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3rd MRO SMARTHUB FORUM
OCTOBER 22, 2024
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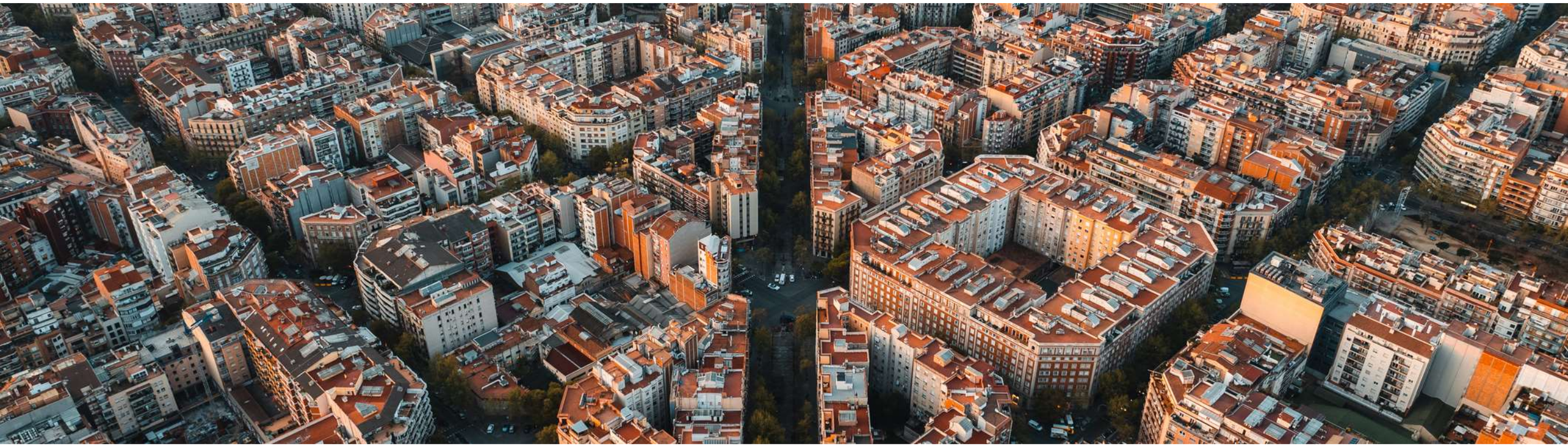

