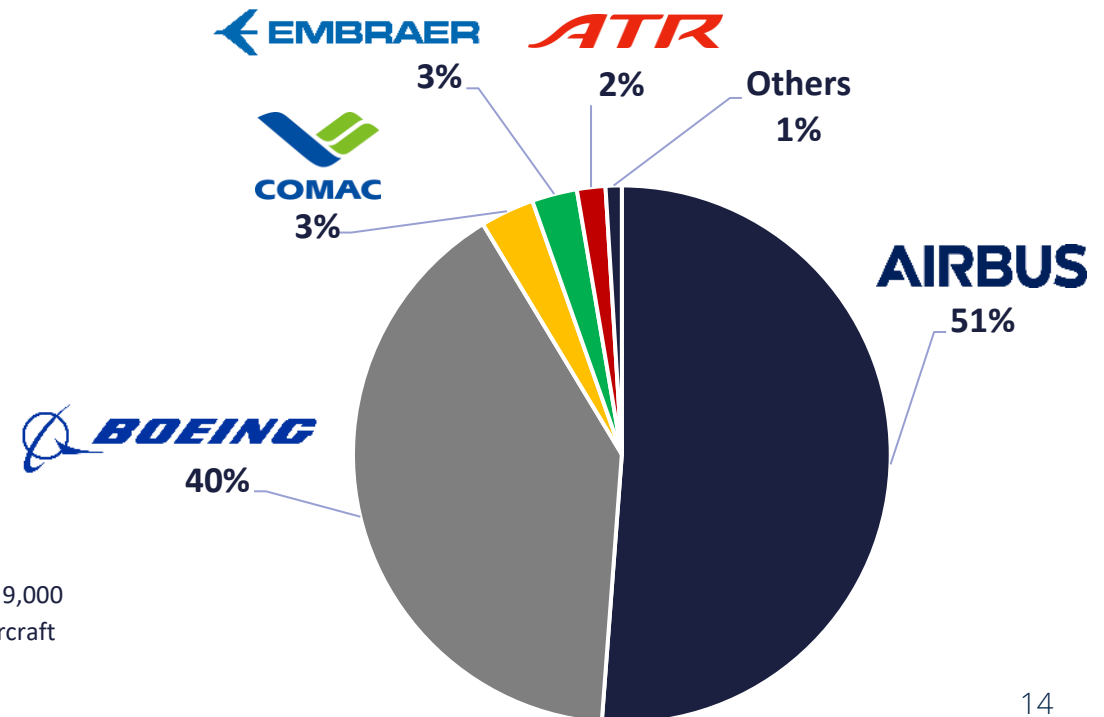


Forecast: Global Aircraft Deliveries 2025-34



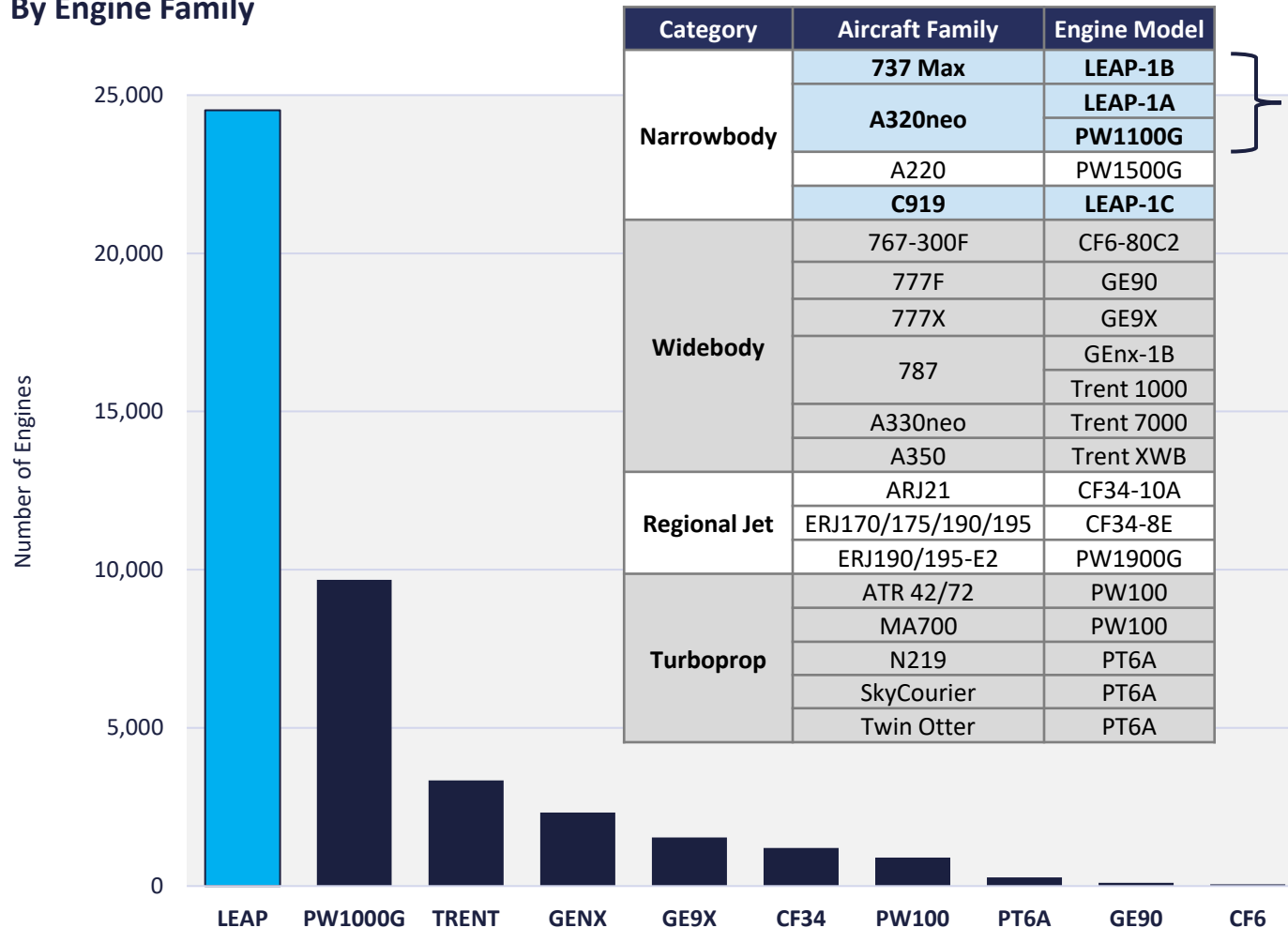
Firm Orders – Mar 2025
17,100+ aircraft
51% - Airbus, 36% - Boeing

Forecast Deliveries by Manufacturer (2025-34)



Forecast: Global Commercial Engine Deliveries 2025-34

By Engine Family



Drivers

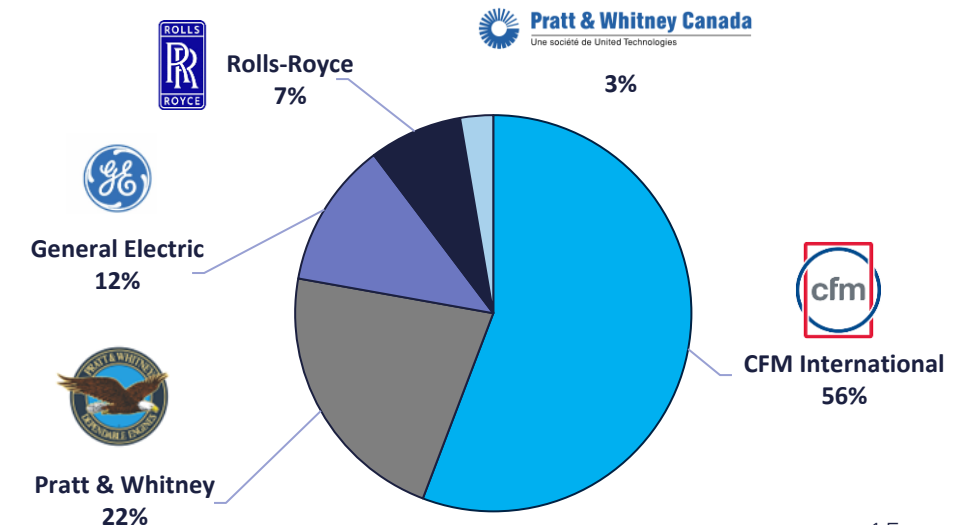


Credit: Guy Norris, Aviation Week

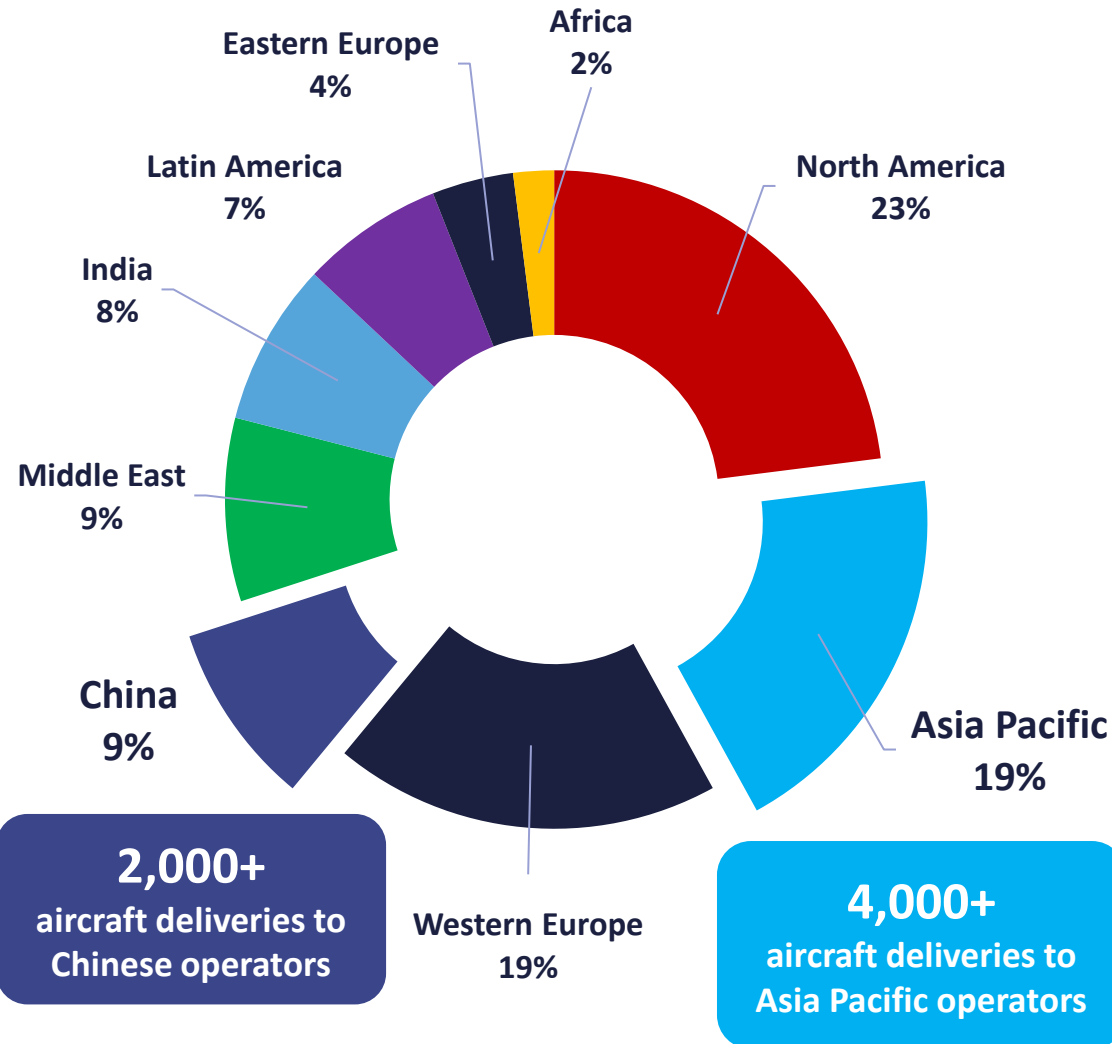
CFM's LEAP engine alone projected at over + 24,500 deliveries.

