



CRONUS

INVESTMENT BANKING

Aerospace and Manufacturing Forum

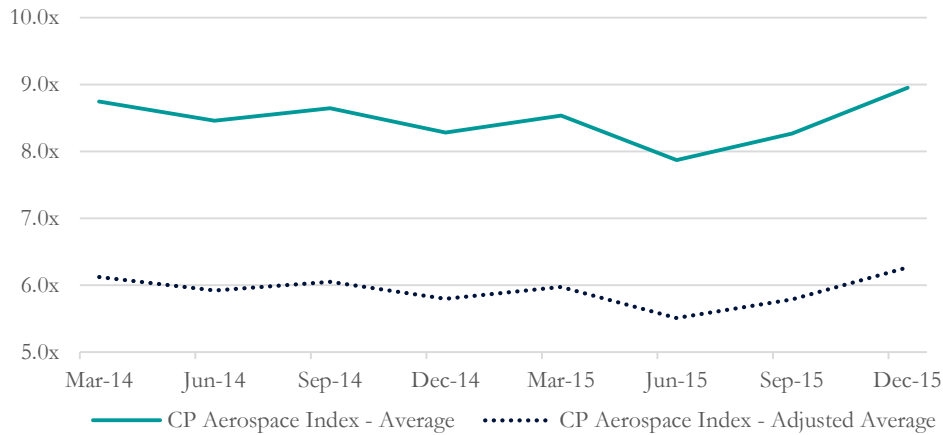
April 20, 2016



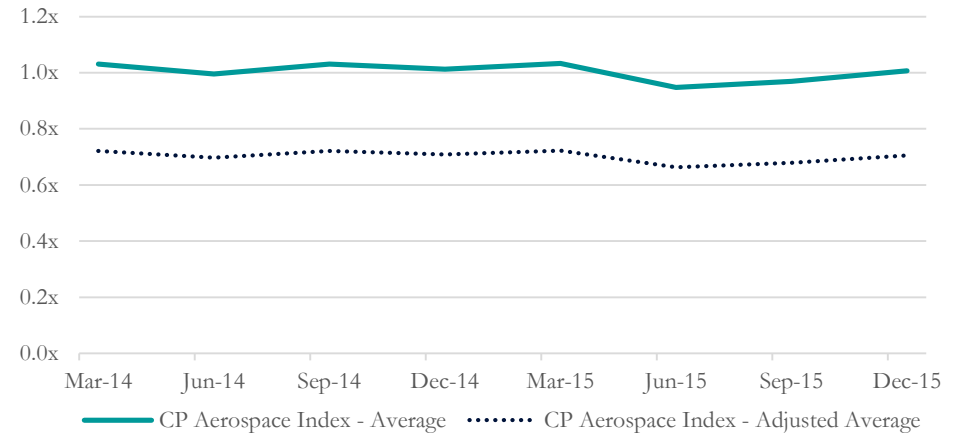
Capital Market Conditions

Publicly Traded Equities – Valuation Multiples

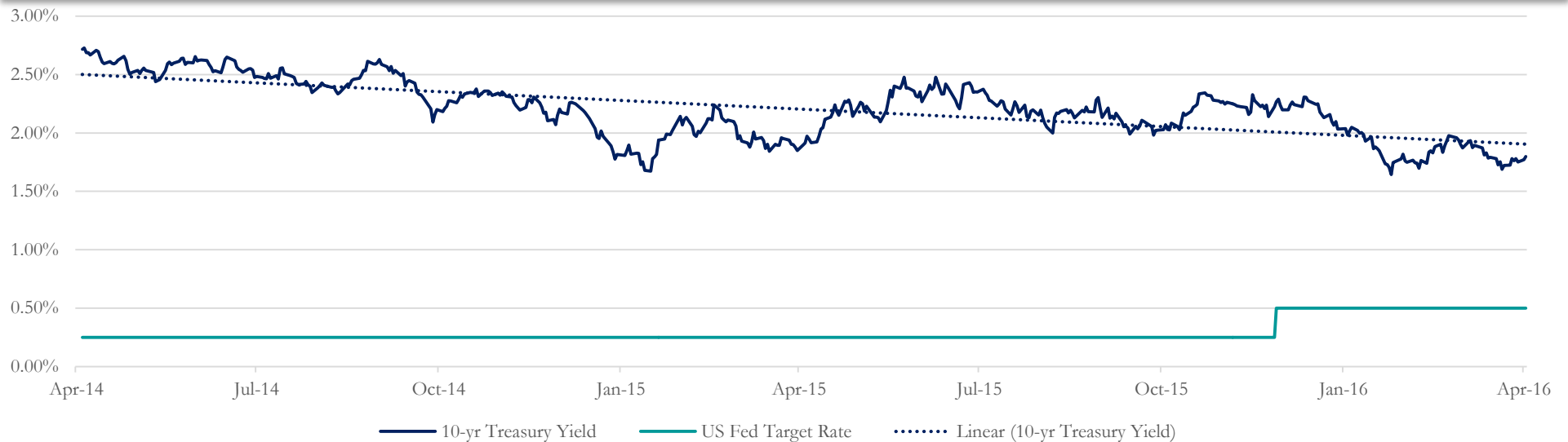
EV/EBITDA



EV/Revenue



Debt Market Rates



Source: Thomson Reuters Eikon; net adjustment is 30%

Speaker Introduction: Richard Brown

- **Principal at ICF International, one of the world's largest and most experienced aviation and aerospace consulting firms, forecasting industry production and demand and providing advisory support to MROs, operators, and OEMs**
- **15+ years' experience in the aerospace industry, including 10 consulting with ICF (formerly Aero Strategy) managing projects with a broad global client base, including airlines, manufacturers, and suppliers**
- **Extensive aerospace market forecasting experience leading to the development of the Aero Strategy business aviation maintenance market forecast**
- **Specialties:**
 - **Asia and Middle East market**
 - **Business aviation**
 - **Pilot and mechanic training**
 - **Aircraft component manufacturing**
 - **Engine and component maintenance and support**
- **Previous experience includes various market analysis roles at TRW Lucas Aerospace and Goodrich Corporation**

Cronus Partners Overview

Cronus Partners, a recipient of the ACG Boutique Investment Bank of the Year award, is a middle market focused independent investment bank headquartered in New York City

Firm Profile