Material Supply Options in a time of USM Scarcity

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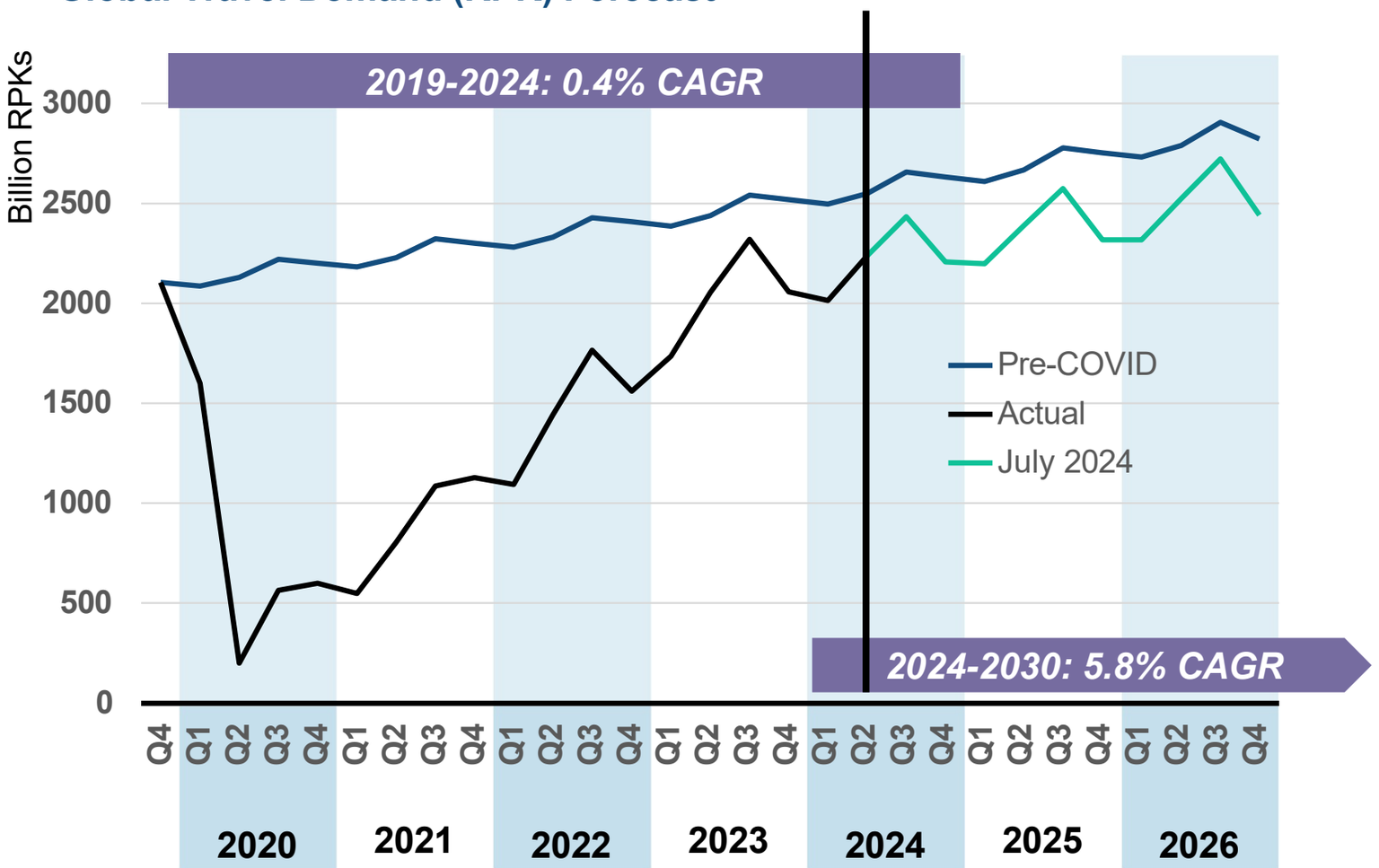
Air travel demand has entered more normal recovery rates. Fundamental demand still expected to growth over the coming years

