

ENGINE AFTERMARKET OUTLOOK

MRO Asia Pacific 2020

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COVID-19 IN CONTEXT



THE IMPLICATIONS OF COVID-19 WILL BE PROFOUND AND PERSISTENT FOR OUR SOCIETY, OUR ECONOMY AND OUR INDUSTRY



We are in uncharted territory. Health concerns are resonating through the real economy. Public health and government actions matter more than ever



A **widespread vaccine** will not be available **before mid-2021**; timing and implications of other treatments are not yet clear



Containment efforts will be successful...but... this means that the numbers of persons infected are **well below** those required for 'herd immunity'

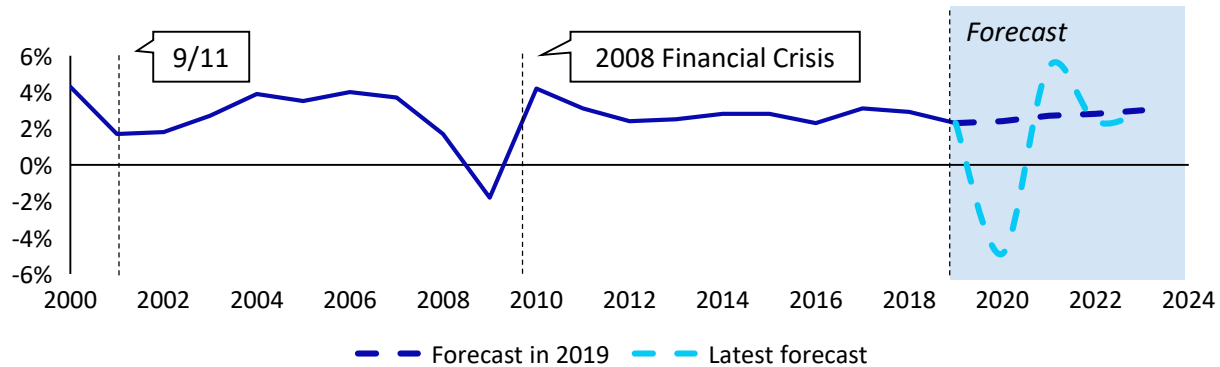


Areas which have contained the virus will need to **impose ongoing measures** to mitigate this risk of future outbreaks

We are expecting at least **12–18 months of iterative and partially controlled cycles of outbreak and containment**
The implications of this 'new normal' will be **profound and persistent for certain sectors and notably aviation, aerospace and MRO**

THE DEPTH AND SCALE OF COVID-19'S IMPACT ON THE GLOBAL ECONOMY WILL BE THE WORST SINCE THE GREAT DEPRESSION

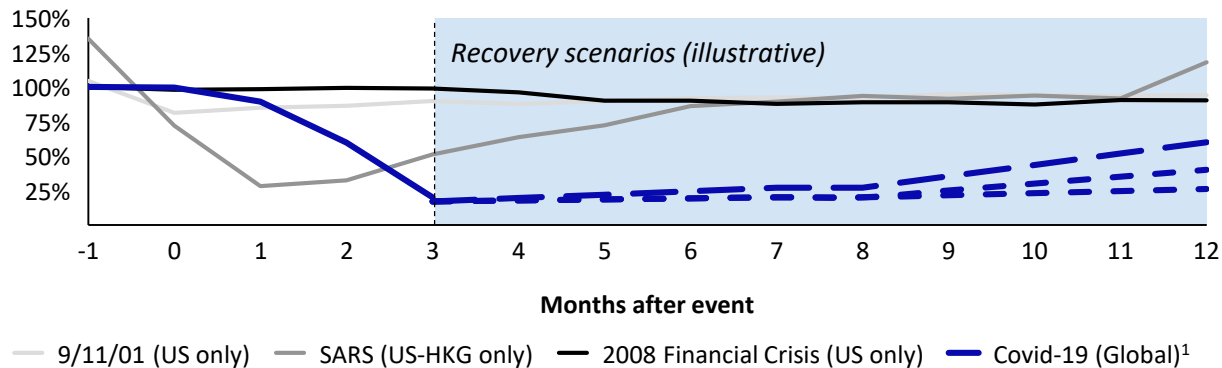
Global GDP growth rates Real GDP growth per annum



Global Economy

- World GDP currently projected to shrink by 4.9 percent in 2020² – **the worst downturn since the Great Depression**
- Global rebound in 2021 to 5.4 percent growth assumes pandemic fades in second half of 2020

Impact on aviation, year-over-year capacity change¹ ASM, indexed to capacity in same month of prior year



Aviation Sector

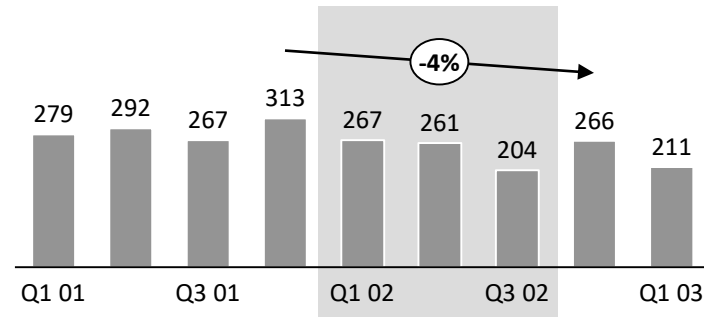
- COVID-19 impact is **the most profound global shock in modern civil aviation**
- At a global level, the **impact on ASMs will be worse than the hardest-hit regions for 9/11, SARS, and GFC, respectively**
 - 9/11 in the US
 - SARS in HK
 - GFC in the US

1. Month 0 for Covid-19 assumed to be Jan '20, Wuhan shutdown; 2. Per IMF. Source: Economist intelligence Unit, Goldman Sachs, IATA Economics, Oxford Economics, Oliver Wyman PlaneStats, OW analysis

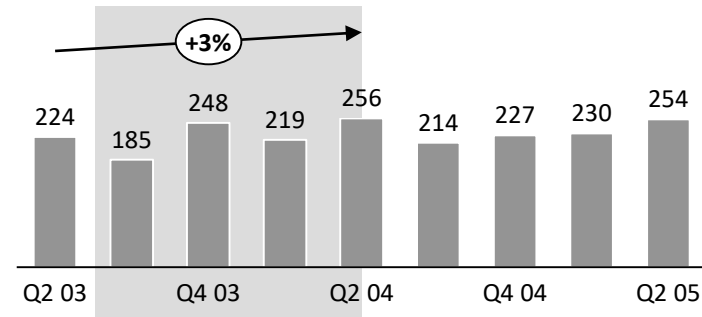
2020 AIRCRAFT DELIVERIES MAY DROP ALMOST 50 PERCENT, BY FAR THE LARGEST SINGLE-YEAR DECLINE IN RECENT HISTORY

Impact of recent crises on near-term commercial aircraft deliveries¹

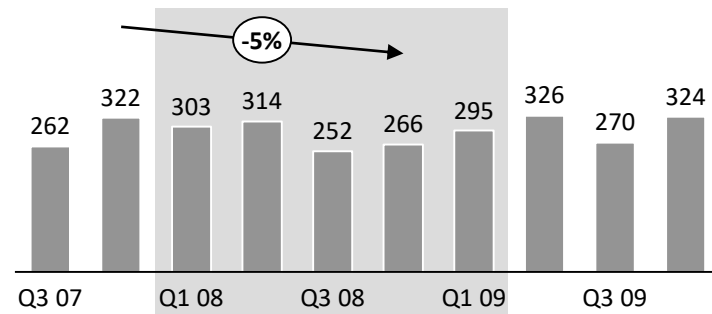
2001 (9/11) Terrorist Attacks



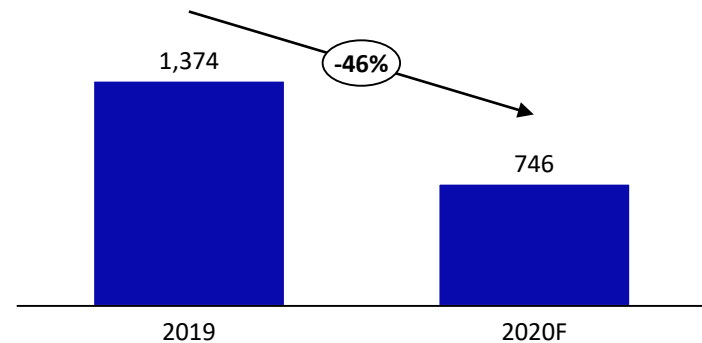
2002 SARS Epidemic



2008 Global Financial Crisis



2020 Covid-19 Pandemic



- Throughout past crises, aircraft manufacturers have been able to adjust to declines in demand through gradual declines in deliveries while **maintaining aircraft production**
- Due to larger global scale, declines were greatest **after 9/11 and GFC**, with a **4–5% YoY decline** in deliveries industry-wide

- In response to the COVID-19 crisis, Boeing and Airbus both **suspended production in its facilities** (e.g. Airbus reducing production by ~30%)
- Combined with a likely record drop in near-term aircraft demand and increasing delivery deferrals, we forecast a **46% YoY decline in deliveries in 2020**