While Cronus works on investment banking mandates for companies across a broad spectrum of industries, we are unrivaled in our knowledge and experience with specific industries. We understand the drivers of change within each industry and nurture relevant and meaningful corporate and private capital market relationships therein. Cronus combines Wall Street expertise with the agility and attentiveness of a boutique firm. Our investment bankers are highly experienced professionals who combine in-depth industry knowledge with transactional execution skills and an intimate understanding of issues facing middle market companies. Cronus' focused attention and guidance through each step of the process enables each client to accomplish its goals.

Investment Banking Services

- Sales, divestitures, spinouts
- Mergers and acquisitions
- Bank facilities, senior, subordinated and other debt financing (asset based, cash flow based, transaction oriented)
- Private placements of equity and debt
- Management buyouts
- Fairness opinions
- Corporate finance advisory services

Sector Coverage

- Aerospace and Defense
- Alternative Energy
- Business Services
- Environmental Services
- Maritime
- Transportation and Logistics
- Oilfield Technology
- Specialty Manufacturing



Contact Us

Cronus Partners LLC

www.CronusPartners.com

850 Third Avenue

20th Floor

New York, NY 10022

Jeffrey Rubin

Managing Partner

212.658.0297

jrubin@cronuspartners.com

Andrea Chase

Partner

212.658.0281

achase@cronuspartners.com

John Quirk

Partner

212.658.0327

jquirk@cronuspartners.com

Ken Leung

Managing Director

212-658-0396

kleung@cronuspartners.com

Paul Nowak

Managing Director

212-658-0314

pnowak@cronuspartners.com

Charles Carson

Senior Advisor

917.833.8881

ccarson@cronuspartners.com

Britt Barclay

Associate

Conor Williams

Analyst

Jenni Singer

Manager, Administration

Lisa Johnson

Marketing Associate





Presented by:
Richard Brown
Principal, ICF International
richard.brown@icfi.com

What's Happening with Aircraft Engine and MRO Demand?