Global Travel Demand (RPK) Forecast

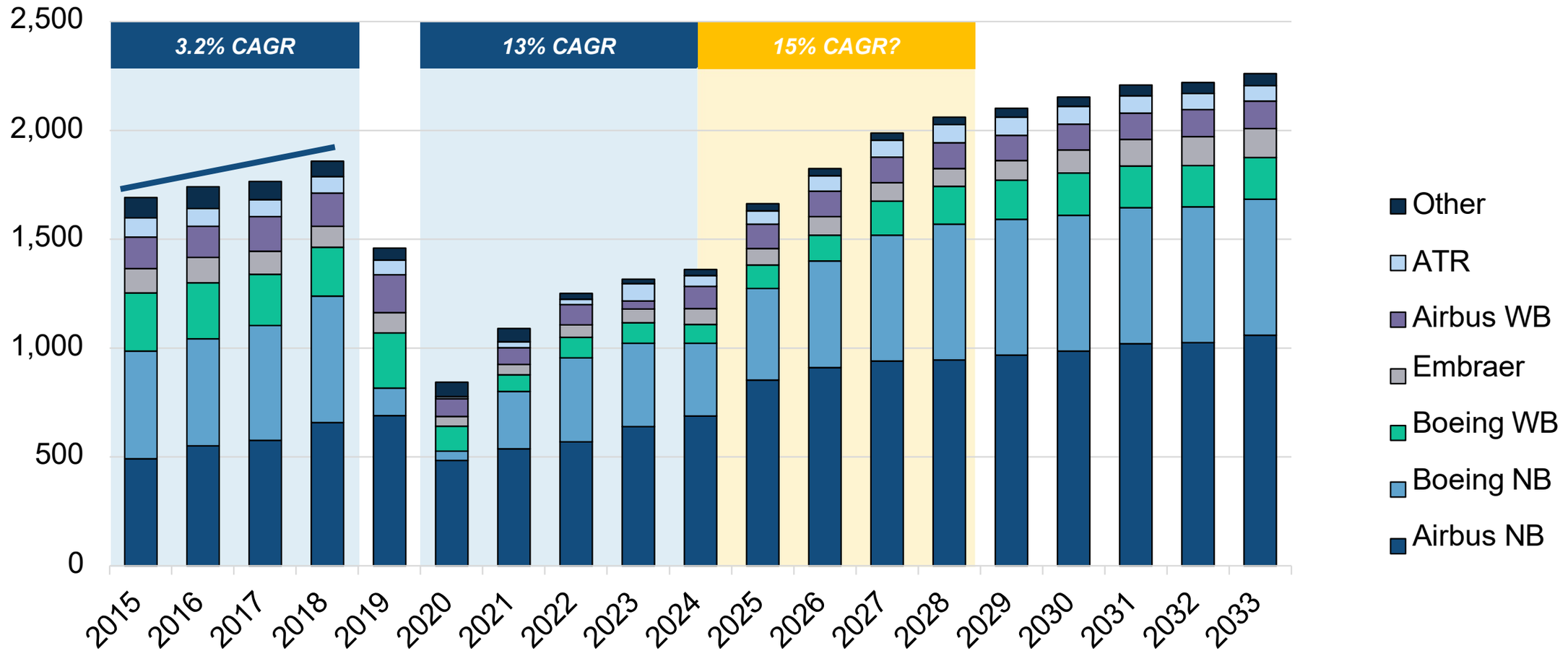


- Muted summer peak in 2024
- Concerns that yields have peaked
- Most regions have now returned to “Normal” growth
- Fundamental 2024-2030 demand growth expected of 5.8% followed by maturation in the 2030s
- Primary drivers are APAC, China, Middle East

Source: AeroDynamic Advisory

Air travel growth will depend on significant increase in production rates over the coming years…

2023-2033 Air Transport Production by Aircraft Model (# of Aircraft)



Source: AeroDynamic Analysis

…but the supply chain is in a poor state and will require investments

Air Transport Production Ramp-up Status

Aircraft Assembly

- Labor issues
- Process / quality

Engine Assembly

- Teething issues
- Fabricated parts
- Castings & forgings

Aerostructures

- Stressed tier 1 in poor financial state
- Low willingness to invest
- Spirit / upcoming integration

Aircraft Systems

- System OEMs doing ok
- Sporadic supply chain issues can arise during ramp-up

Cabin Interiors

- Strong demand growth
- Complex BFE orders
- Tier 1s at capacity; unwilling to invest