■ Airline industry recovery period²

1. Boeing, Airbus only. 2. Based on YoY capacity change. Source: Chicago Tribune, Aviation Market Intelligence, Oliver Wyman analysis

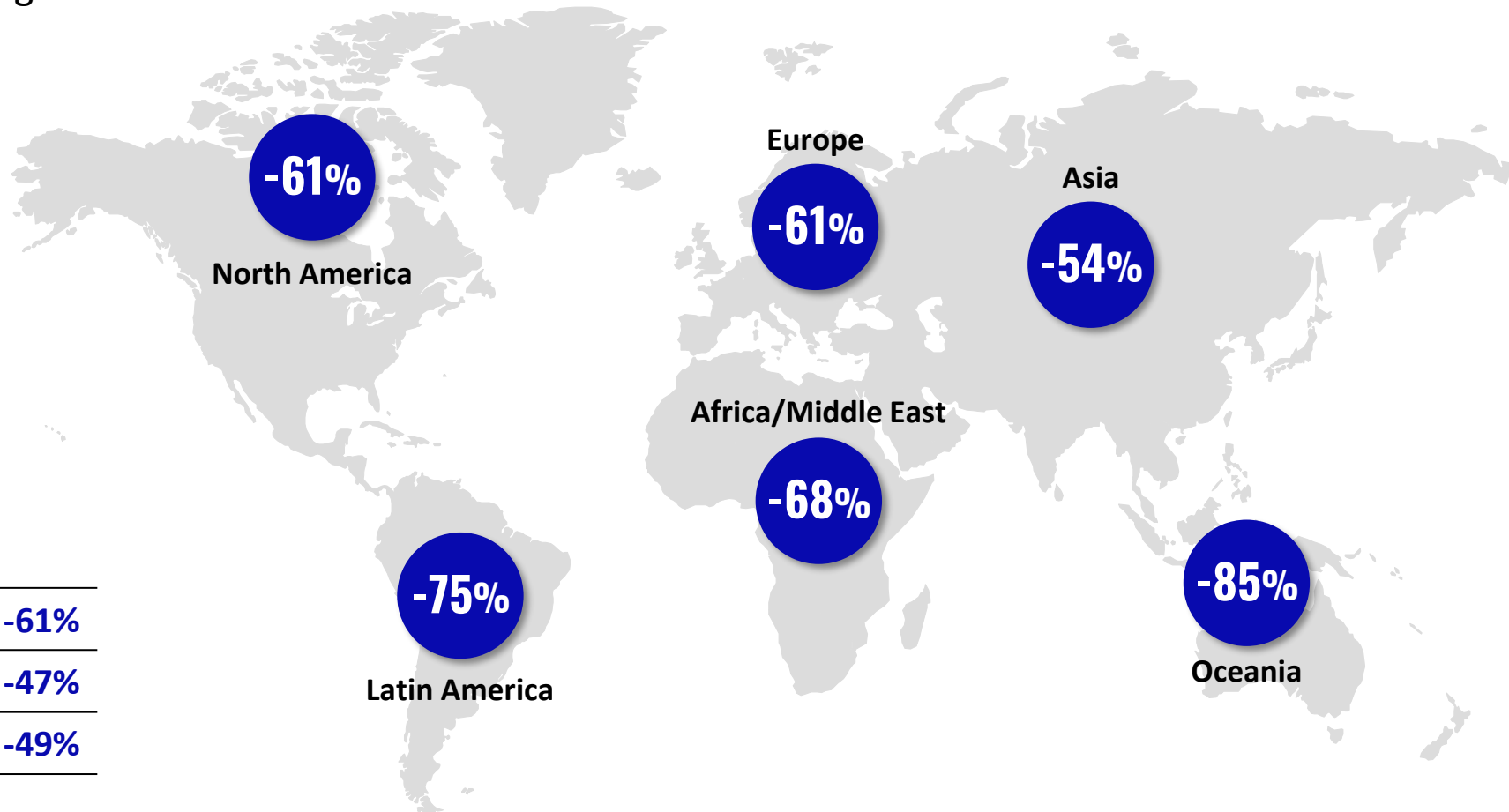
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FLEET AND MRO SPEND IMPACT



CURRENT GLOBAL CAPACITY IS DOWN 61% FROM 2019

Current snapshot: Airline capacity and by region
YOY change in August ASMs



World total

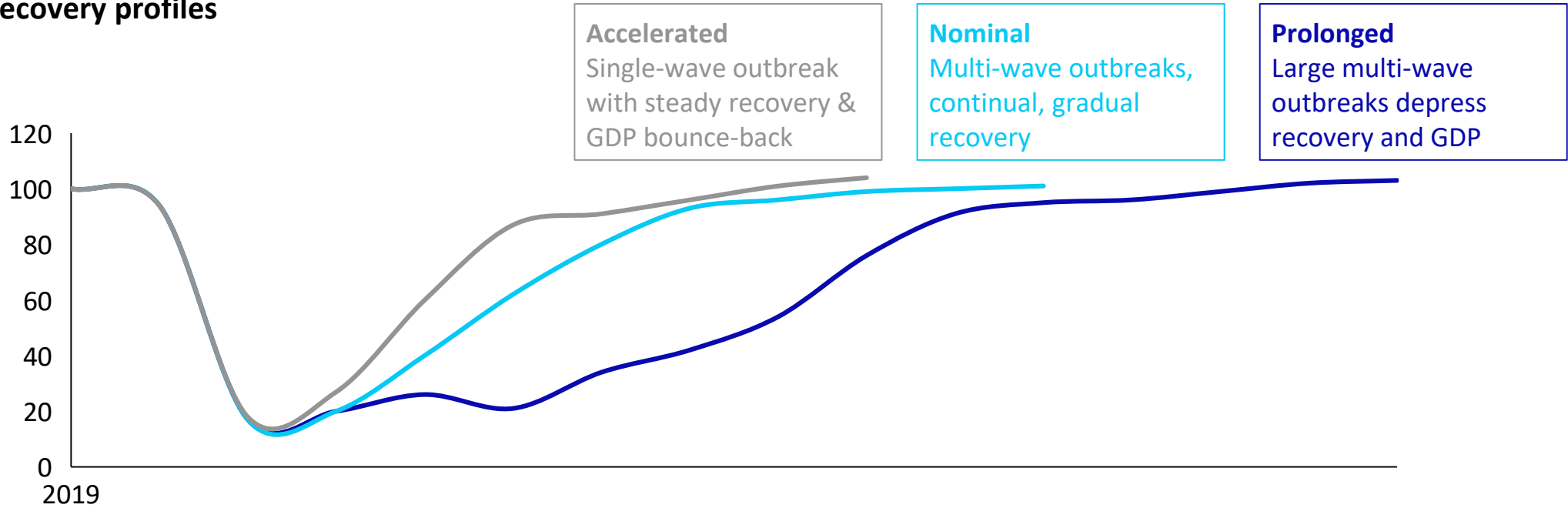
ASM	-61%
Departures	-47%
Seats	-49%

Source: OAG schedules as of August 2020

FOUR PRIMARY FACTORS DRIVING DEMAND RECOVERY PROFILES

Epidemiological timeline	Traveler sentiment	Government restrictions	Macro-economic impact
OW Epidemiological modeling (SIR models) predicting the number of cases by country and when the peak is expected to happen and downward curve	First trips are likely domestic/ regional for vacation or VFR Dependence on government guidelines	Policy variations and uncertainties International travel likely to return in phases – “corridors”	The level of recessionary impact/ damage affects return to travel