20 April 2016 - Hartford, CT

Agenda

MRO Market Forecast & Key Battlegrounds



Market Context

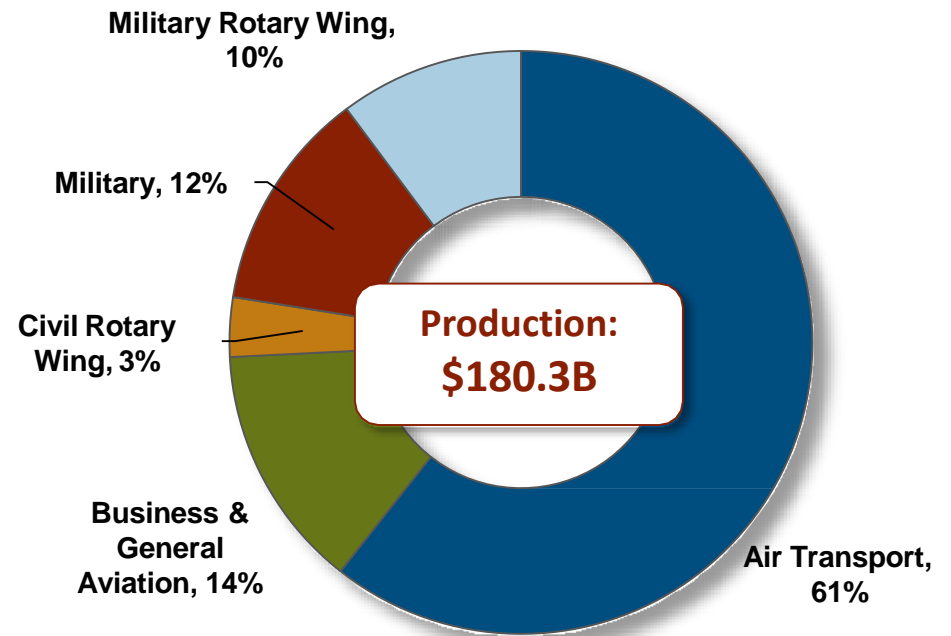
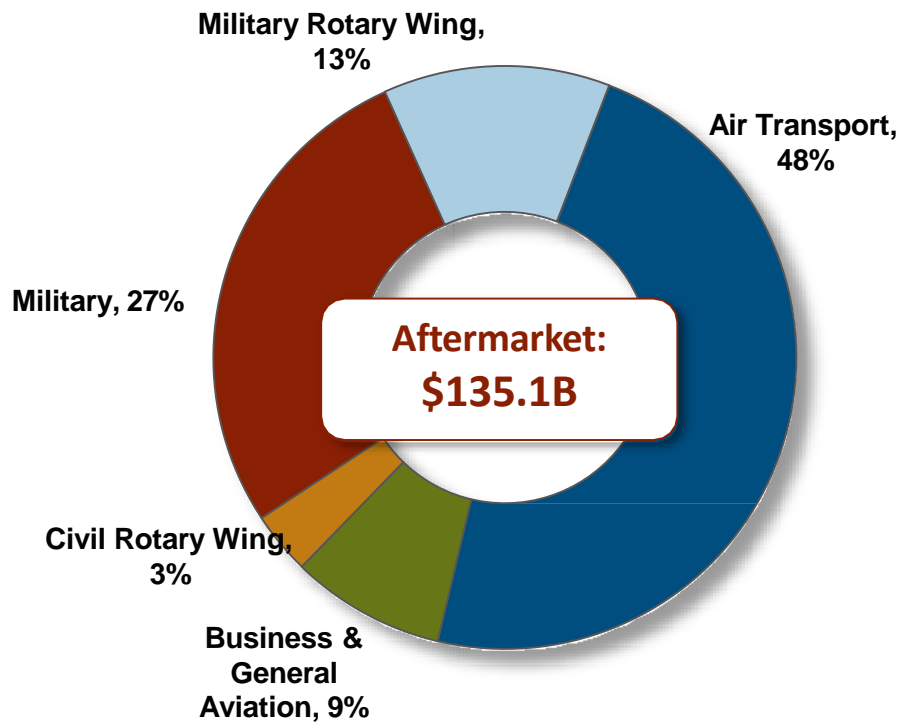


MRO Forecast & The Battlegrounds

What's Happened To MRO?