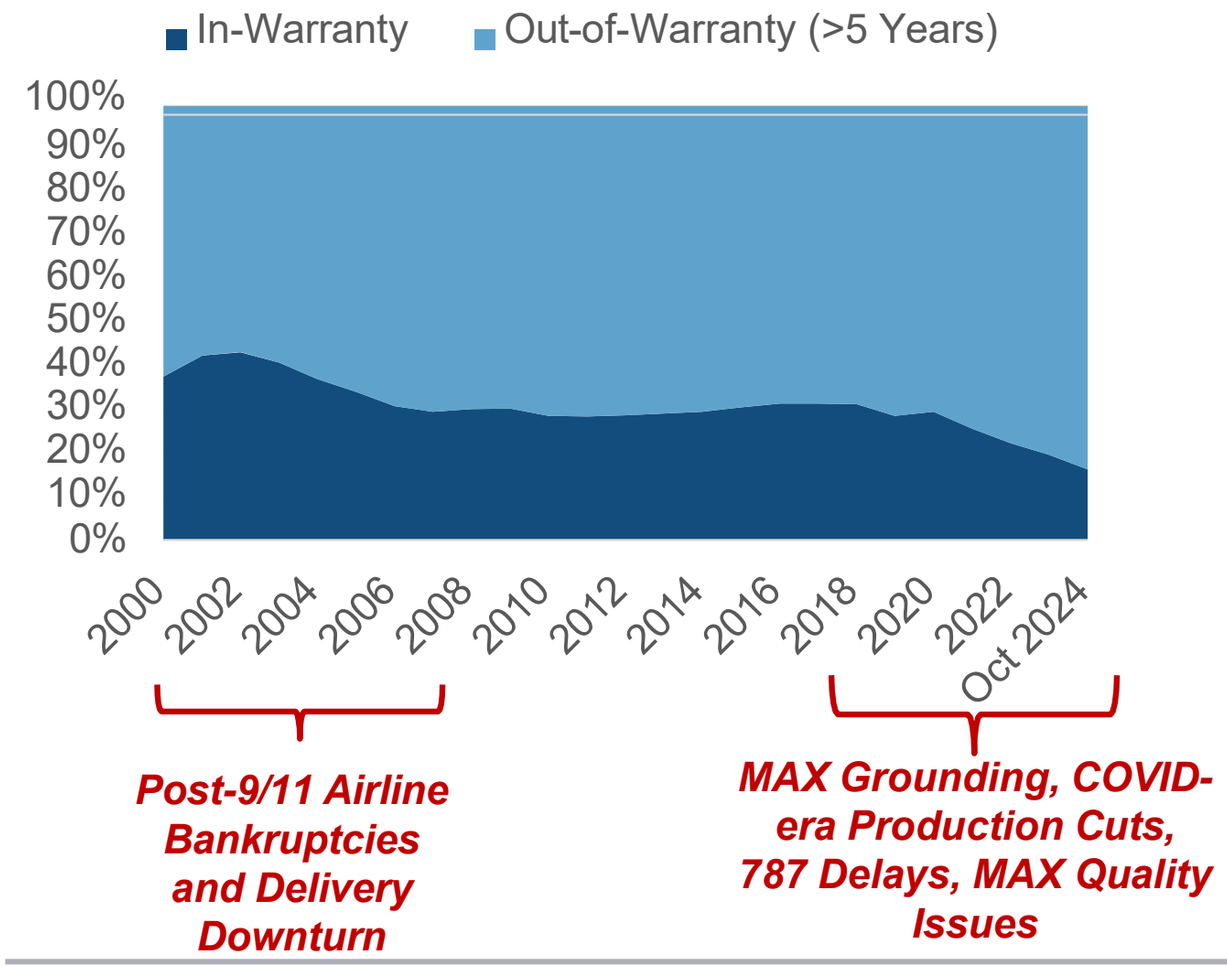
Structural bottleneck
Temporary but significant
Sporadic issues

Supporting OEMs are 1,000s of sub-tier suppliers that are unable to ramp-up in current conditions

Source: Market interviews, secondary research, AeroDynamic Advisory analysis

With low production rates, the share of the out-of-warranty fleet has reached a record 84% and shows no signs of reversing near-term

2000-2024 Warranty Status of Passenger Fleet



› 84% of passenger fleet >5 years old in Oct 2024, a record high share

› Continued constraints on deliveries likely to add further upward pressure on fleet age