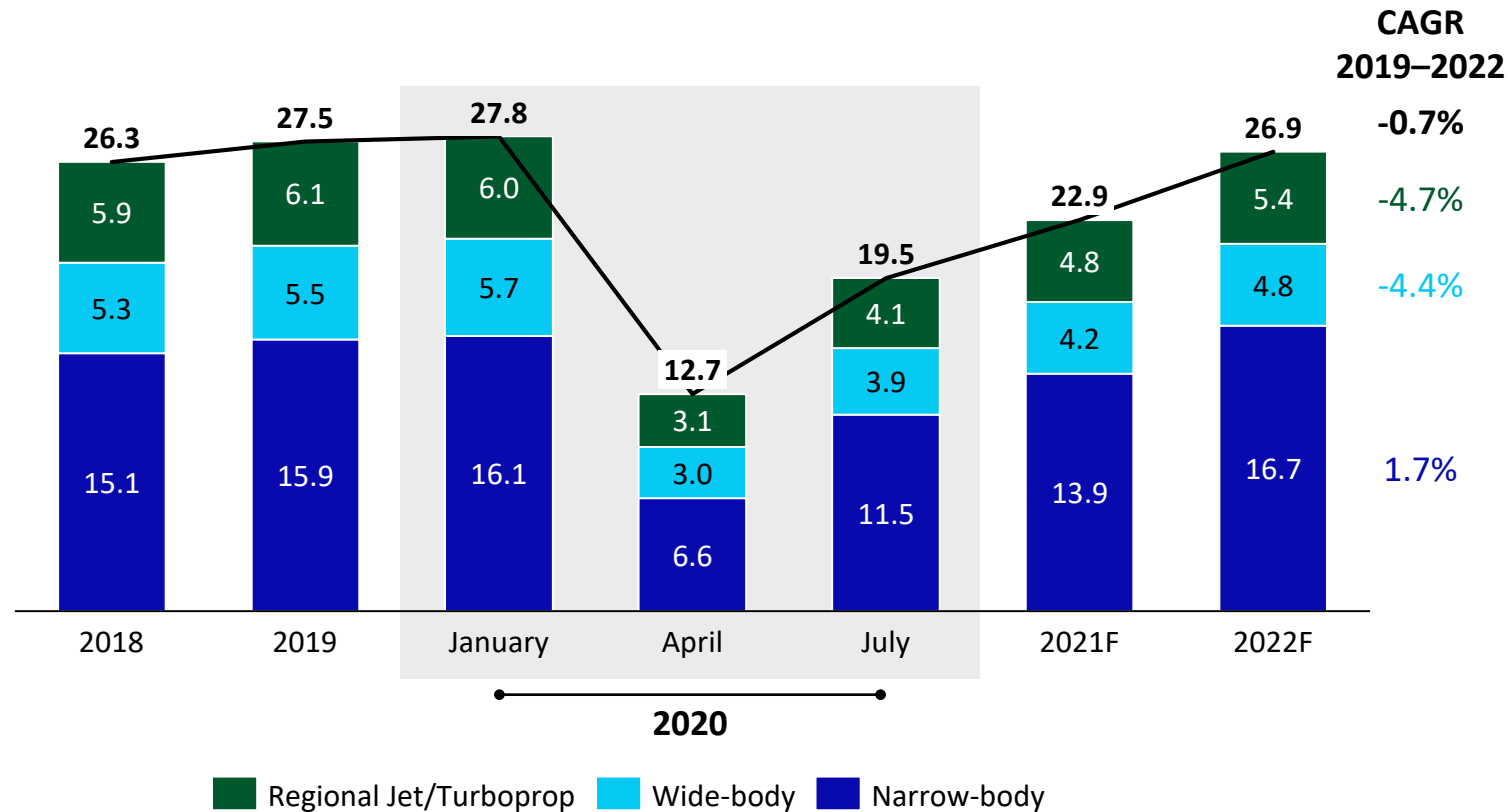
Recovery profiles



DUE TO THE DEMAND CRUNCH, THE GLOBAL COMMERCIAL FLEET WILL STAGNATE THROUGH 2022

Forecasted in-service fleet size¹

Number of in-service aircraft (K), 2018–2022F



- In-service fleet reduced by 20% in 2020–2021 from extensive fleet groundings
- Overall commercial fleet sees zero growth through 2022 as airlines recover

1. As of beginning of year

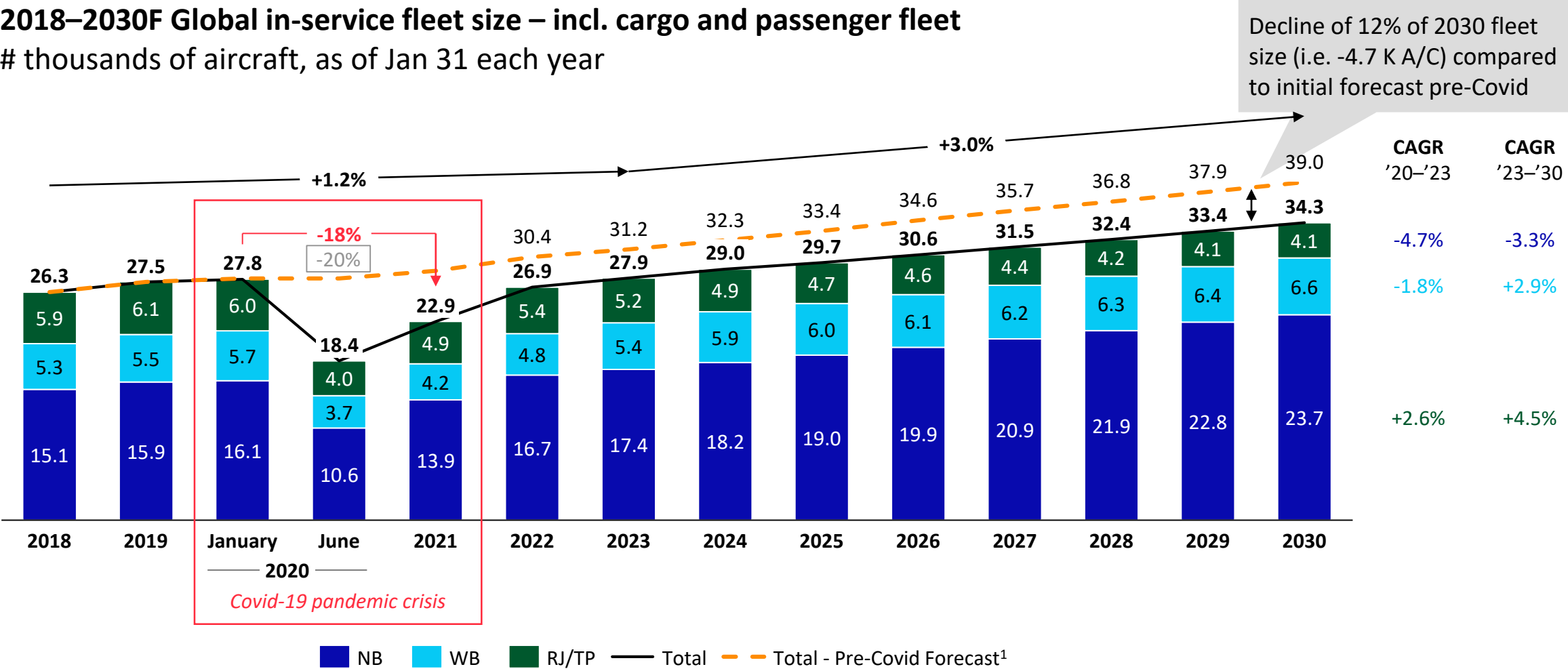
Source: Oliver Wyman Global Fleet and MRO Market Forecast, 2020–2030, Revised; Oliver Wyman analysis

IN-SERVICE FLEET FORECAST

Facing an 18% drop in 2021, the Global in-service Fleet will not recover before 2023 and By 2030, there will be ~4.7 K fewer aircraft than expected prior to COVID

2018–2030F Global in-service fleet size – incl. cargo and passenger fleet

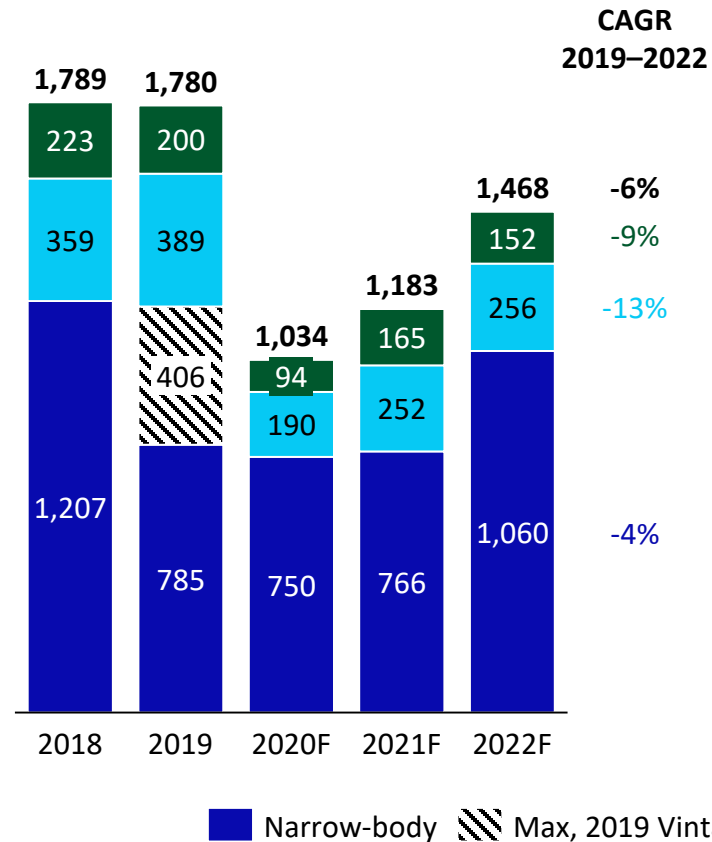
thousands of aircraft, as of Jan 31 each year