Aftermarket is significant at \$135B, equivalent to 75% of the value of current production

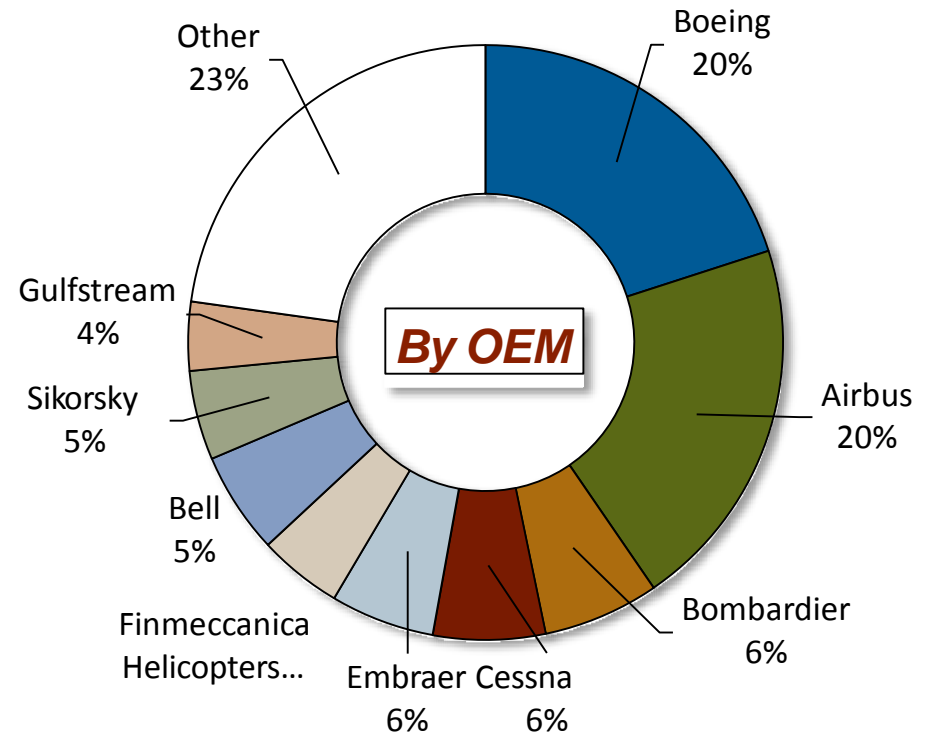
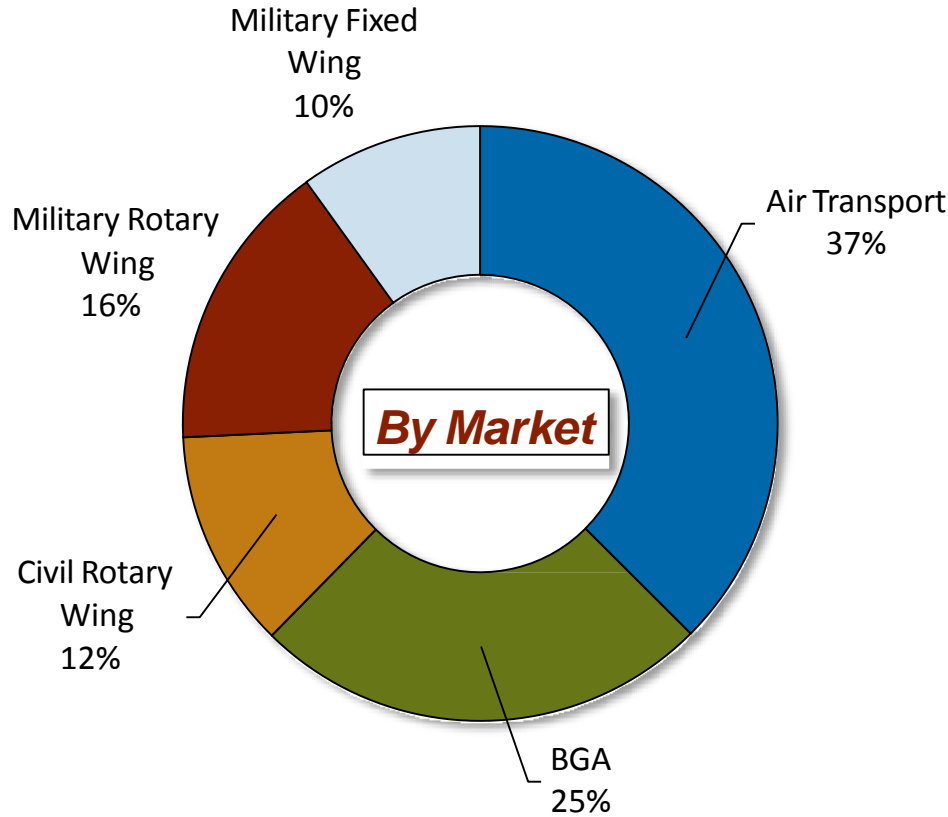
Aftermarket and Production Market Size (2015 \$B)