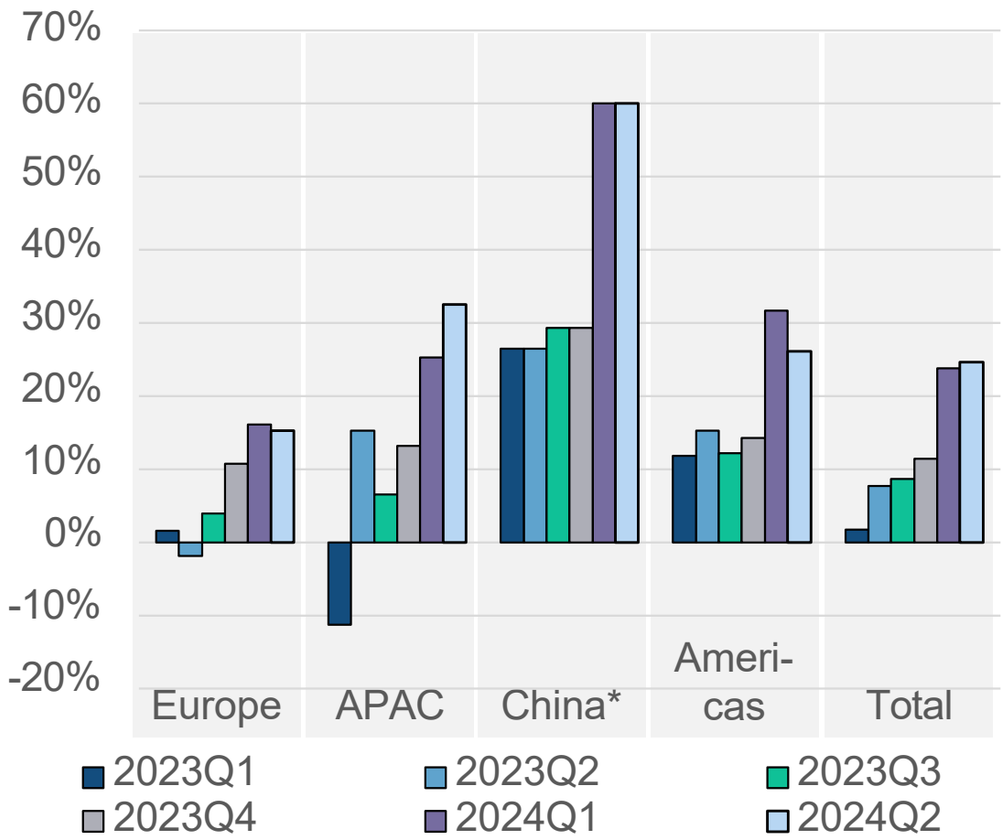
› Out-of-warranty share of fleet likely to continue to grow in near-term

› Additional upward pressure on MRO costs for airlines

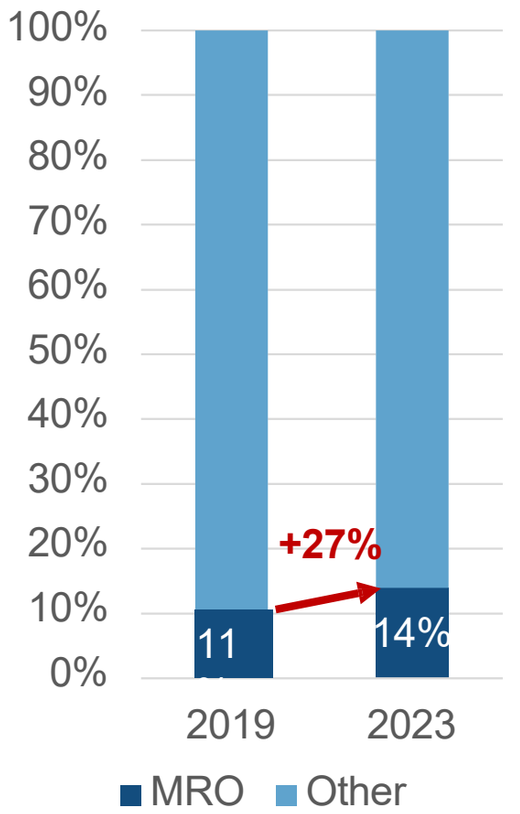
Source: CAPA

As a result, MRO is driving greater airlines expenditures - the MRO share of airline costs has risen from 11% to 14%