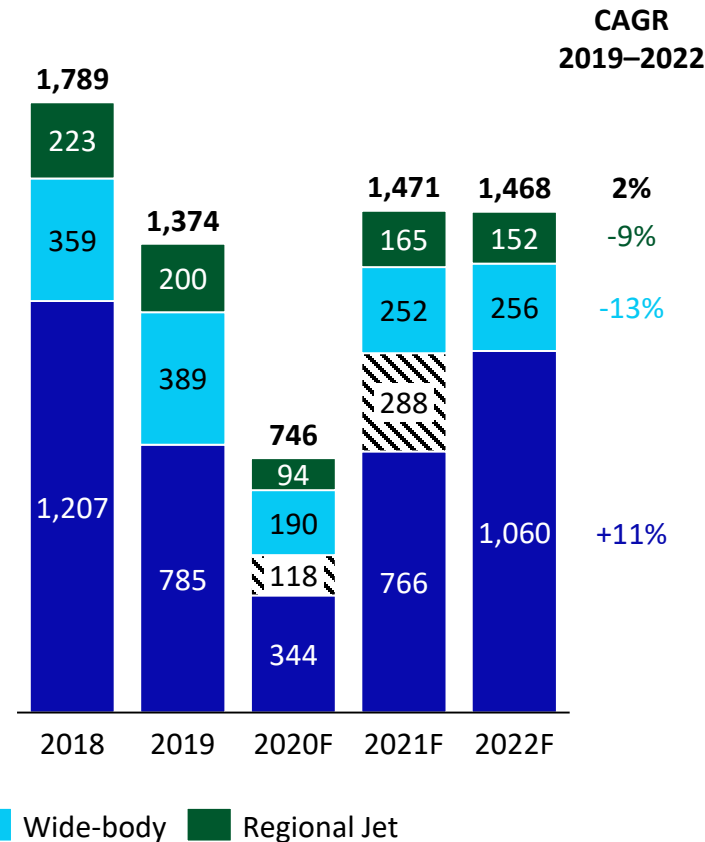
1. Forecast as of July 2020
Source: Oliver Wyman analysis

UNPRECEDENTED MISMATCH OF PRODUCTION AND DELIVERIES WILL CHALLENGE AEROSPACE SUPPLY CHAINS

Commercial aircraft production
Number of aircraft, 2018–2022F



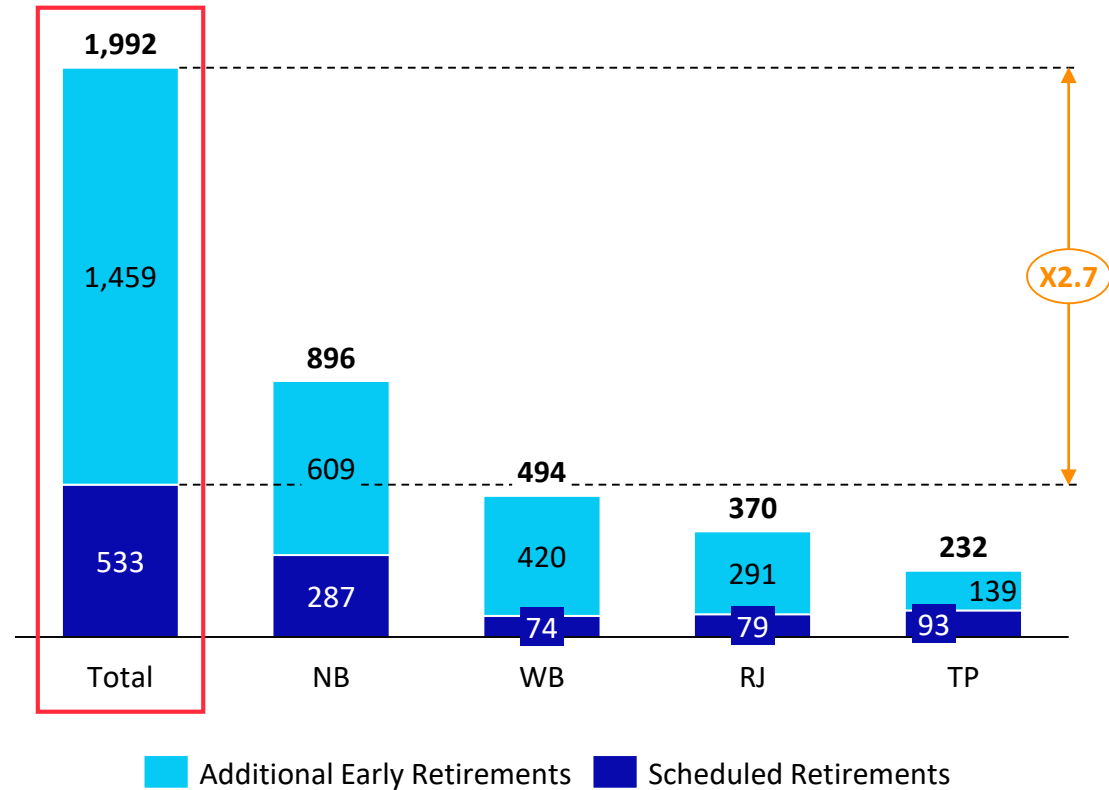
Commercial aircraft deliveries
Number of aircraft, 2018–2022F



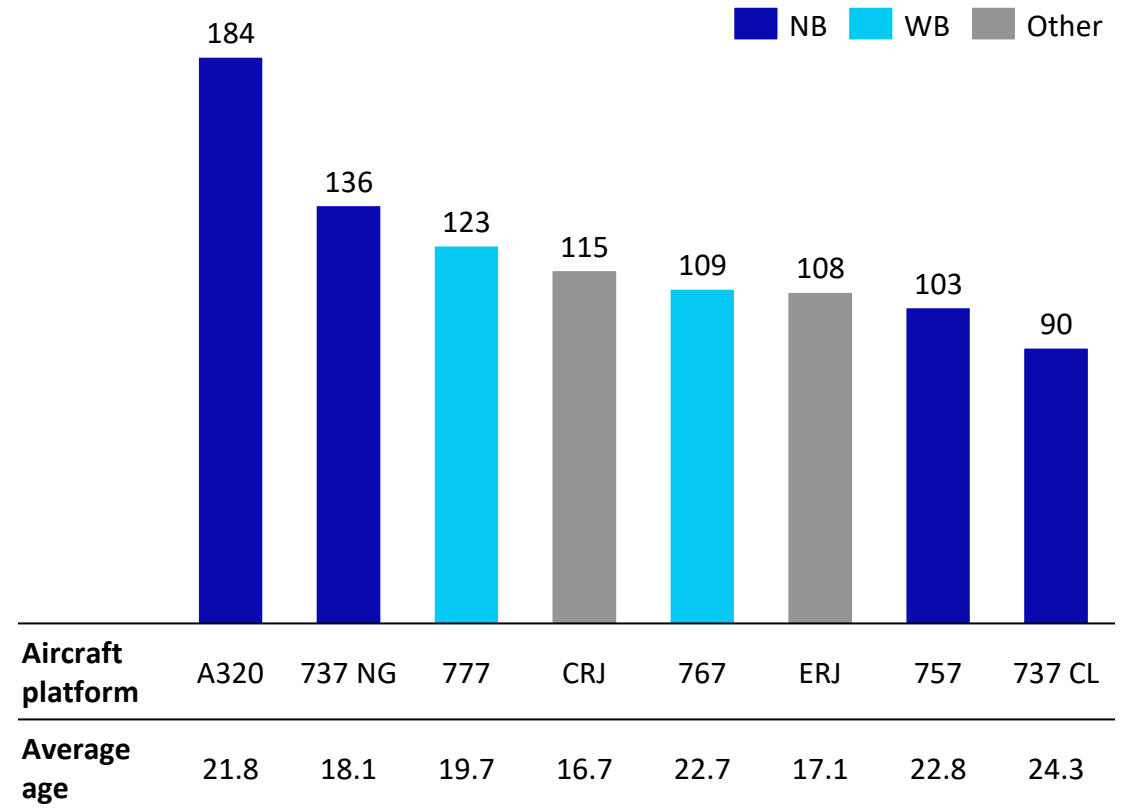
- Dramatic decrease in **2020** aircraft production (-42%) and deliveries (-46%)
- **3-year production levels (2020–2022) will not return to the scale of 2019**, particularly in widebody
- **~18% of future deliveries will be 737MAX A/C produced in prior years**