Source: ICF International

Nearly 5,000 aircraft were produced in 2015 in all markets; air transport accounts for one-third of all production

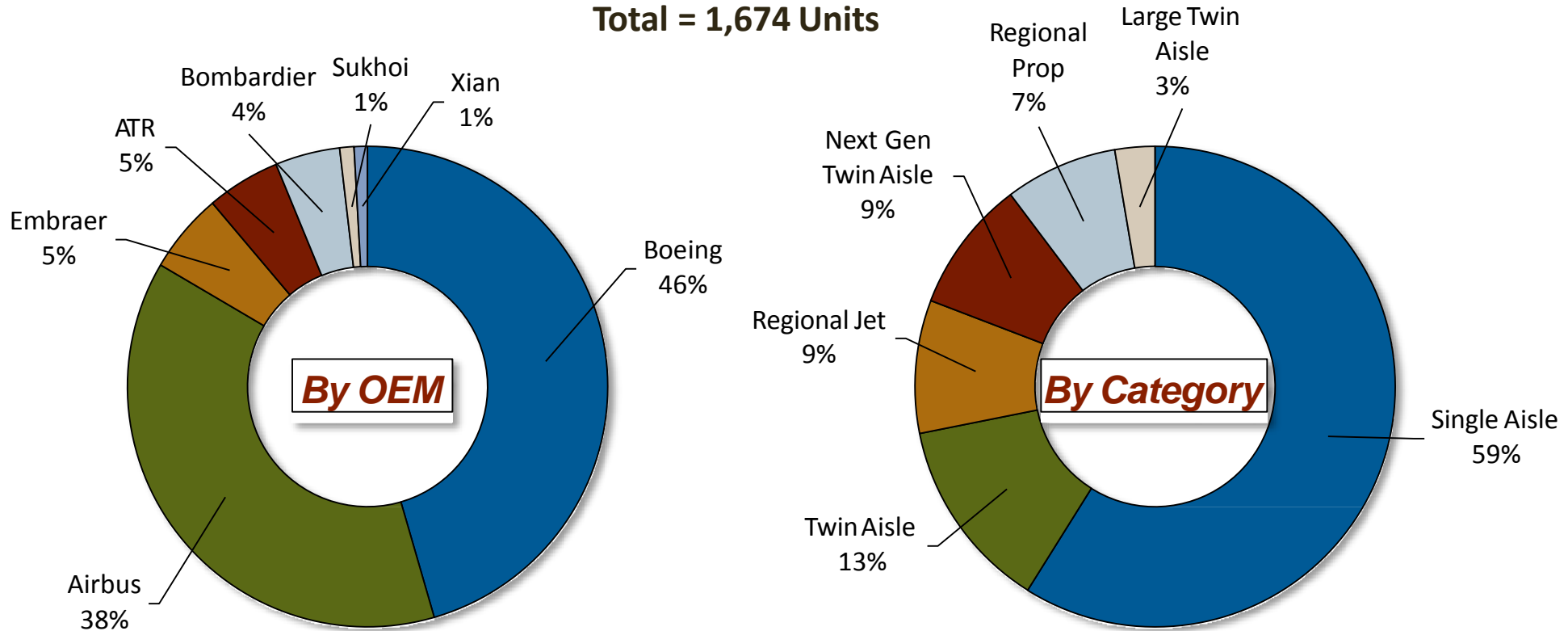
2015 Aircraft Production
Total = 4,466 Units