CFM engines account for 56% of all engine deliveries (not including spares)

Deliveries By Engine Manufacturer



Forecast: Deliveries by Region, 2025-34



Chinese airlines - 295 "firm order" 737 MAX - family aircraft; 60 engines scheduled for this year...

Highlights – Asia-Pacific & China

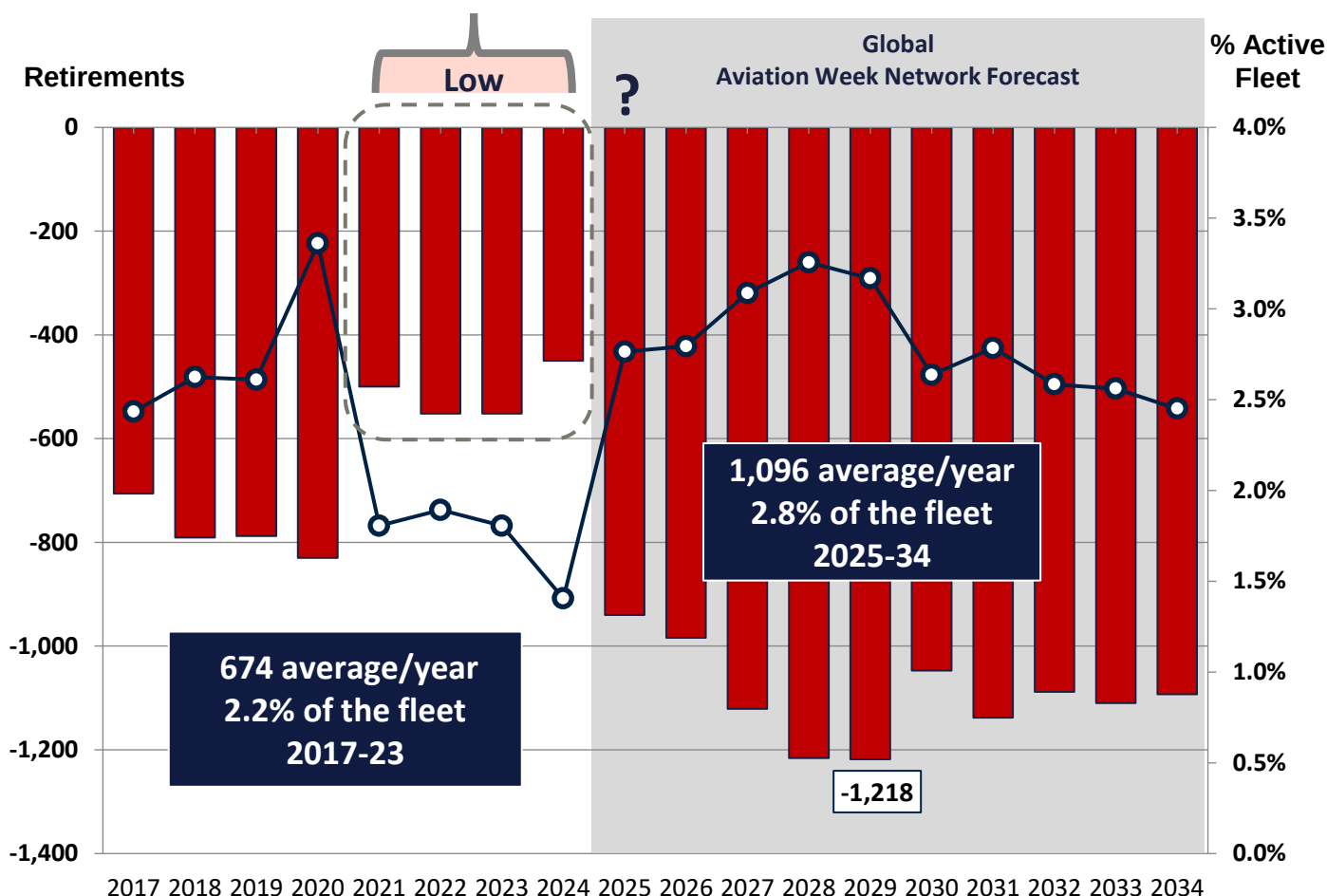
- ~6,100 new deliveries to Asian carriers
- 69% narrowbody share
- 48% Airbus, 10% Comac
- +12,200 new engine deliveries

Top Airlines in Asia



Forecast: Global Retirement Trends

Annual retirements historical & forecasted, % of in-service fleet



Recent Annual Retirements						
	2024	vs. 23	vs. 22	vs. 21	vs. 20	vs. 19
Narrowbody	301	-6%	-3%	14%	-24%	-31%
Widebody	104	-16%	0%	-8%	-55%	-28%
Regional	43	-74%	-75%	-73%	-82%	-84%
Total	448	-26%	-23%	-16%	-48%	-47%

~10,900 Retirements 2025-34

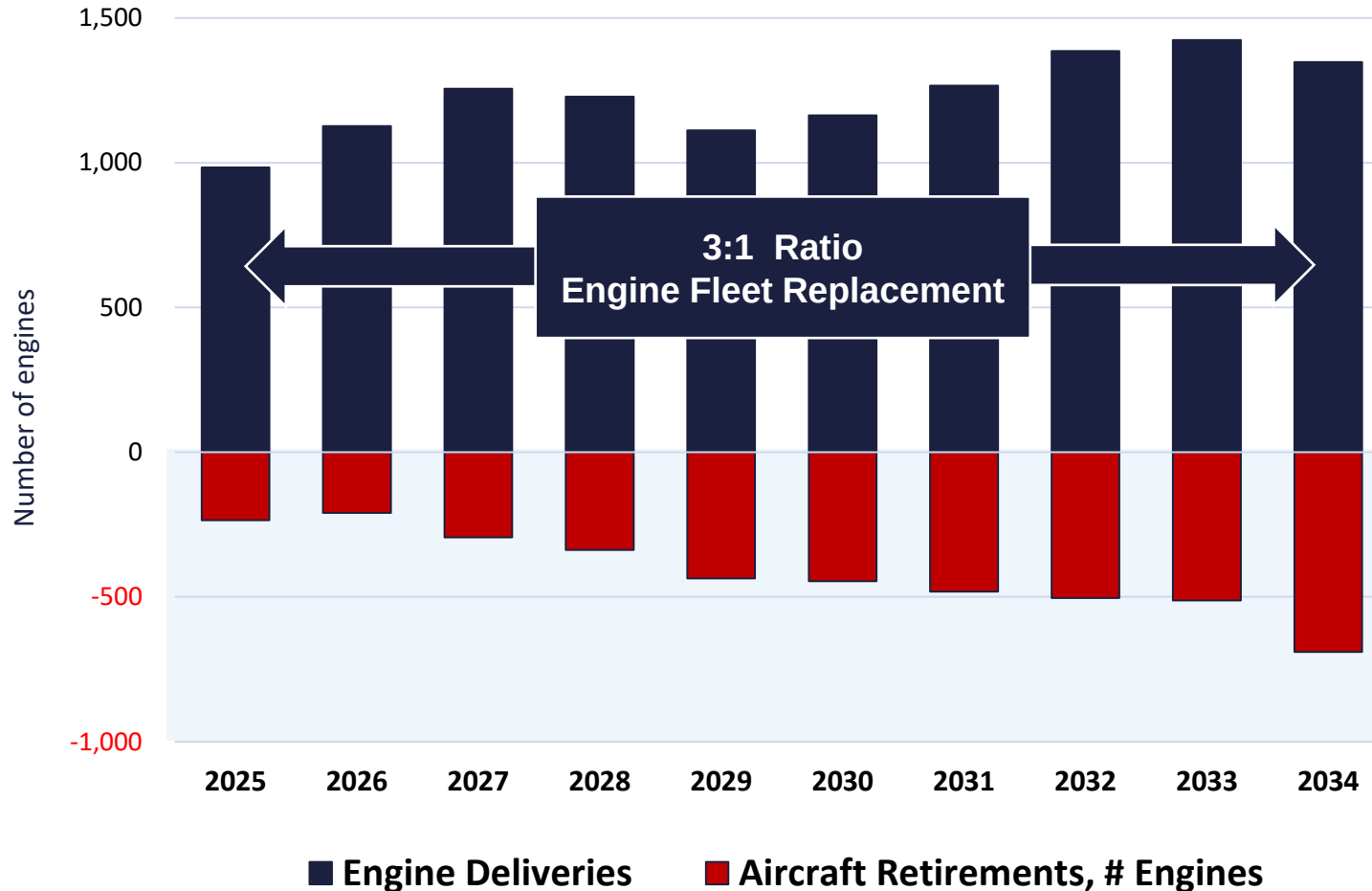
Credit: Brian Kough, Aviation Week Network

Credit: Nigel Prevett, Aviation Week

Recycled Parts Impact on USM Market?