EARLY RETIREMENTS IN AGED FLEETS WILL EXACERBATE THE DROP IN FORECASTED AFTERMARKET SPENDING

Early vs. Scheduled Retirements, 2020
By class



Early Retirements, 2020
By platform

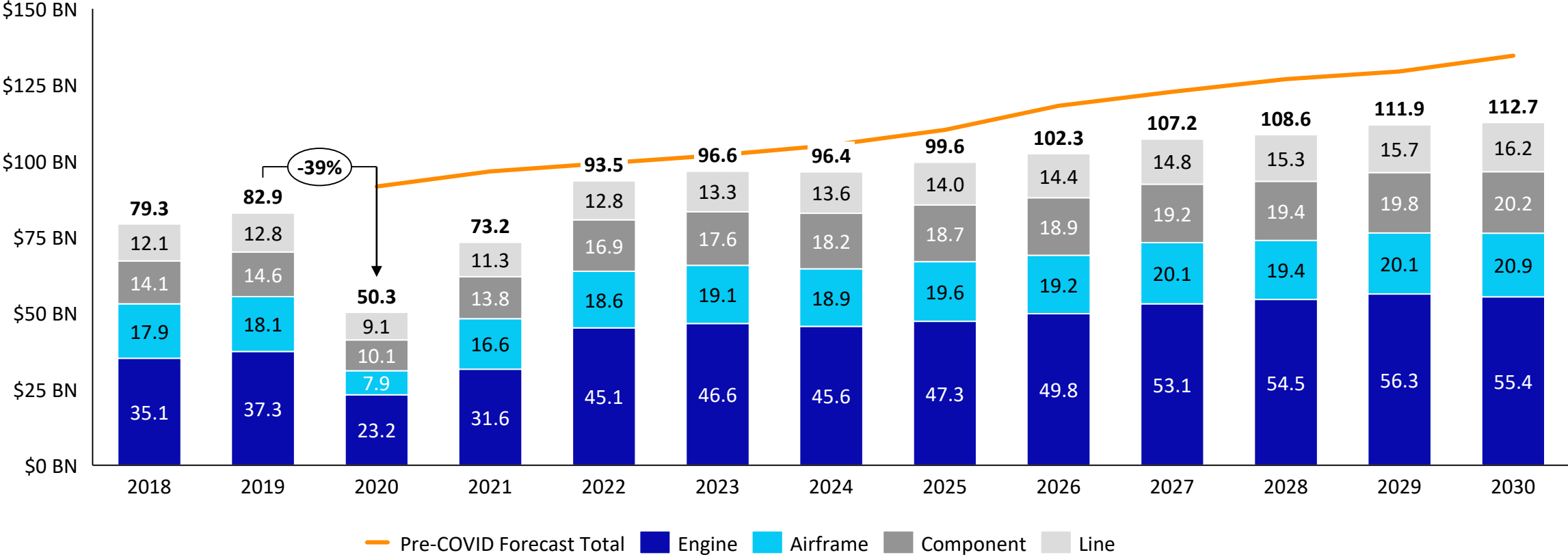


MRO FORECAST

Facing a ~45% drop in 2020, MRO spend will not recover until 2022 and over the next ten years \$184 BN in MRO spend will be erased by COVID-19

2018–2030F MRO Spend

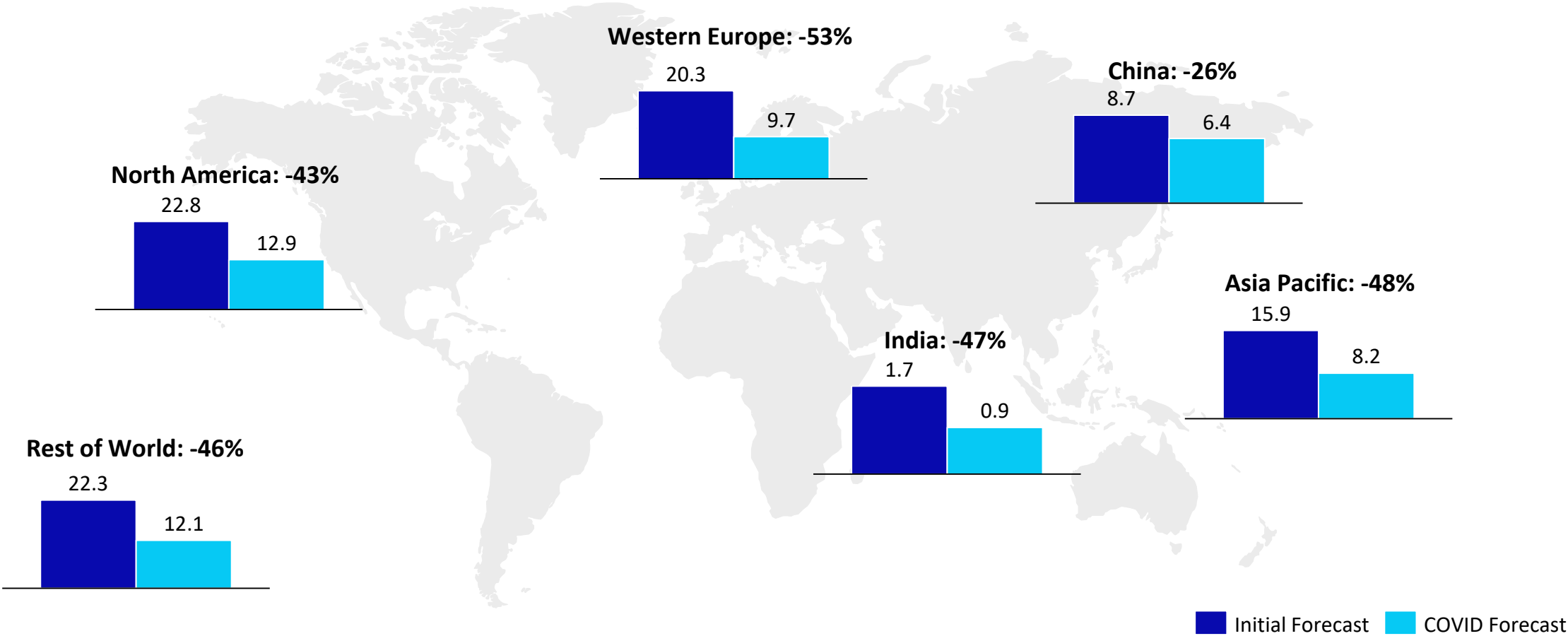
US\$ BN, by year



1. Forecast as of July 2020
 Source: Oliver Wyman analysis

IN 2020, EVERY REGION WILL EXPERIENCE A SIGNIFICANT DECREASE IN MRO DEMAND

2020 demand: Pre-COVID-19 vs. post-COVID-19
US\$ BN



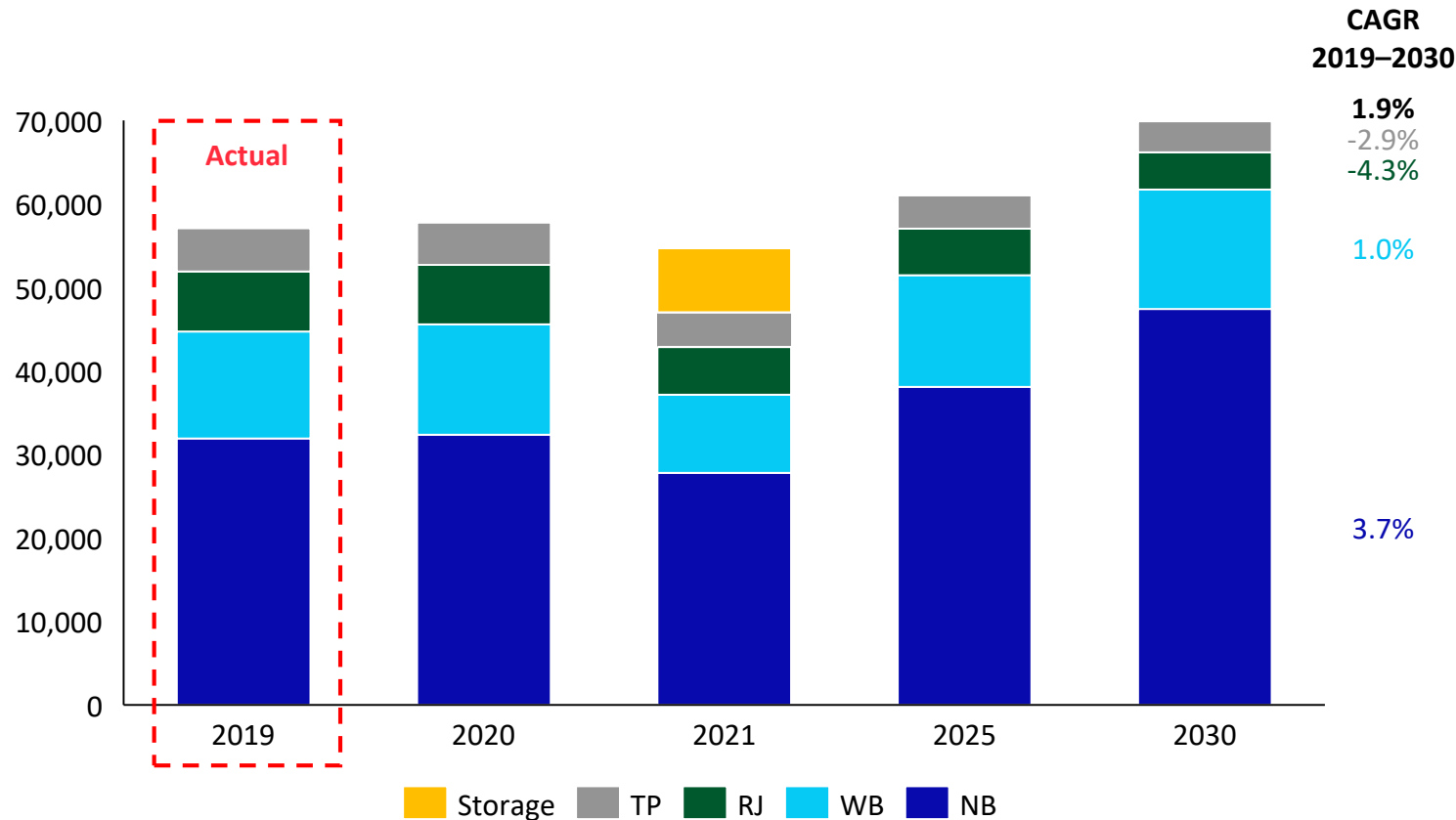
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ENGINE AFTERMARKET



THE GLOBAL ENGINE FLEET IS FORECAST TO GROW AT JUST 1.1% OVER THE NEXT FIVE YEARS BEFORE ACCELERATING TO 2.8% ANNUALLY FROM 2025 TO 2030