Airline MRO Spend vs. Same Quarter 2019



MRO Share of Airline Expenses



MRO costs facing greater scrutiny at airlines as their portion of expenses grow

Source: Airline financial reports, IATA, AeroDynamic Advisory analysis

(*) Typically reported on half-year basis

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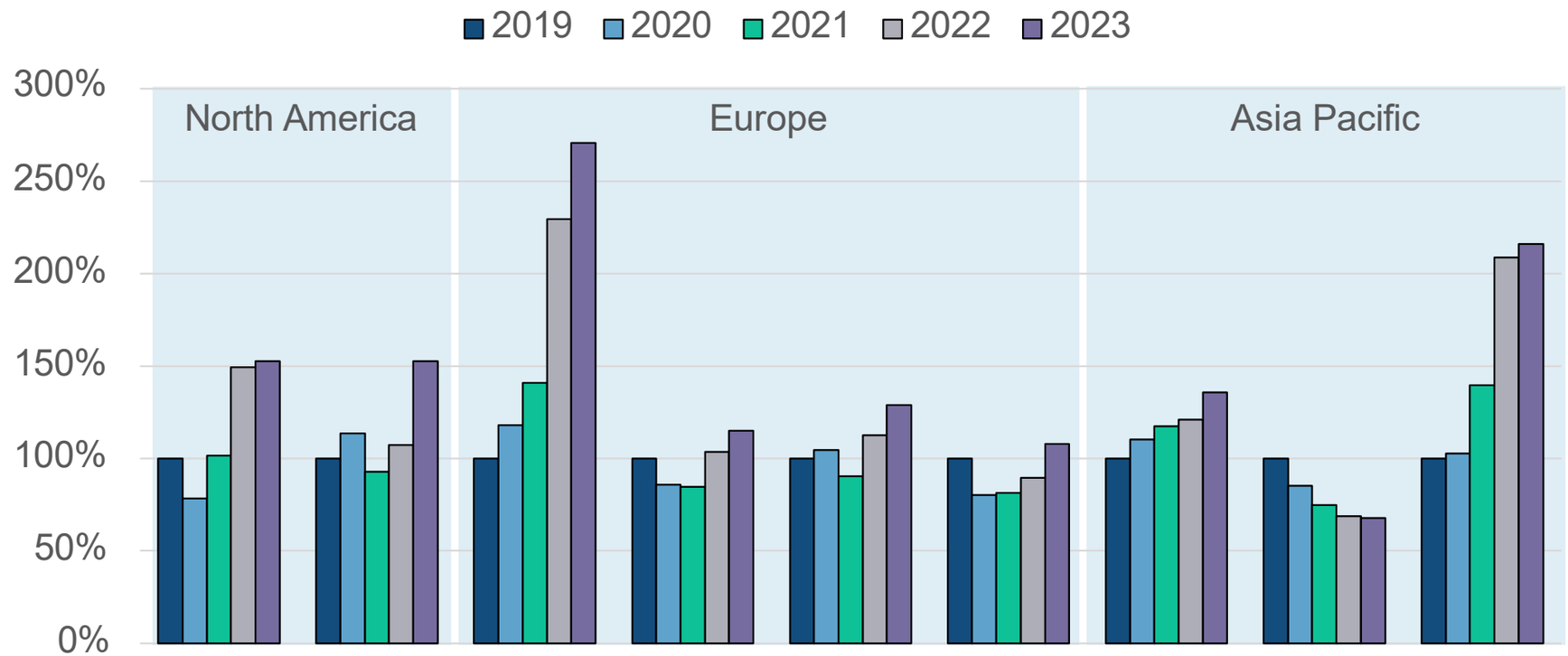
Post-COVID restocking has led to significant competition for assets

Indexed Airline Spare Part Inventories (2019 = 1)



Carrier Type	LCC	Network	National	Network /MRO	Network / MRO	Network /MRO	Network	Network	LCC
Versus 2020/21	95%	65%	129%	36%	43%	34%	23%	-32%	110%