Forecast: Asia's Engine Transition

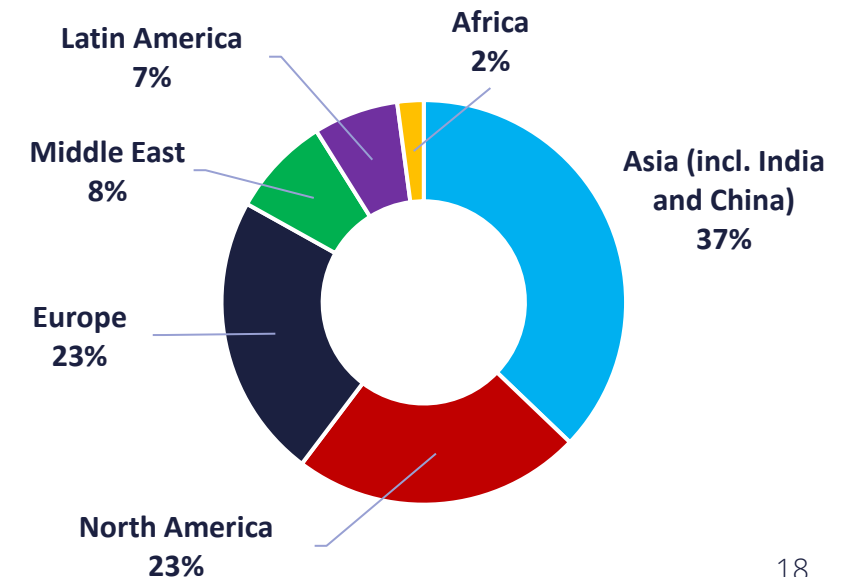
New engine deliveries vs. engines on retiring aircraft 2025-34



~12,300 new engines required in next 10 years

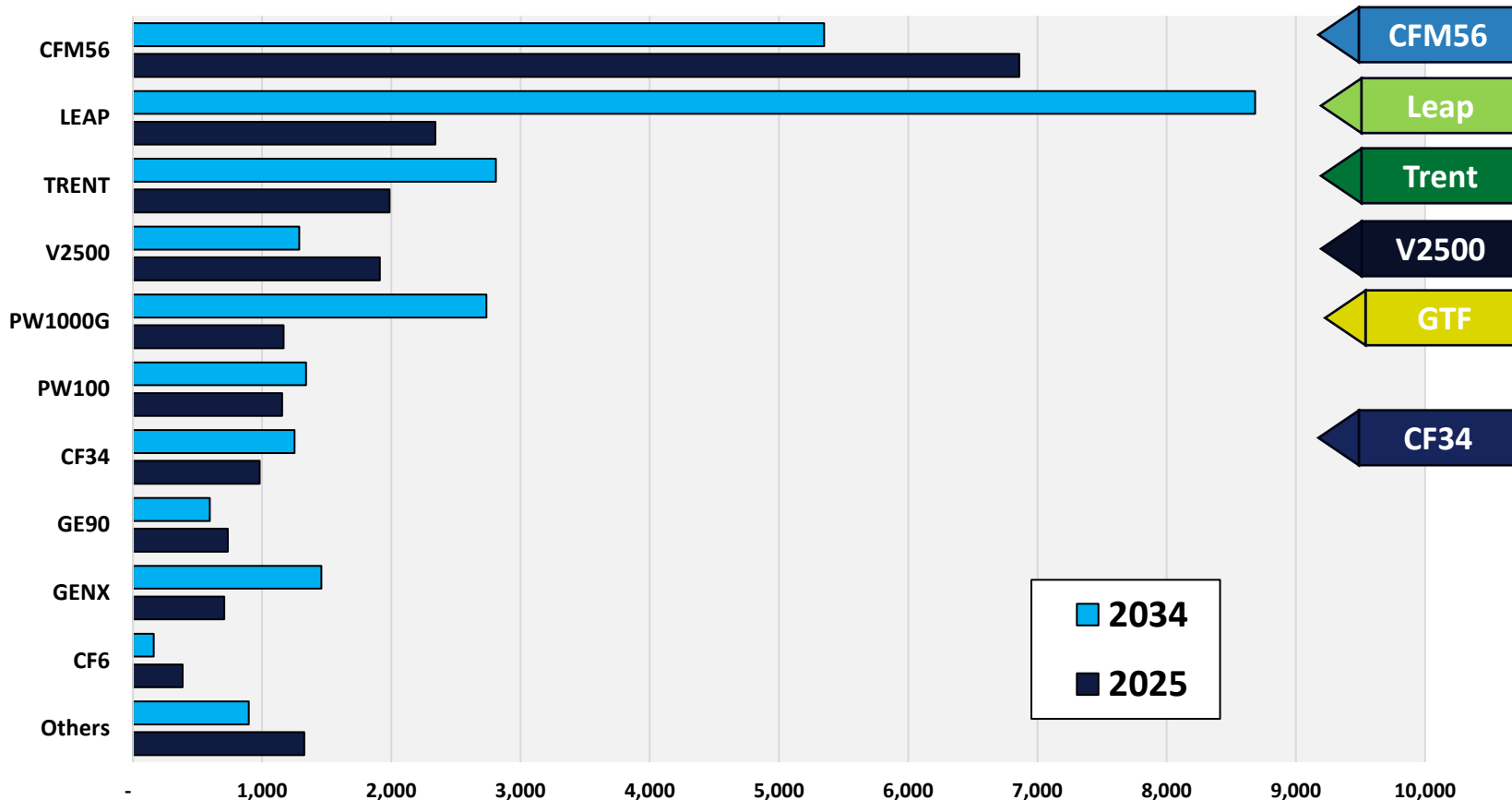
~4,100 engines associated with projected retiring aircraft

World Engine Delivery Share



Forecast: Asia's Engine Fleet, 2034 vs. 2025

In-Service Engine Change



Highlights

- CFM56 declines to ~5,350.
- Leap increase to ~8,700.
- GTF increases to ~2,700.
- CF34 increases to ~1,250.
- V2500 declines to ~1,290.
- Trent series increases to +2,800.

2.9% CAGR

Engine Fleet Forecast
2025-34

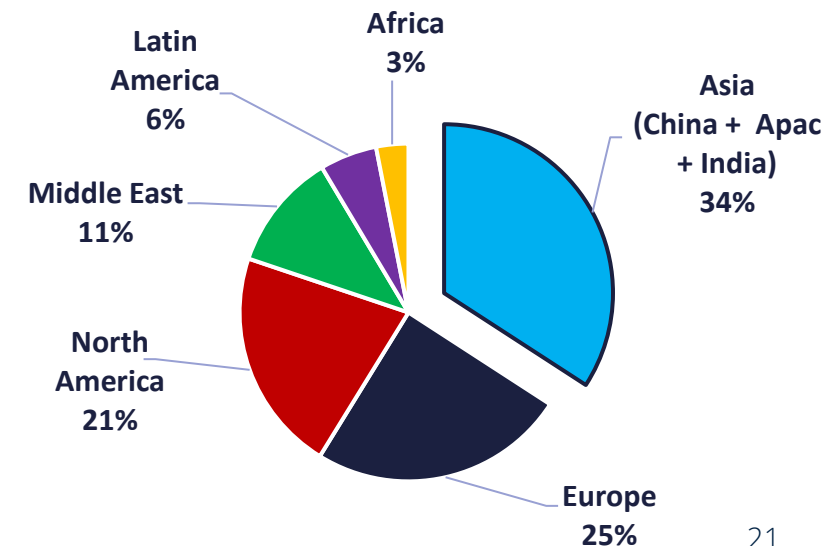
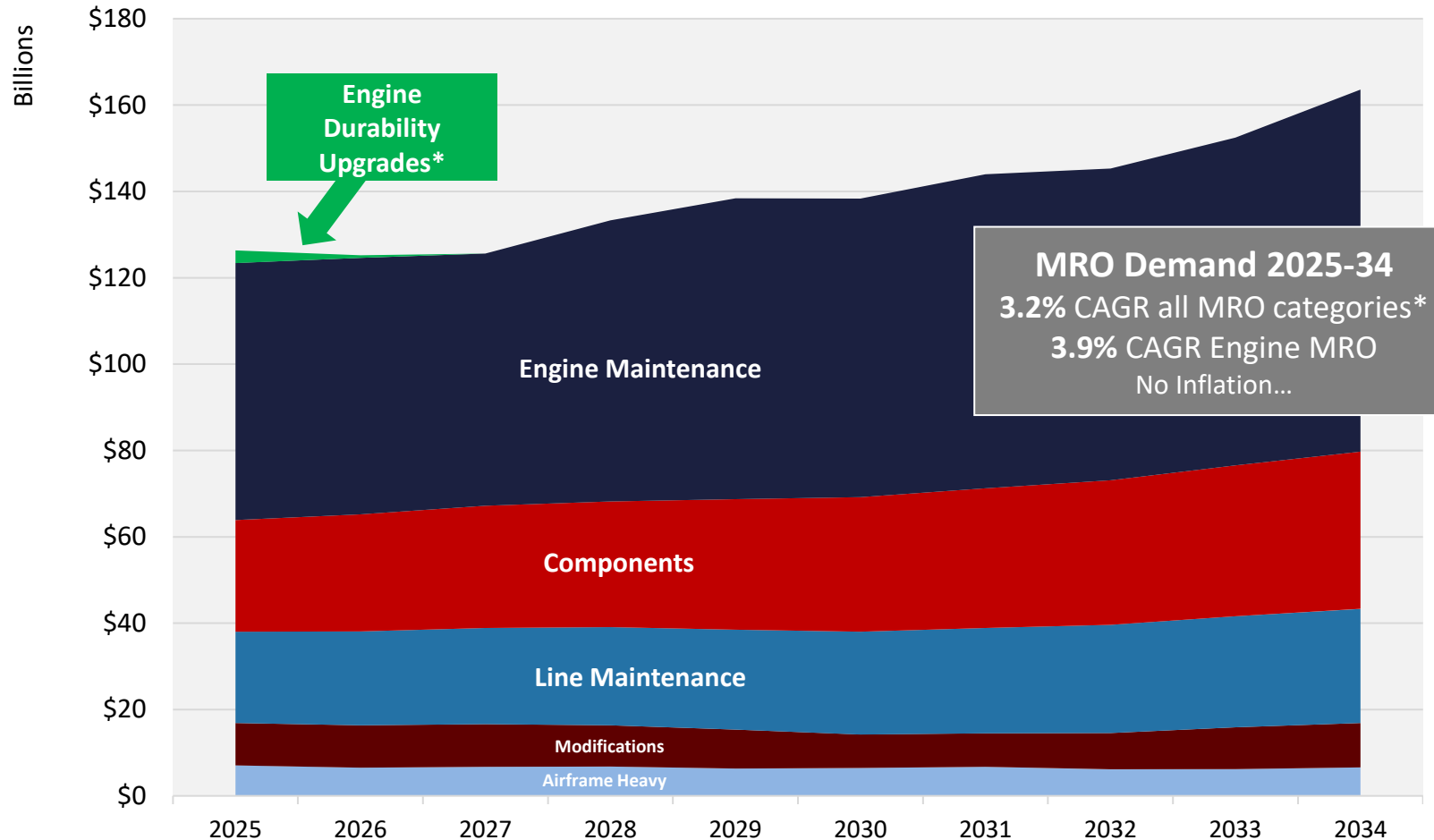
Jets + turboprops + storage return + PTFs

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Commercial MRO Forecast 2025-2034

Forecast: MRO Demand Overview

Global MRO aftermarket by category, constant US dollars.