2019–2030 Global Engine In-Service Fleet By Class



- The in-service engine fleet will be **reduced by nearly 11,000 in 2021 ...**
- ...with more than **7,500 engines on aircraft in storage**
- Through 2019–2030, the **engine fleet will grow by more than 12,000**, an average annual rate of 1.9%

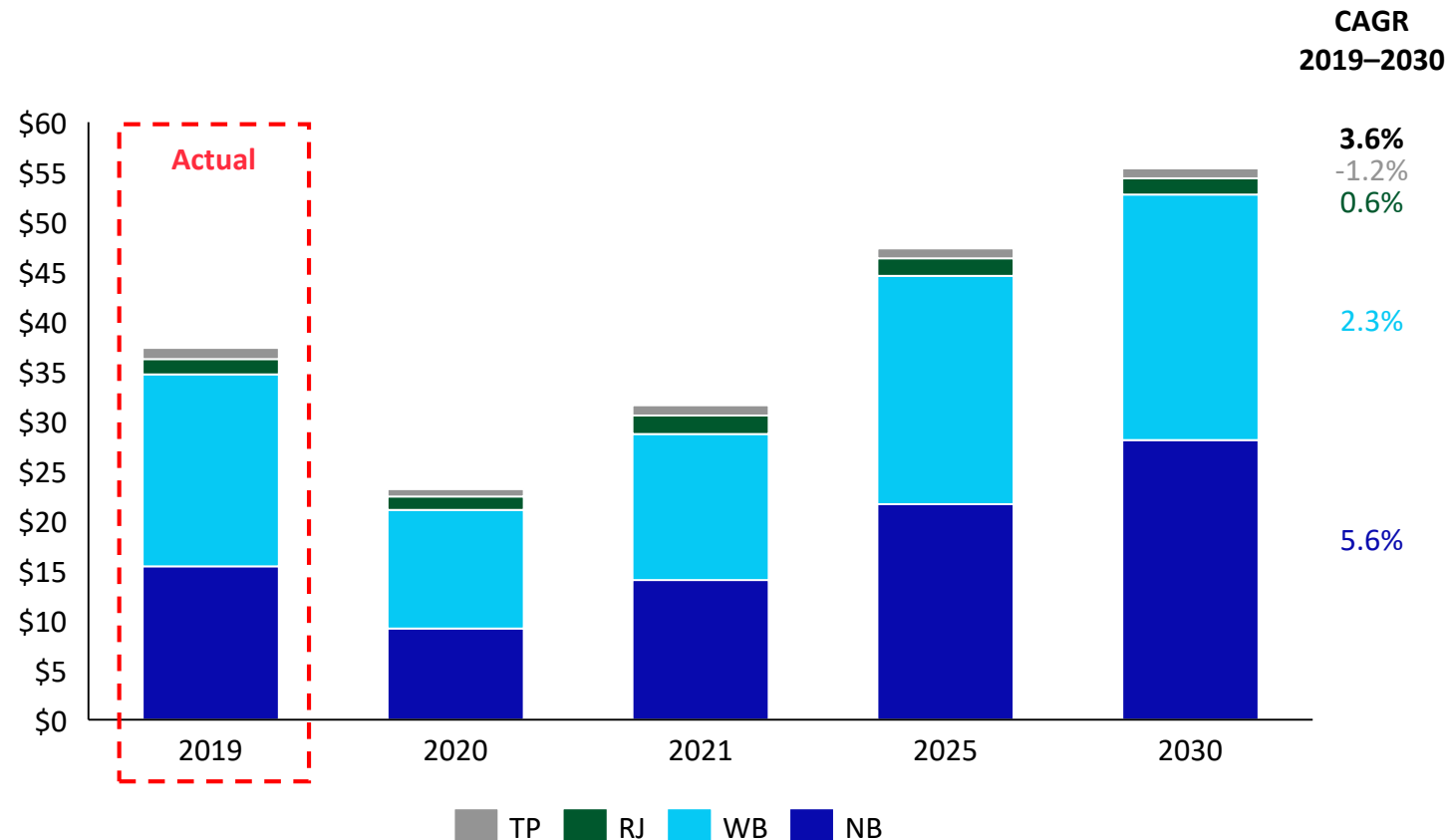
Note: Annual fleet counts are as of the beginning of each year

GLOBAL ENGINE MRO IS FORECAST TO DROP FROM \$37 BN IN 2019 TO JUST \$23 BN IN 2020, A DECREASE OF 38%

The market is not expected to surpass 2019 MRO levels until 2022

2019–2030 Global Engine MRO

By Class

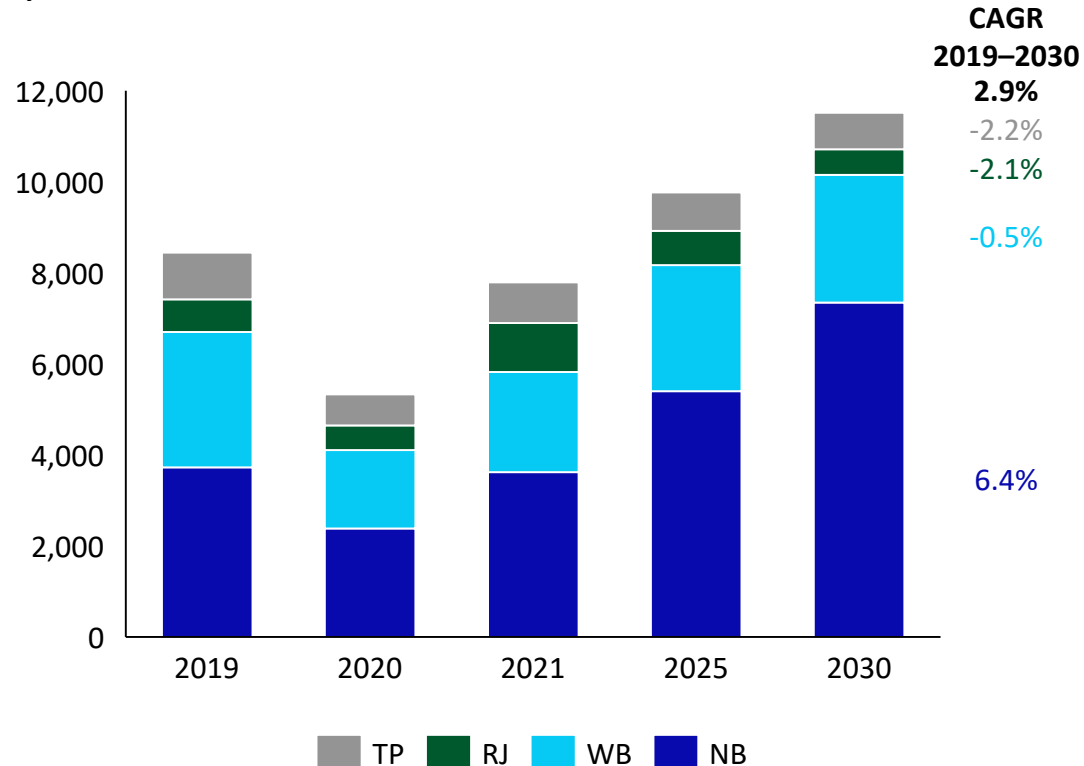


- After the MRO market stabilizes post-crisis, **engine MRO is forecast to grow 3.2% annually from 2025–2030**
- In the same period, **narrow body engine MRO will quicken to 5.6% annual growth** while wide body MRO will grow at just 1.5% annually
- By 2030 engine MRO is forecast to reach \$55 BN, a **48% increase from 2019**

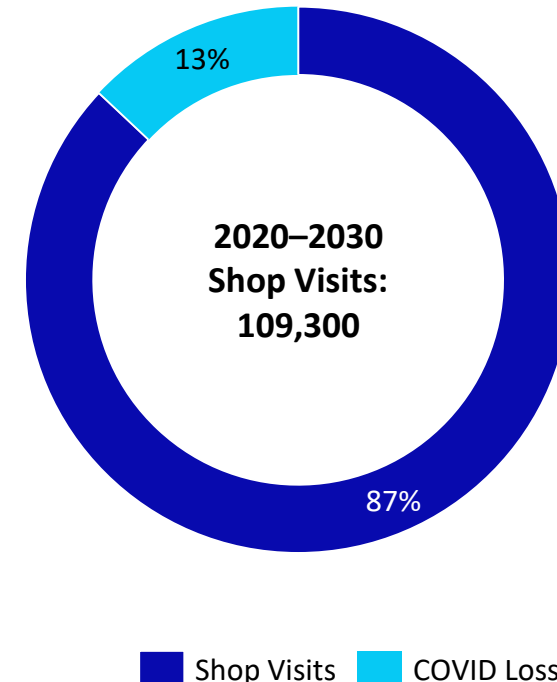
Note: Annual fleet counts are as of the beginning of each year