Source: ICF International

The Boeing-Airbus duopoly in air transport accounts for 84% of all production units

2015 Air Transport Aircraft Production
Total = 1,674 Units

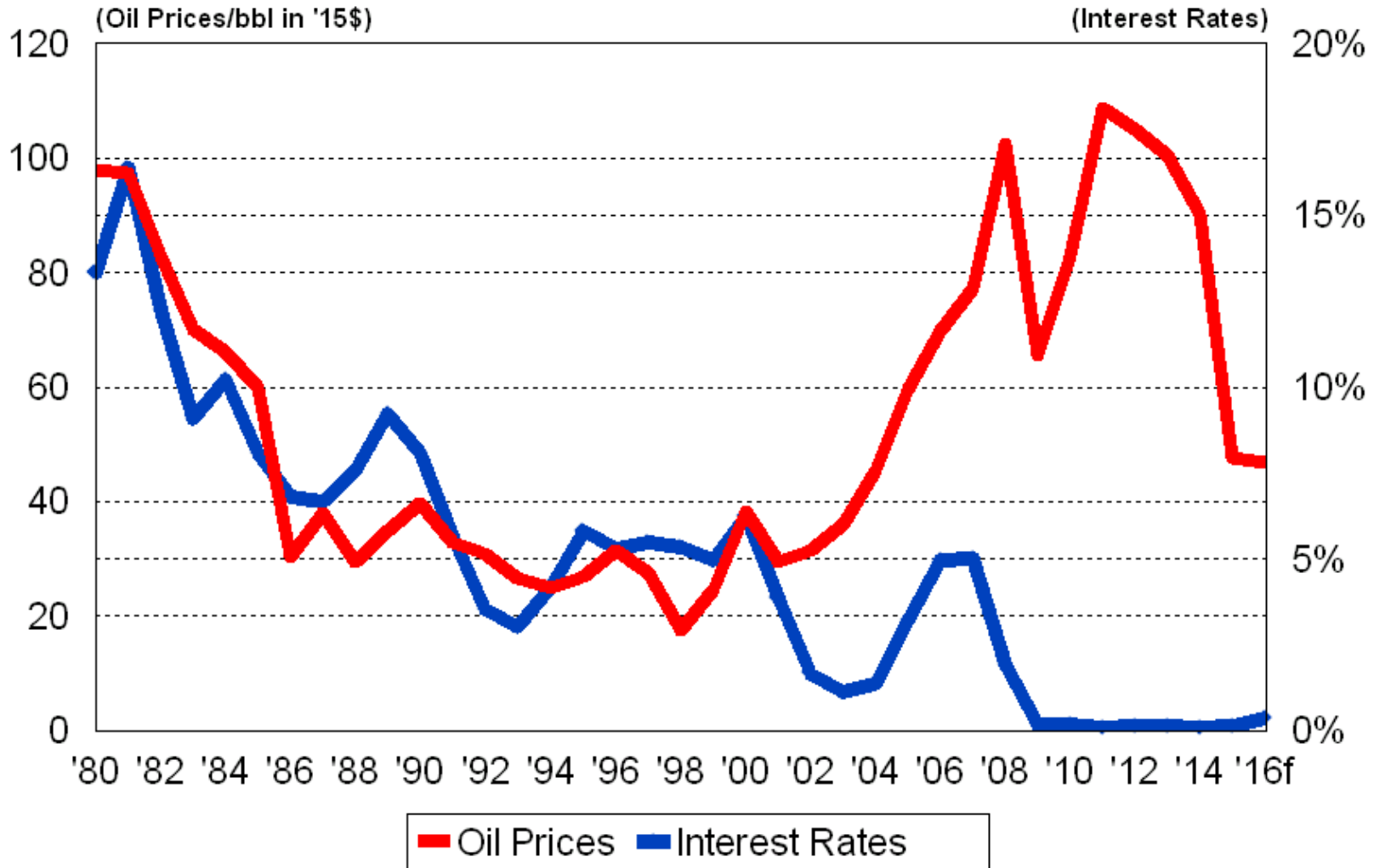


Source: ICF International

MARKET CONTEXT

A combination of high fuel prices and low cost of capital has created favorable aircraft buying conditions.....