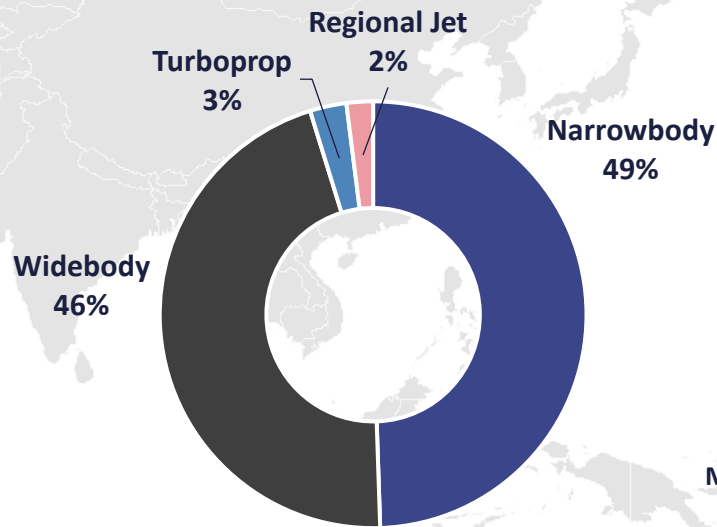


Forecast: Asia's Commercial MRO Demand 2025-34

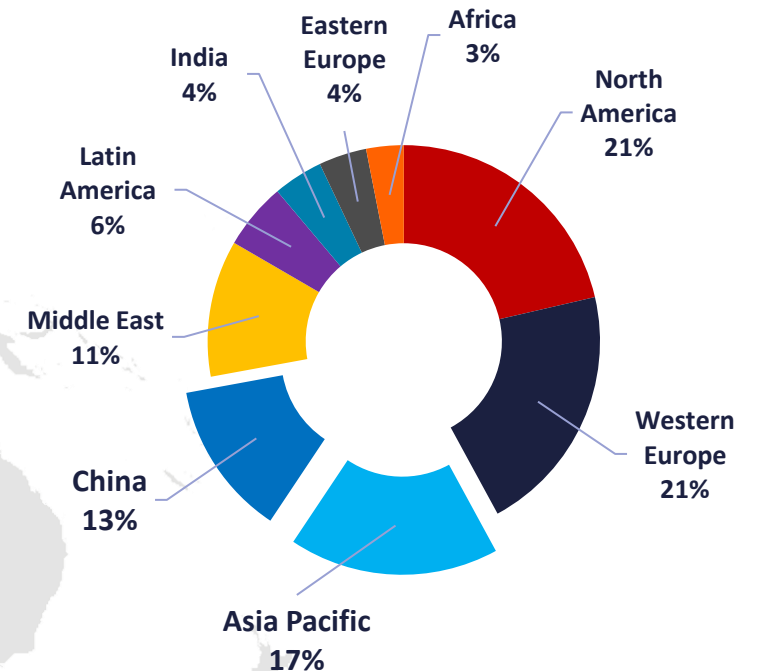
Asia 30% of Worldwide Demand Grows at 2.3% CAGR

- \$206 billion narrowbody MRO demand, 49% of region's share.
- 46% widebody MRO demand.
- Narrowbody and Widebody MRO grow at 2.6% and 2.3% CAGR, respectively.
- Engine MRO grows 2.7% CAGR.