GLOBAL SHOP VISITS ARE NOW EXPECTED TO NUMBER JUST OVER 5,000 FOR 2020, A 45% DECLINE FROM ORIGINAL EXPECTATIONS

2019–2030 Global Shop Visit Forecast
By Class



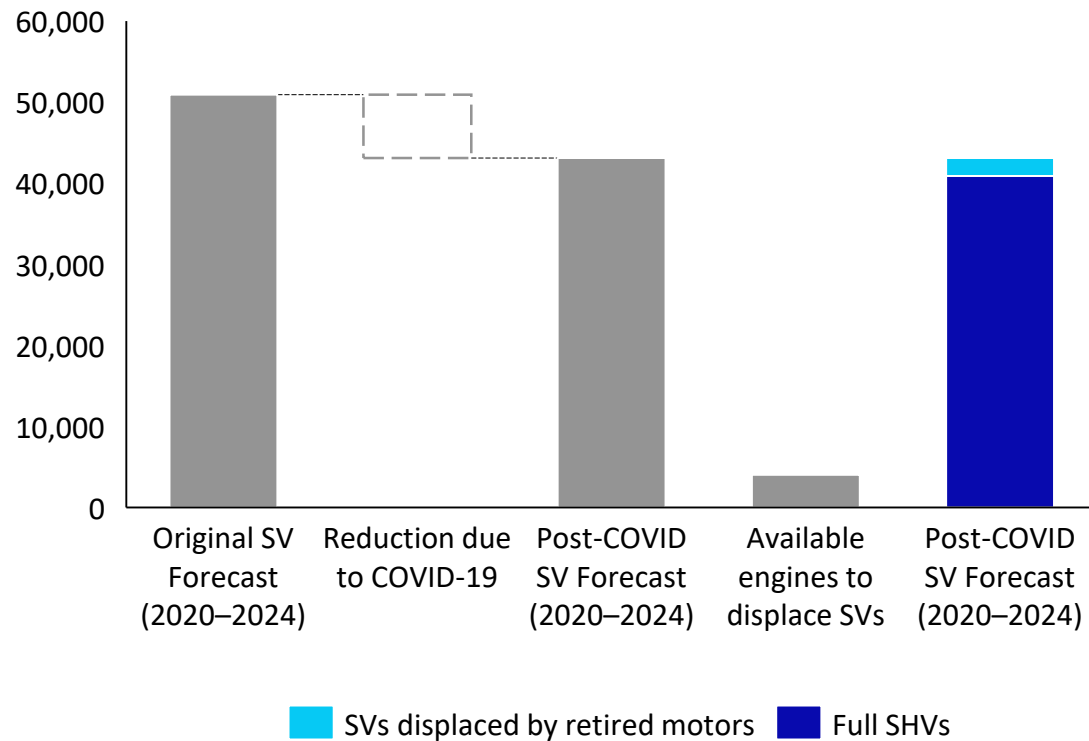
2020–2030 Global Shop Visit Forecast
Total Shop Visits



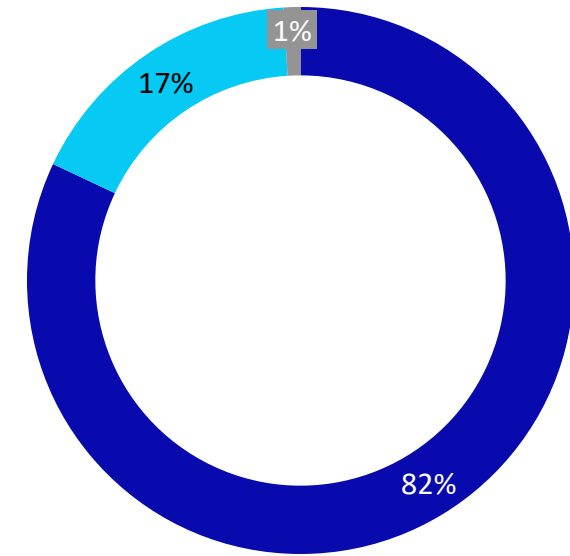
Shop visit volumes will grow at 6.4% CAGR from 2019 through 2030; over this period, the COVID crisis will result in 16,000 fewer forecasted shop visits

AVAILABILITY AND USE OF GREEN TIME ENGINES TO REPLACE OR DEFER WORK WILL REDUCE THE NUMBER OF SHOP VISITS BY A FURTHER 5% THROUGH 2024

Shop Visits Displaced by Greentime Engines
Number of Shop Visits, 2020–2024



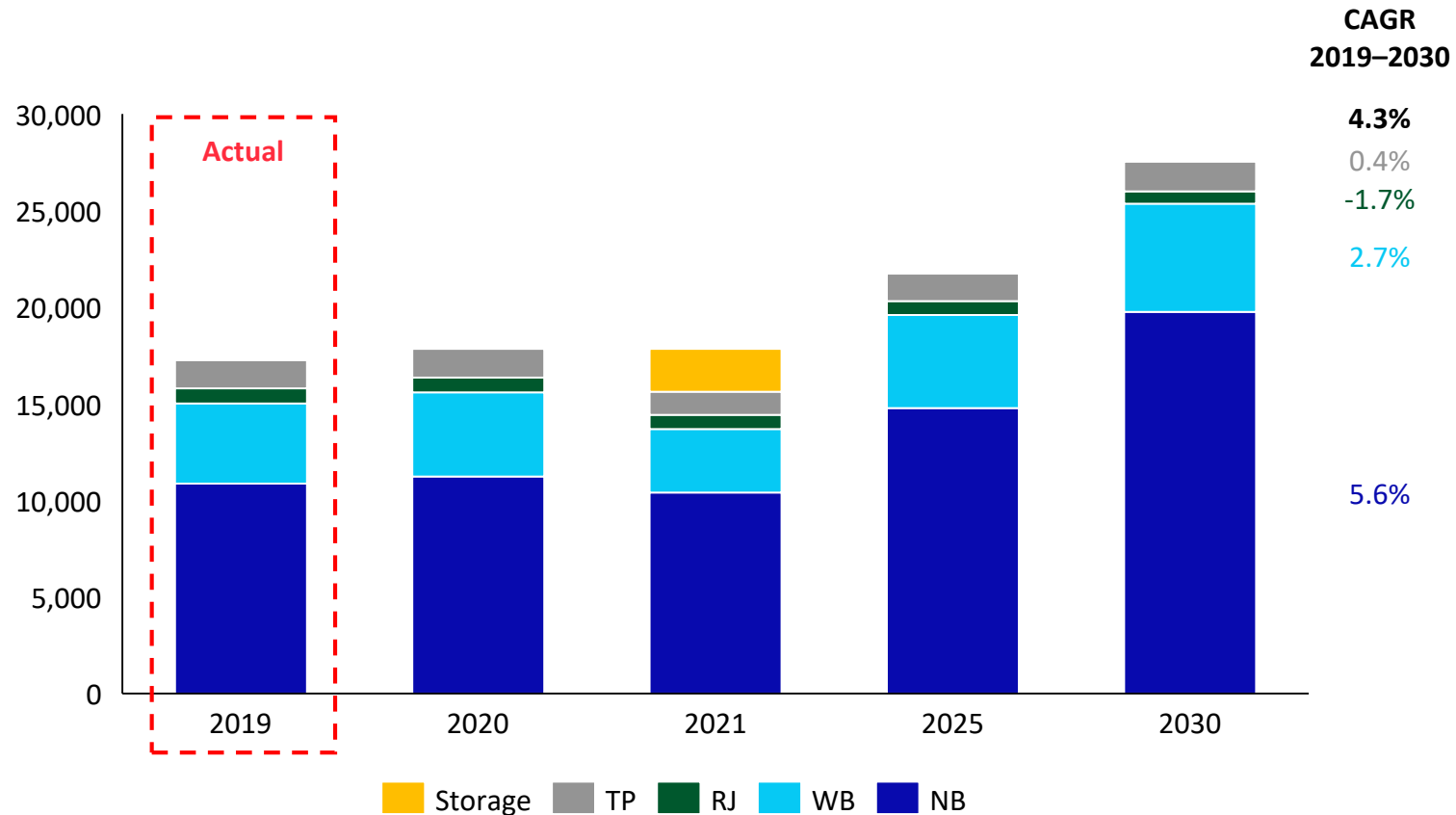
MRO Spend Displaced by Greentime Engines
MRO Engine Spend, 2020–2024



Greentime engines usage will decrease engine spend by a total of \$1.5 BN over the next two years

THE ASIA FLEET IS FORECAST TO GROW AT AN ANNUAL RATE OF 4.3% THROUGH 2030 WITH A SIGNIFICANT AMOUNT CONCENTRATED IN NARROWBODIES