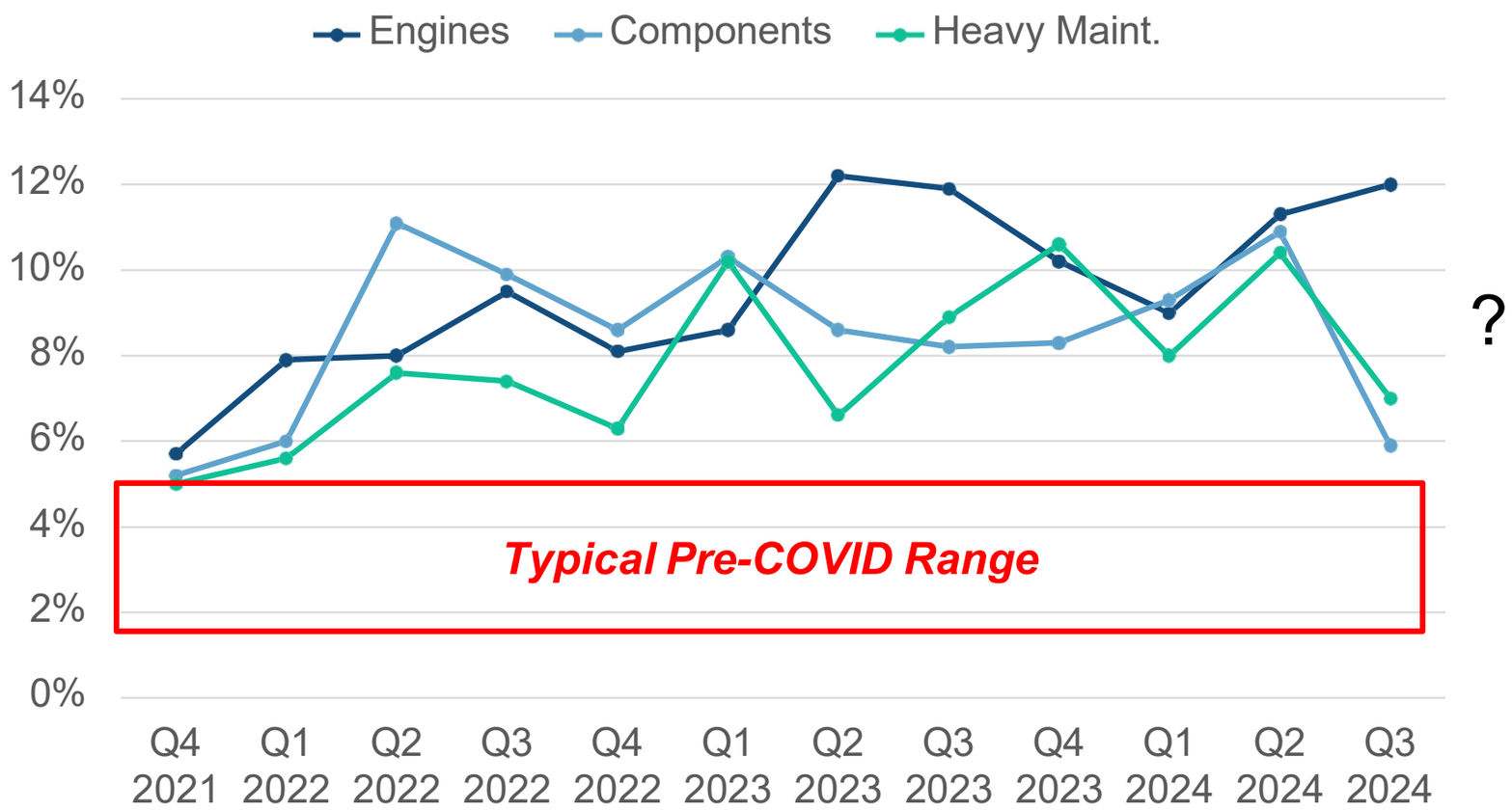
- Inventory sell-offs at low prices during COVID
- Competition for assets during post-COVID
  - ➔ high prices
  - ➔ Low availability
- ***Anecdotal evidence of inventory levels stabilizing***

Source: Airline financials

(*) Financial years ending 31 Dec – 31 March

Despite cooling inflation among consumers, price increases for aftermarket material have remained well above pre-COVID levels

Surveyed YoY Commercial Aftermarket Material Price Changes



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- Greater reliance on older fleets and overall strong demand for lift underscores strong pricing environment that has yet to show signs of weakening
- Is drop in inflation here to stay?