Asia's MRO Demand

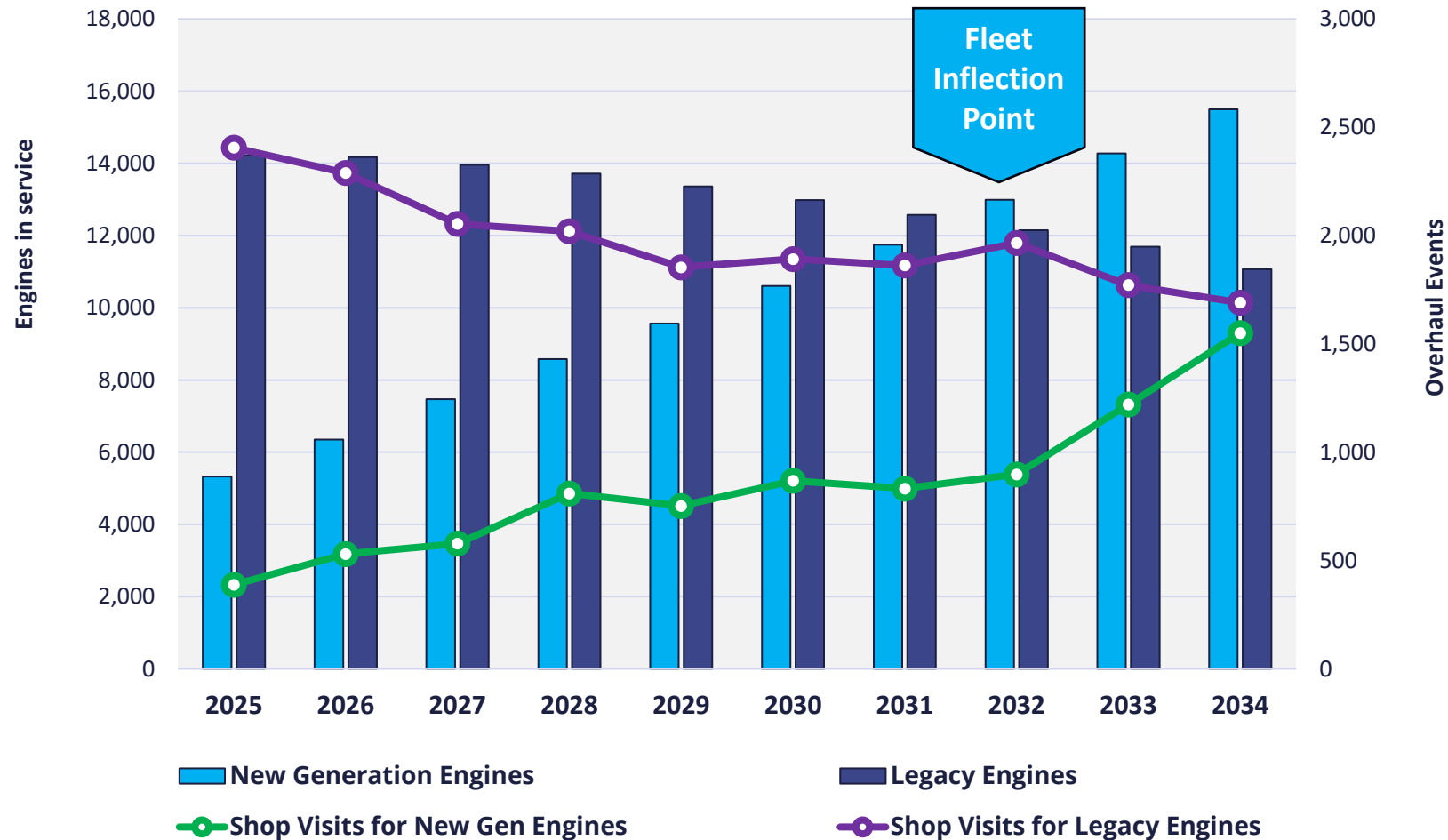


World's MRO Demand



Forecast: Engine Fleet & Overhaul Events – Asia

New generation vs. legacy fleet share & SV event forecast

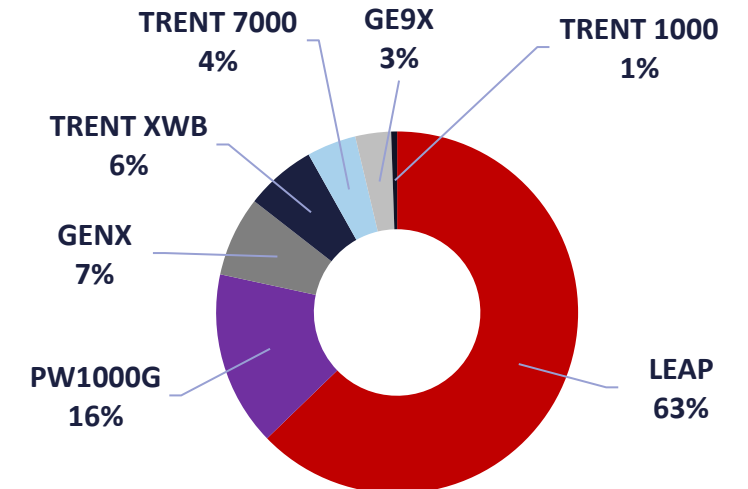


2032

New Generation Engines
Fleet Inflection Year

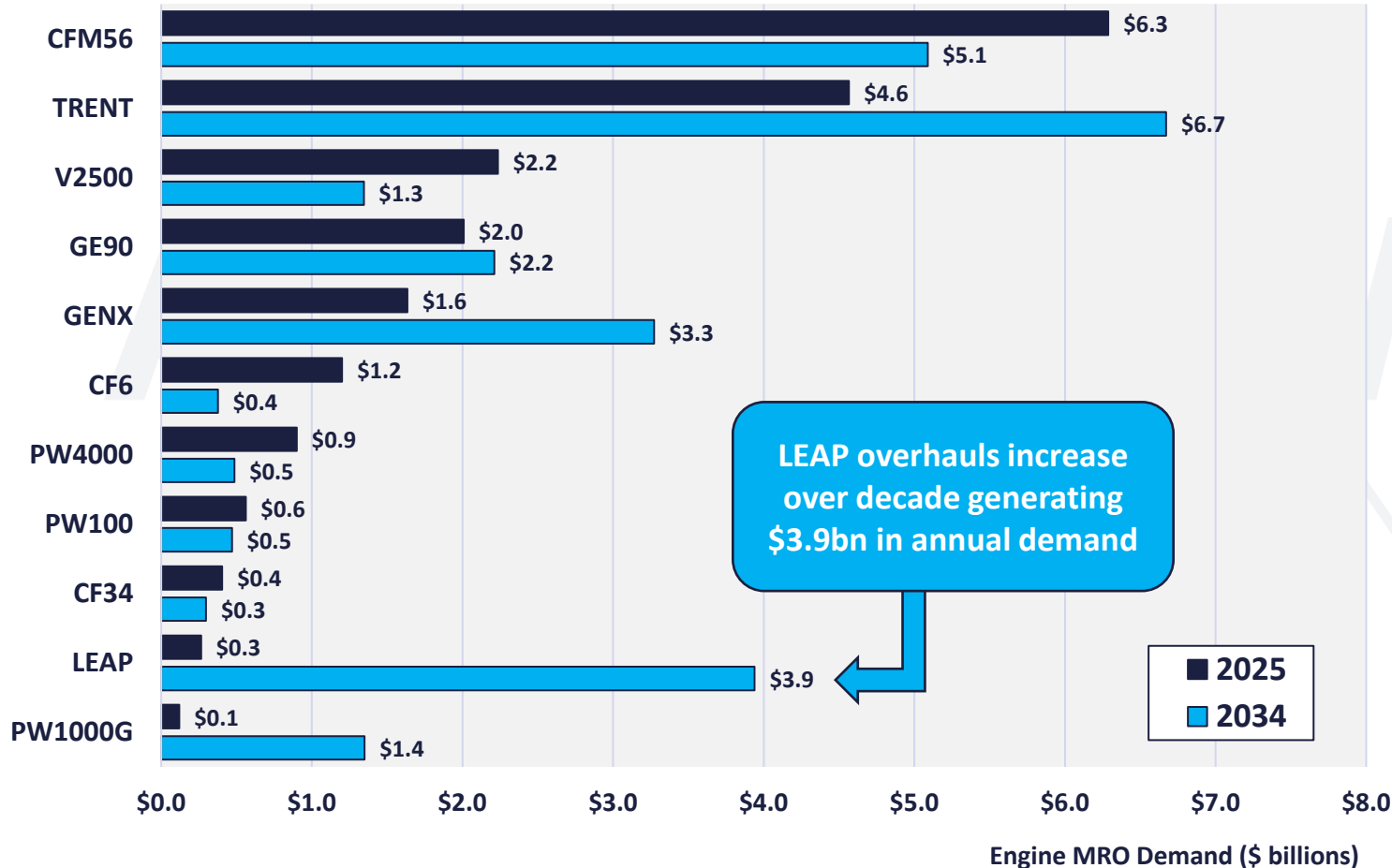
+28,000 Overhaul Events
Inflection point beyond 2034

New Gen Engine Deliveries
(Asia Pacific and China)



Forecast: Engine MRO Demand in Asia

MRO Demand by Engine Family

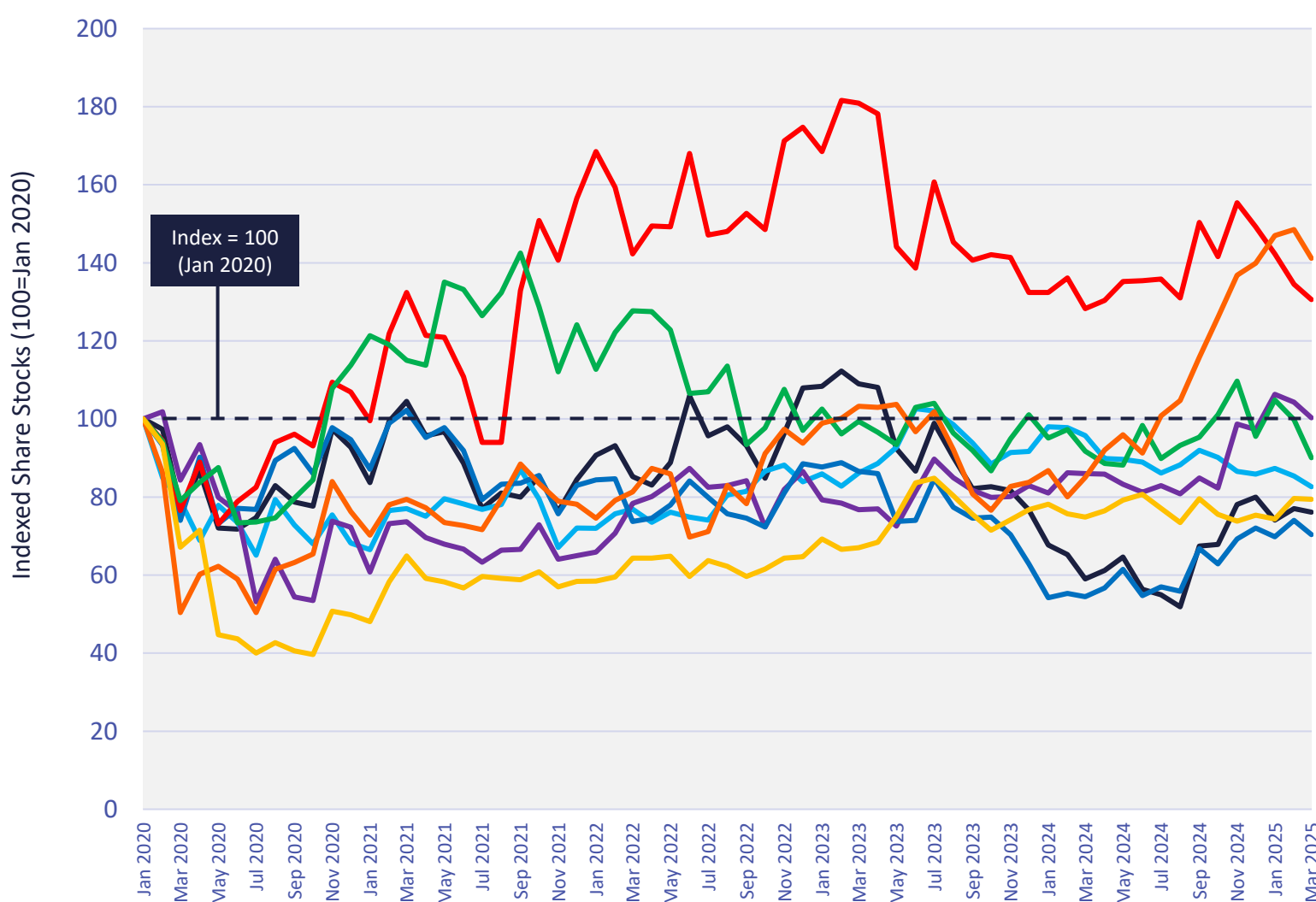


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Commercial MRO Trends



Indexed Stock Price Change – Leading Airlines in Asia



		Year-on-Year Change		
		31-Mar-25	28-Mar-24	Change
	AIR CHINA	4.90	3.80	28.9%
	ANA	2,760	3,196	-13.7%
	CATHAY	9.87	8.46	16.7%
	中國東方航空 CHINA EASTERN	2.52	1.95	29.2%
	中国南方航空 CHINA SOUTHERN	5.68	5.58	1.8%
	KOREAN AIR	21,300	21,700	-1.8%
	QANTAS	9.05	5.45	66.1%
	SINGAPORE AIRLINES	6.79	6.40	6.1%

Note: Figures in local currency.

Operating Margin for Leading U.S. Operators

Annual Pre-Tax Margin 2019 to 2024

Smaller Margins
in 2024 v. 2019

Airline Group	2019	2020	2021	2022	2023	2024
 DELTA	14.1%	-72.9%	6.3%	7.2%	9.5%	9.7%
 UNITED AIRLINES	9.9%	-41.4%	-4.1%	5.2%	7.8%	8.9%
American Airlines 	6.7%	-60.1%	-3.5%	3.3%	5.7%	4.8%
Southwest 	13.2%	-42.2%	10.9%	4.3%	0.9%	1.2%
<i>Alaska</i> 	12.1%	-49.8%	11.1%	0.7%	3.8%	4.9%
jetBlue	9.9%	-58.0%	-1.3%	-3.3%	-2.4%	-7.4%
FRONTIER AIRLINES	12.3%	-29.2%	-5.7%	-1.4%	-0.1%	1.5%
SkyWest AIRLINES	17.2%	5.1%	10.2%	6.0%	3.5%	14.0%
 allegiant	19.8%	-28.4%	15.4%	4.0%	8.8%	-9.6%

Note: Hawaiian Airlines became a subsidiary of Alaska Air Group on September 18, 2024, following the completion of Alaska Airlines' \$1.9 billion acquisition of Hawaiian Holdings, Inc.
Source: AWIN, Aviation Week Network and company reports

Large Increase in
MRO Expenses
2024 v. 2019

Operating Revenues & MRO Expenses: 2024 vs. 2019

	Operating Revenue (m\$)		MRO Expenses	
	2024 (\$m)	vs. 2019	2024 (\$m)	vs. 2019
 DELTA	\$61,643	+31%	\$2,616	+66%
 UNITED AIRLINES	\$57,063	+32%	\$3,063	+71%
 American Airlines	\$54,211	+18%	\$3,794	+61%
 Southwest	\$27,483	+23%	\$1,353	+11%
 Alaska	\$11,735	+34%	\$620	+42%
 jetBlue	\$9,279	+15%	\$628	+1%
 FRONTIER AIRLINES	\$3,775	+51%	\$209	NA
 SkyWest AIRLINES	\$3,528	+19%	\$712	+39%
 allegiant	\$2,513	+37%	\$125	+36%

Source: AWIN, Aviation Week Network and company reports.

Note: Hawaiian Airlines became a subsidiary of Alaska Air Group on September 18, 2024, following the completion of Alaska Airlines' \$1.9 billion acquisition of Hawaiian Holdings, Inc.