2019–2030 APAC, India and China Engine In-Service Fleet By Class

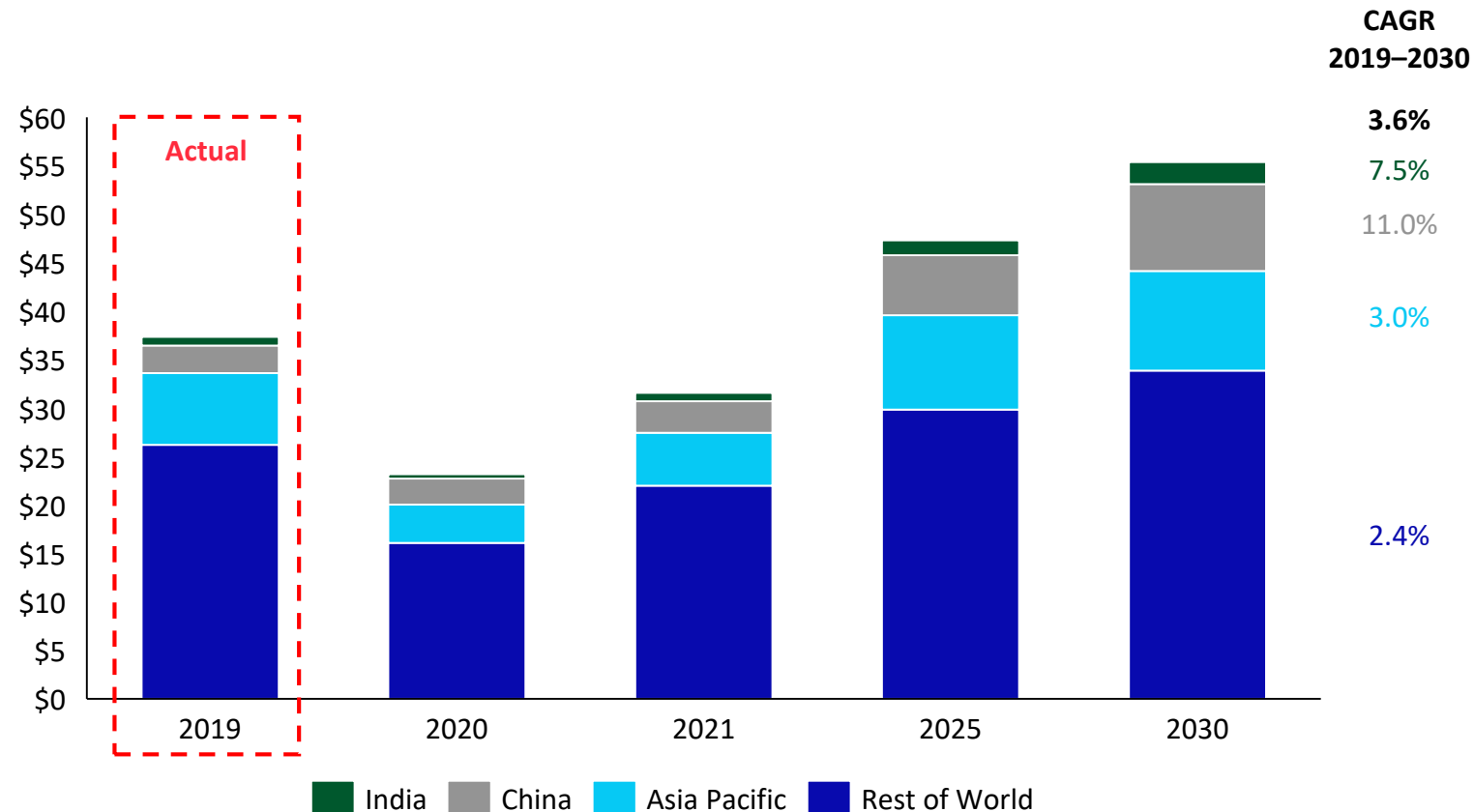


- The mature regions of North America and Western Europe will experience flat or negative growth over the next ten years while **China and India are forecast to grow at annual rates of 5.9% and 11.2%, respectively**
- There remain in **storage more than 2,200 installed engines** on aircraft in 2021
- The combined Asia region is forecast to **grow by nearly 10,000 aircraft** from 2020 to 2030

Note: Annual fleet counts are as of the beginning of each year

ENGINE MRO IN ASIA IS FORECAST TO GROW AT AN ANNUAL RATE OF 6.2% THROUGH 2030 COMPARED TO 2.4% GROWTH FOR THE REST OF THE WORLD

2019–2030 Global Engine MRO By Region

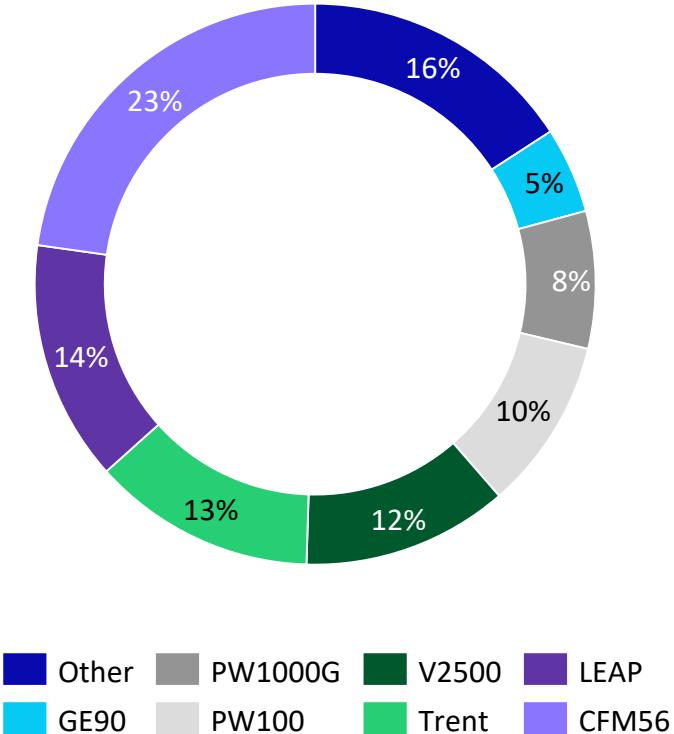


- Engine MRO is expected to **return to pre-COVID levels by end 2022**. Over the second half of the forecast period, Asia engine MRO is forecast to grow at an annual rate of 4.2%
- Asia Pacific, China and India combined are forecast to **comprise 39% of global engine MRO by 2030**, up from less than 30% in 2019
- Engine MRO in Asia is expected to **nearly double by 2030**, growing from \$11 BN in 2019 to more than \$21 BN in 2030

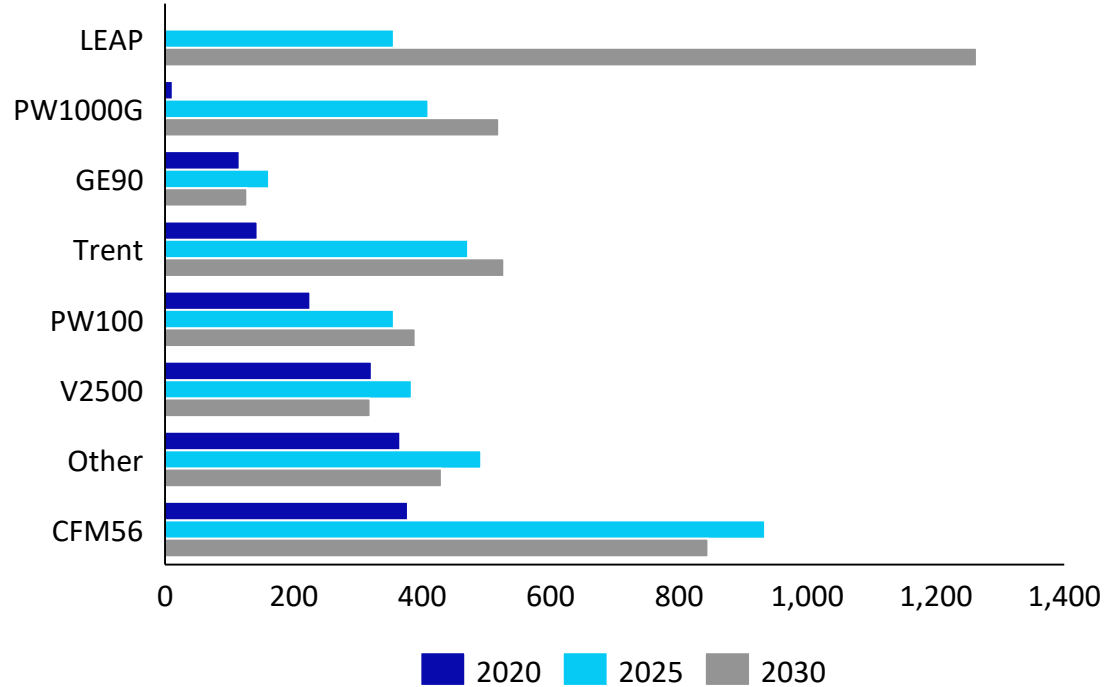
Note: Annual fleet counts are as of the beginning of each year

ENGINES POWERING THE 737 AND A320 WILL COMPRISE 57% OF ALL SHOP VISITS IN ASIA OVER THE NEXT TEN YEARS

2020–2030 Asia Shop Visit Forecast
By Engine Platform



2020–2030 Asia Shop Visit Forecast
By Engine Platform



Shop visits for the LEAP are forecast to number fewer than half the CFM56 in 2025 before accelerating to 50% more than the platform by 2030

READ OUR LATEST INSIGHTS ABOUT COVID-19 AND ITS GLOBAL IMPACT ONLINE

Oliver Wyman and our parent company Marsh & McLennan (MMC) have been monitoring the latest events and are putting forth our perspectives to support you clients and the industries you serve around the world. The Coronavirus Hub will be updated daily as the situation evolves.



[Visit our dedicated COVID-19 website](#)