Supply chain constraints and upward pressure on labor rates could further underpin price escalations

Source: RBC Quarterly MRO Surveys

The troubles have driven increased interest in USM, PMA, DER and a shift in inventory strategies – though all subject to constraints

USM

- Supply constrained from low feedstock – currently ~6% of material demand, compared to 10-15% pre-COVID
- Global airline interest increasing

Supply Constrained

PMA

- 2% of material spend
- Has historically grown in times of poor availability
- Rising global interest, also in historically conservative regions

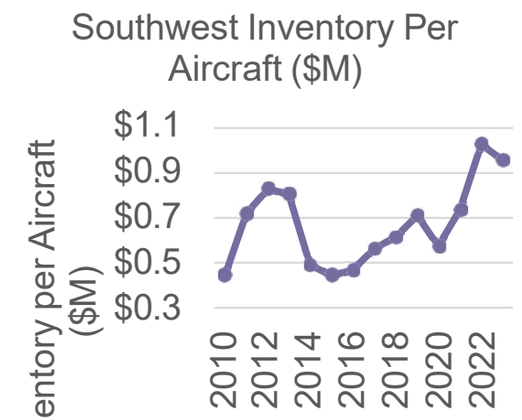
Supply Constrained

DER Repairs

- Adoption likely around 5-10% of material spend
- Simpler approval process than PMA
- Increasingly OEM-centric MRO ecosystem

OEM-Constrained

Just-in-Time ➔ Just in Case Inventory



Supply Constrained

Source. AeroDynamic Advisory

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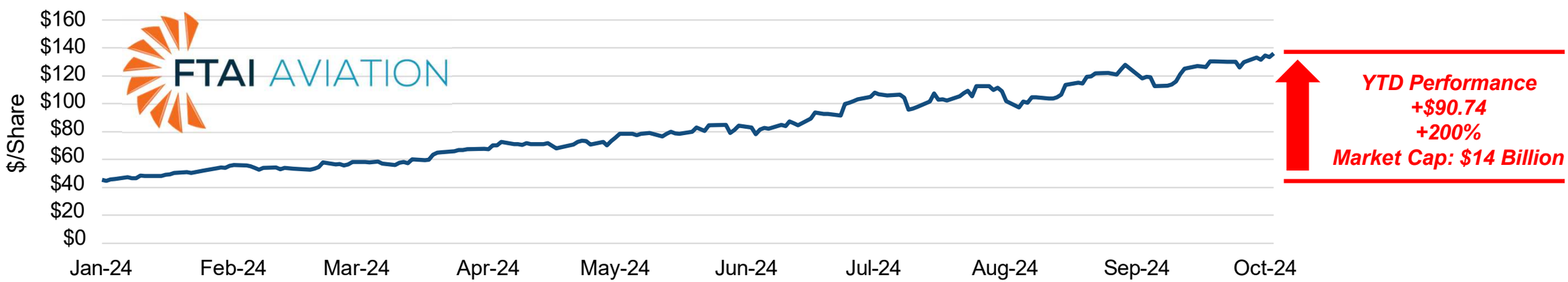
Engine module swaps are one tactic increasingly used to minimize MRO spending in the face of a constrained supply chain and inflationary environment

CFM56 Shop Visit vs. Module Swap Comparison

Factor	Mature Run Shop Visit Pre-COVID	Mature Run Shop Visit Current Environment	Fan/LPT Module Swap
Material & Labor Cost	$4-6 Million (incl. LLPs)	$5-7 Million (incl. LLPs)	$1-1.5 Million
Spare Engine Lease Cost	~$190,000 (2.5mo x $75k/month)	~$400,000 (4mo x $100k/month)	~$75,000 (3 weeks x $100k/month)
Cost Contingency	Medium	Med-High	Low
Turn-Around Time	70-90 Days	110+ Days	15-20 Days
Proximity to Operator	Off-Wing	Off-Wing	Near-Wing



Source: Secondary Research, Market Interviews

Airlines have been through a significant period of growth and unit cost increases – a coming phase of correction may provide opportunity to reset costs

Conclusions

MRO Unit Cost Growth

- Structural changes brought MRO spending to 14%
- Price inflation
- Excess stocking
- Aging fleet
- Rising MRO unit cost

End of Cycle?

- Airline business slowing
- Profits falling
- OEMs unable to ramp up – but will eventually solve production bottlenecks

Correction Expected

- Robust MRO activity for coming years, but also a phase of correction:
  - destocking
  - clawing back price increases
  - pursuing alternatives
- Airlines aren't likely to let the 14% of cost structure MRO spending "stick"

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Thank you!

Any questions?

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