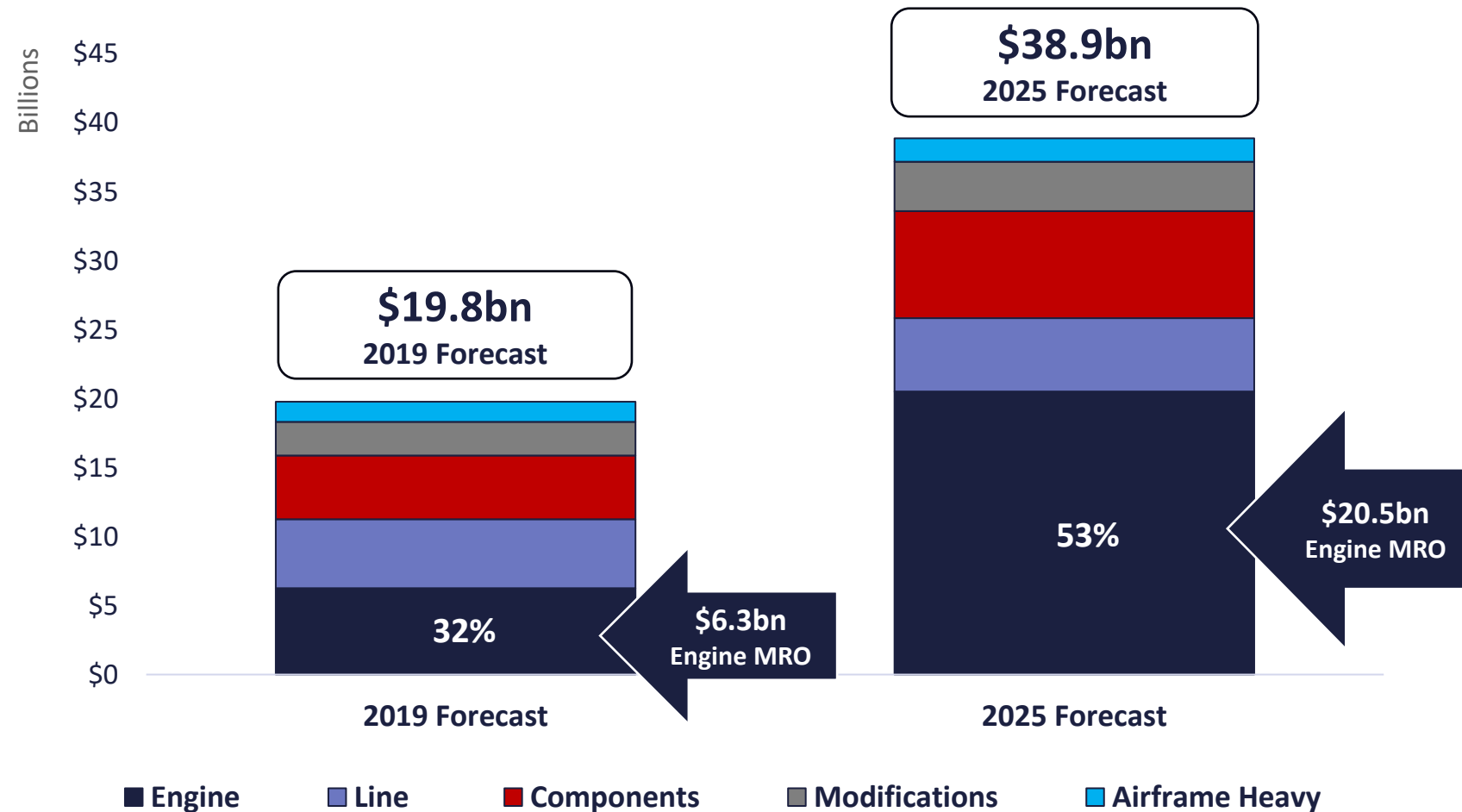
MRO Demand Share & Comparisons, 2025 vs. 2019

2025 v. 2019 Aviation Week Forecasts; MRO demand share for Asia Pacific and China

Engine MRO now 53% of MRO demand for 2025.

\$20.5 billion engine MRO expected in 2025 (LLPs + O/Hs) vs. \$6.3 billion in 2019.

Drivers: old engines, new tech, CLP, shortages of USM, labor...



Narrowbody Engine Durability Issues

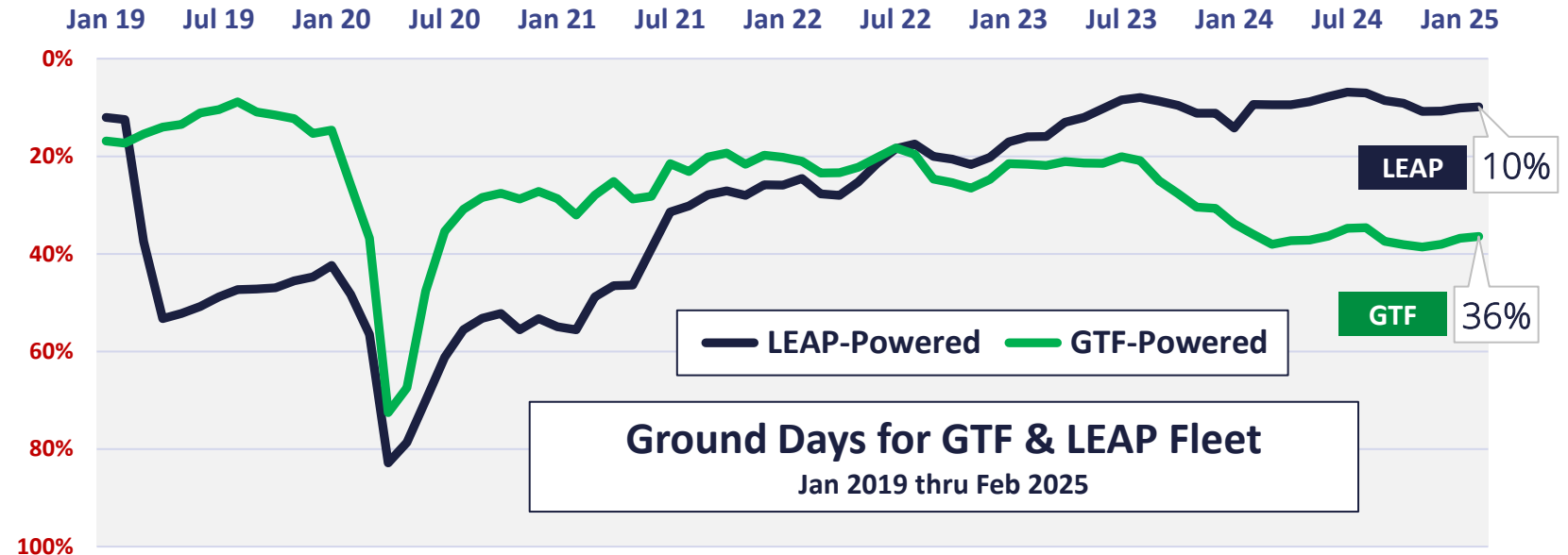
Unscheduled MRO aftermarket impacts for Pratt & Whitney GTF & CFM LEAP

\$3.5 billion

Durability Aftermarket Impacts
for Pratt & Whitney and CFM

- ⚡ GTF - combustion/heat exchanger.
- ⚡ GTF - HPT #1 and #2, HPC.
- ⚡ LEAP - fuel nozzles, R.B.S.

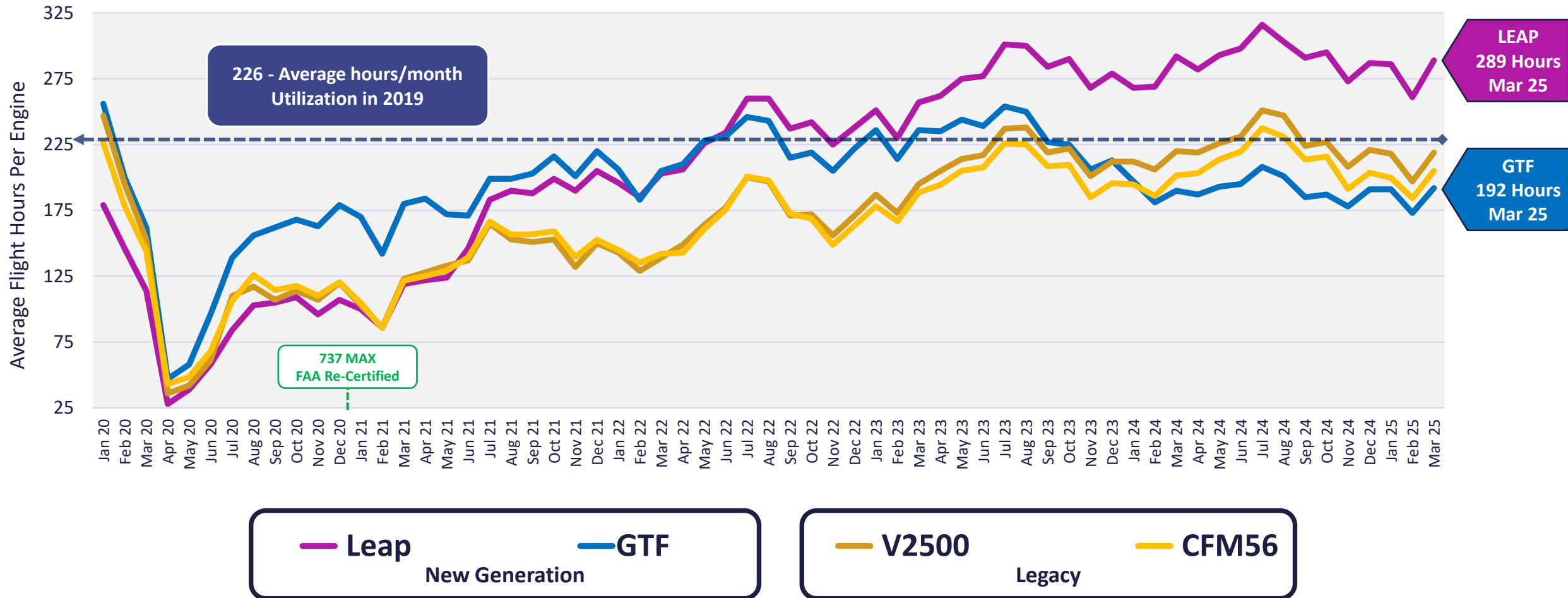
Commercial Aircraft	Engine Model
737 Max 7/8/9	LEAP-1B
A220-100/300	PW1500G
A319/320/321neo	LEAP-1A
A319/320/321neo	PW1100G-JM
C919	LEAP-1C
E190/195-E2	PW1900G



Narrowbody Engine Utilization: Jan 2020 – Mar 25

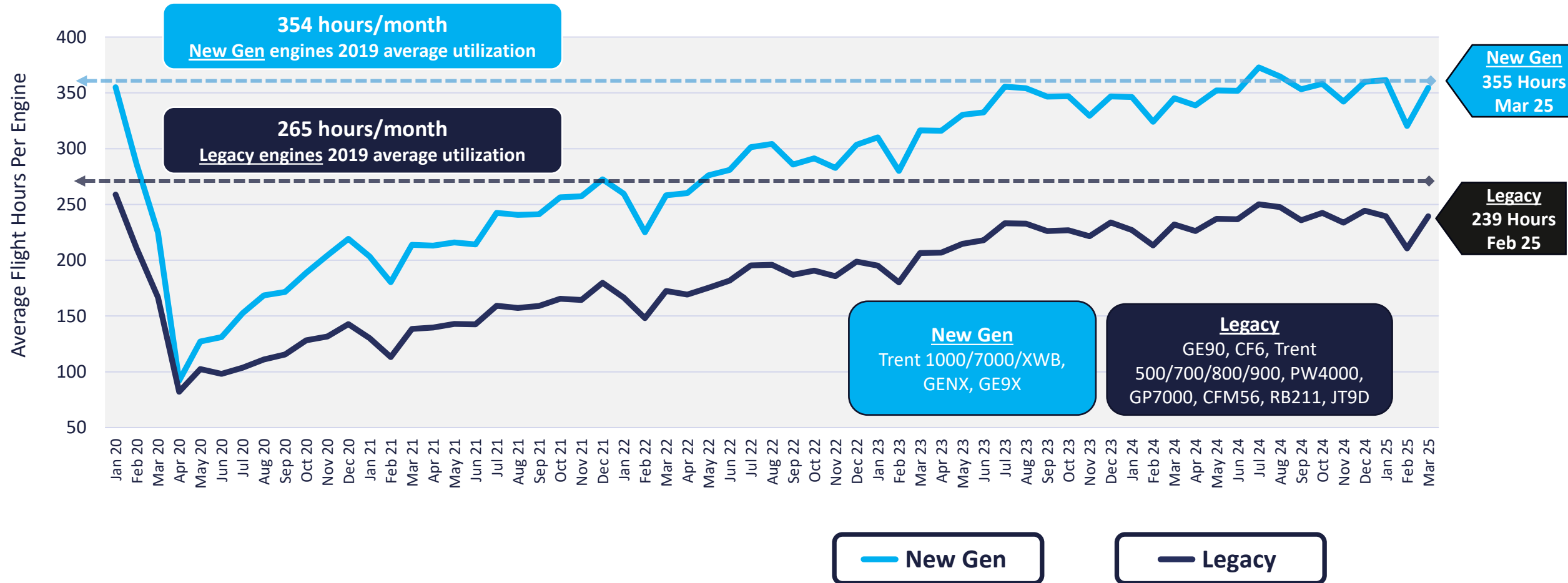
Average monthly flight hours, per engine, new generation vs. legacy engines

LEAP
In Service: 3,600+
On Order: 8,500+



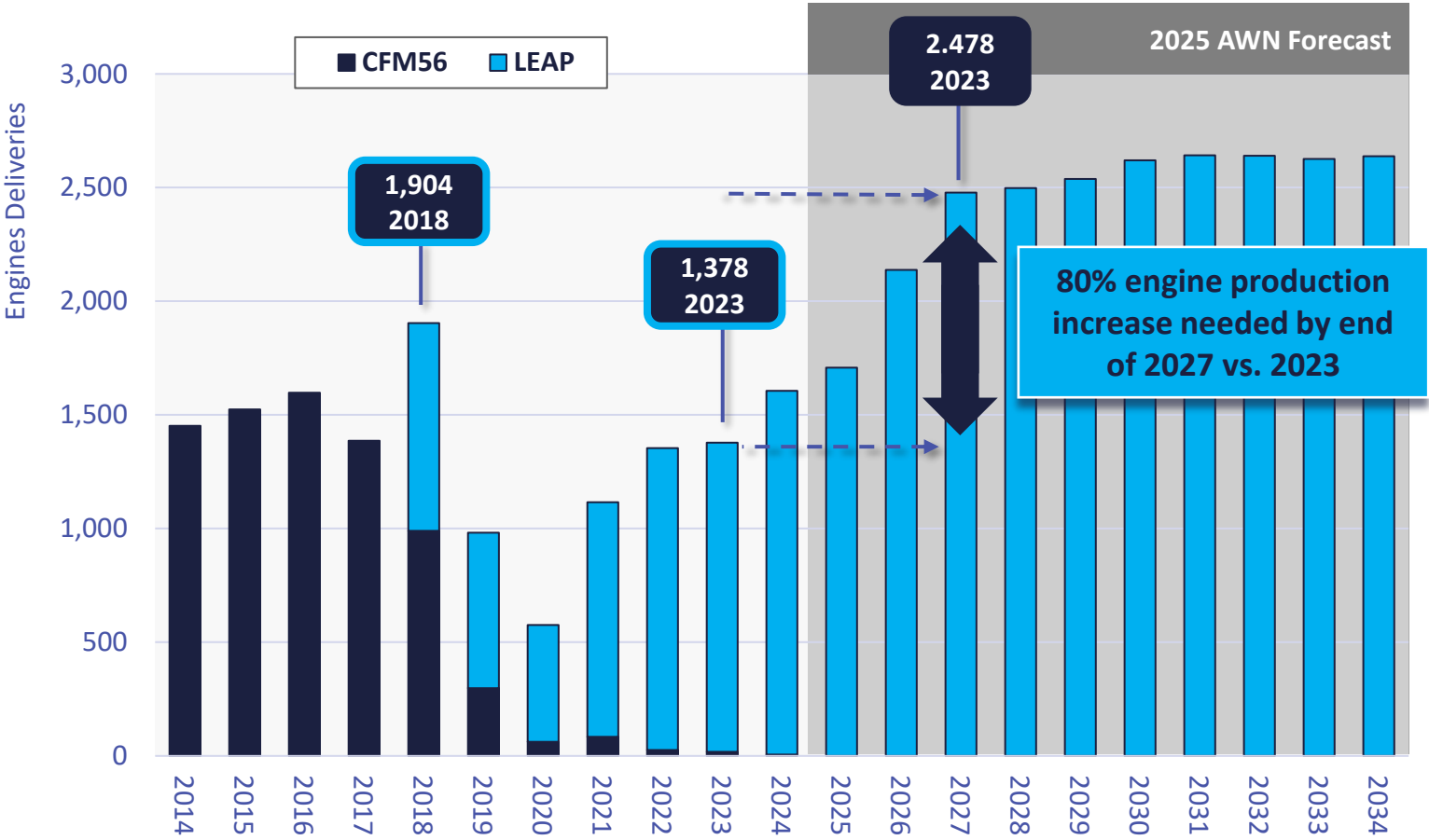
Widebody Engine Utilization: Jan 2020 – Mar 25

Average monthly flight hours by engine family: new generation vs. legacy



CFM Challenge: LEAP Global Production Needed

Historical & Forecast Engine Deliveries - CFM56 & LEAP

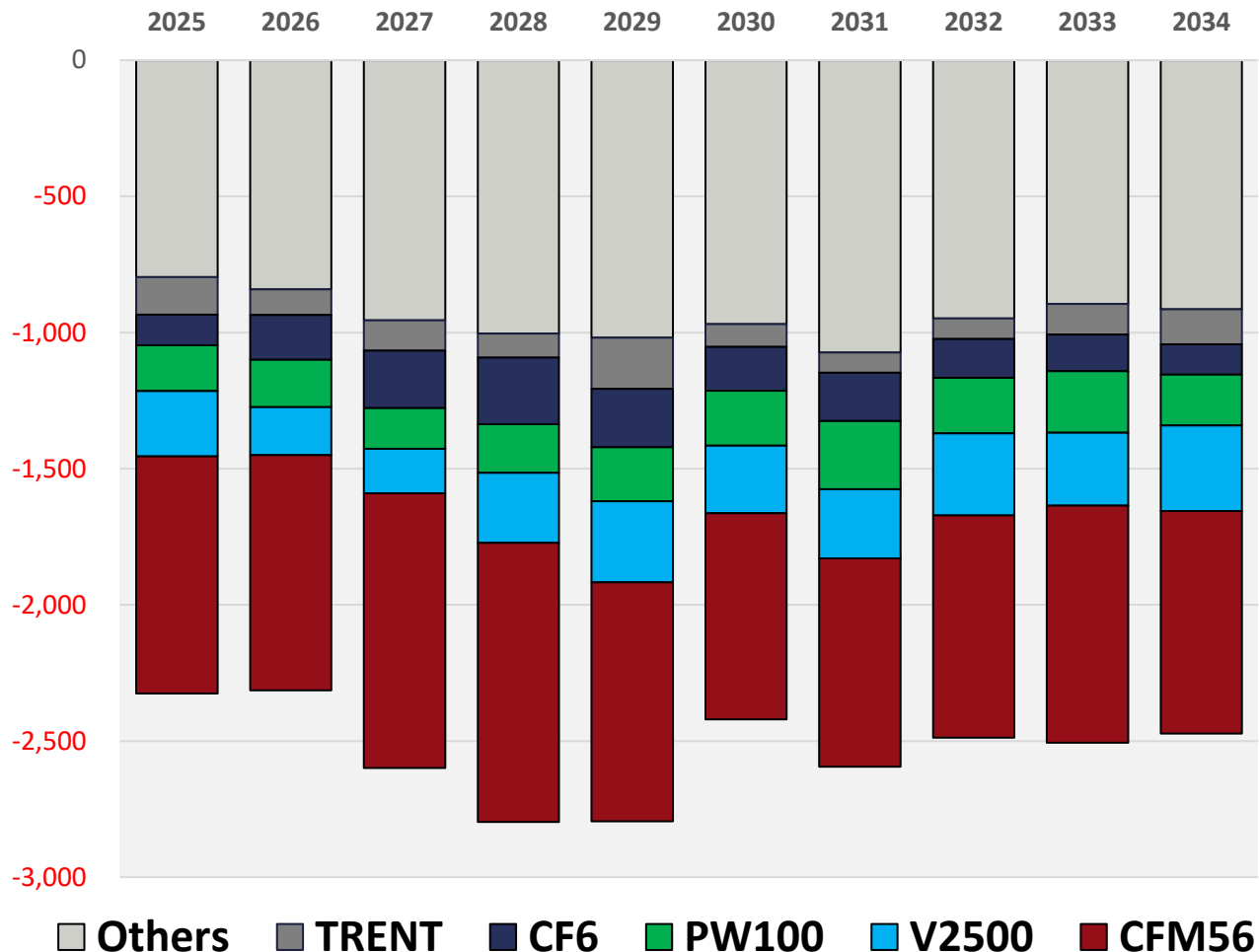


Highlights

- 80% production increase needed by 2027 to meet A320 and 737 projections.
- +24,500 LEAP engines needed over 2025-34 period (w/o spares).
- 2016 busiest year for CFM56 deliveries, ~1,600 units shipped.
- 2018 busiest year with combined CFM56 & LEAP engines, 1,904.
- 2023 +1,360 LEAP engines delivered, forecast to exceed 1,700 in 2025.
- Challenges: A320 orderbook – rate 75, 737-7 & -10 safety exemptions for nacelle deicing withdrawn..., COMAC orders growing...

Forecast: Top Commercial Engines Coming to You Soon?

Engines worldwide associated with retiring aircraft: available as **green time spares** or USM?

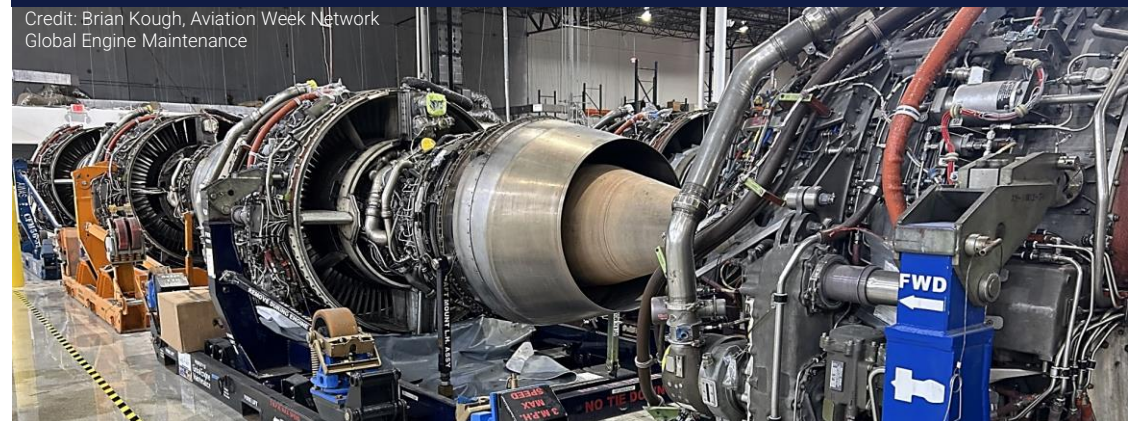


Used spare parts/**green time** engines may depress pricing OEM/USM parts, and leases of popular legacy types.

- Topping the list: 8,600 CFM56 and 2,500 V2500 powerplants.
- Deferred maintenance may delay or accelerate a/c retirements.
- Future: downward pressure on the price of legacy spares, leases, shop visits, & USM.

CFM56

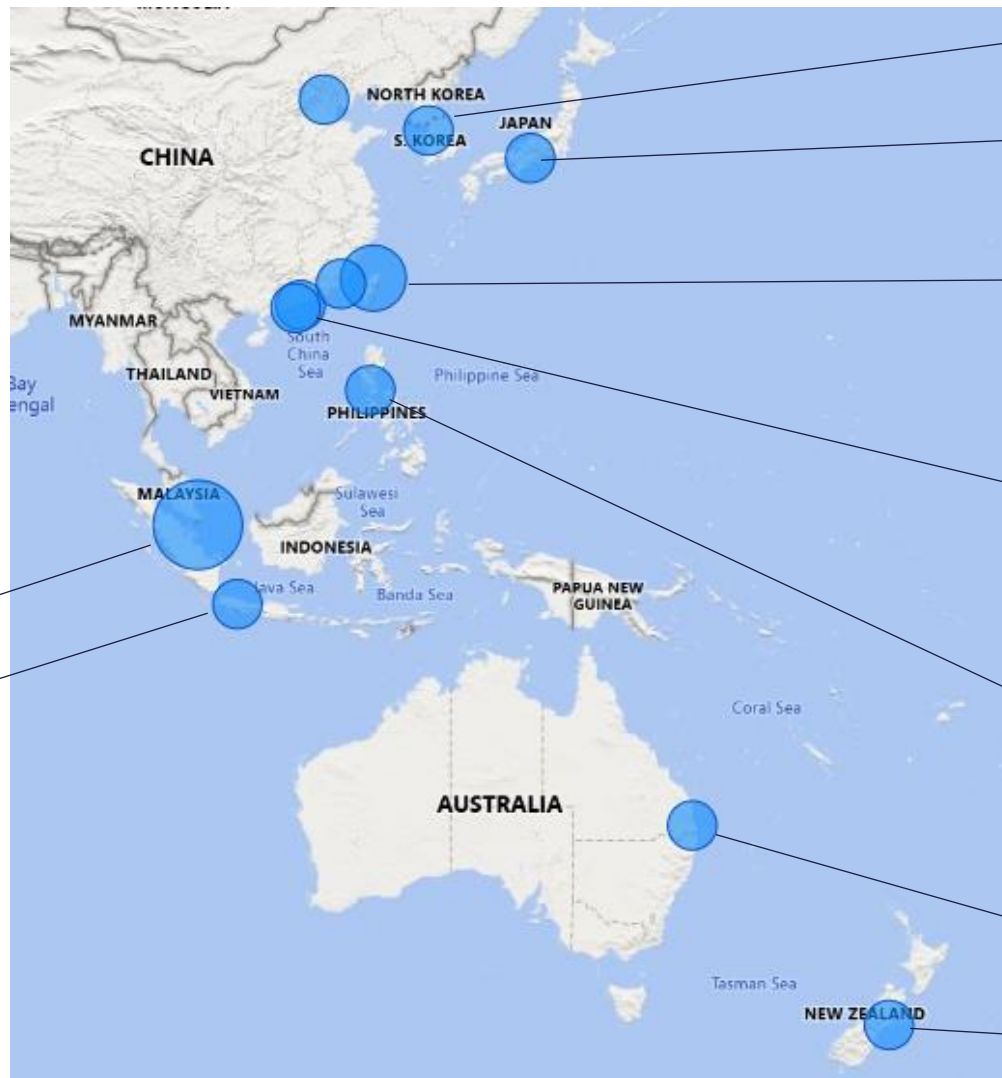
Credit: Brian Kough, Aviation Week Network
Global Engine Maintenance



Engine Overhaul Locations – Asia Pacific

2025 Engine MRO
+\$16 billion

But...
225 Contracts
Outsourced from
Asia Pacific & China



Singapore



Malaysia



South Korea



Japan



Taiwan



China



Philippines



Australia

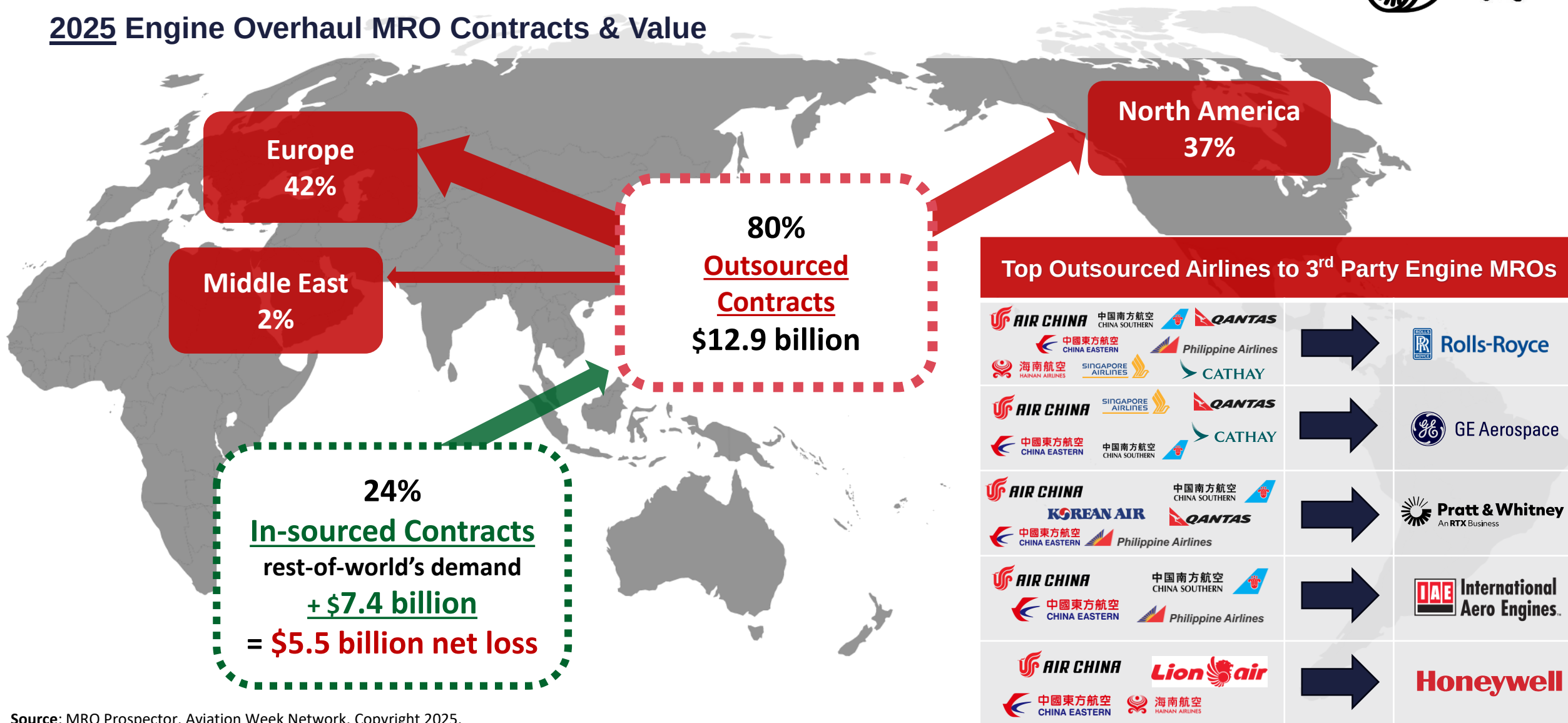


New Zealand



Asia-Pacific & China Market Outsourced/Insourced

2025 Engine Overhaul MRO Contracts & Value



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personnel



49,000+ global
organizations



Details on 150,000+
commercial, business and
military aircraft



16,000 suppliers of
more than 175,000
products and services



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