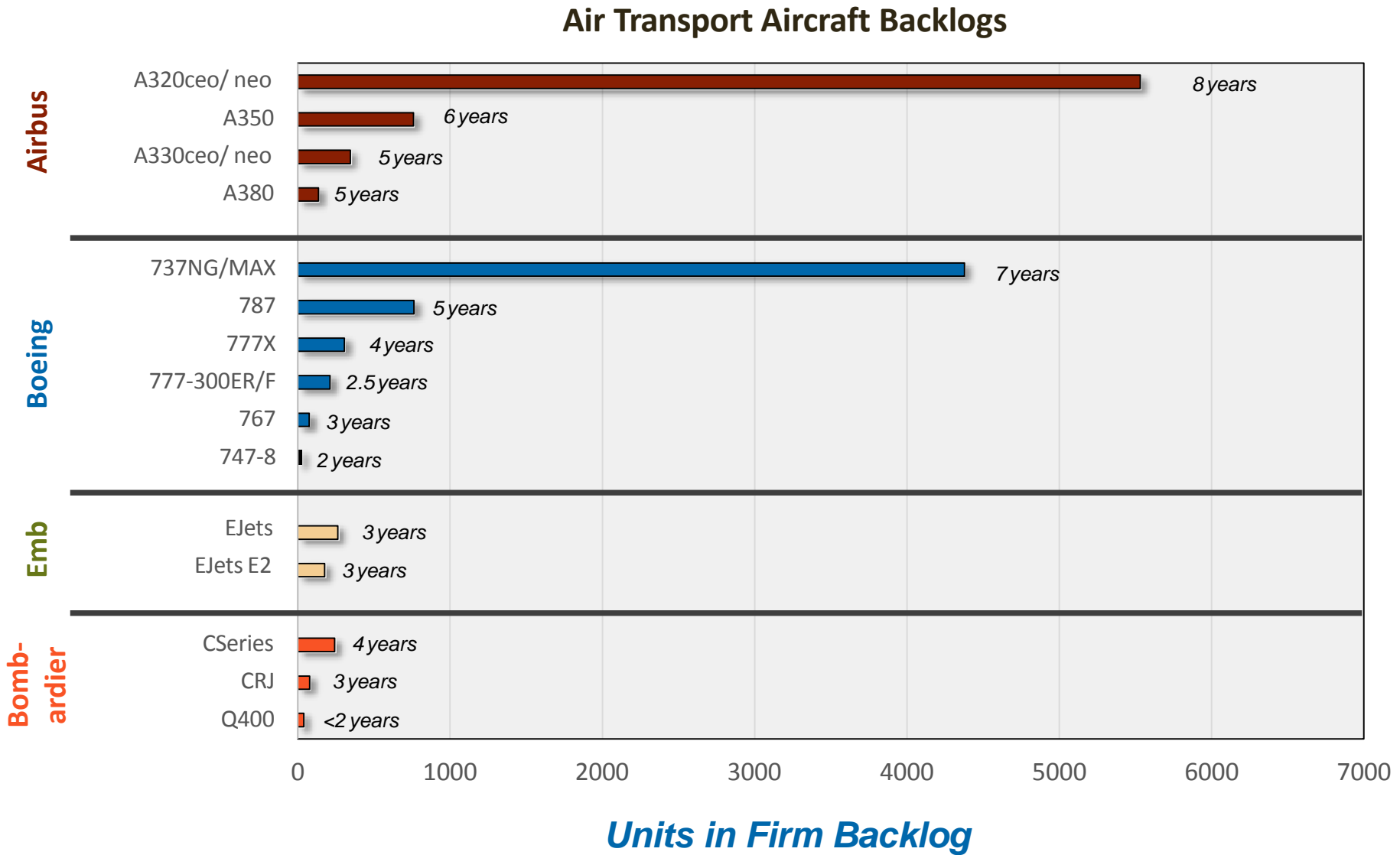
Oil Prices and US Federal Funds Rate



Sources: EIA; US Federal Reserve, Teal Group

MARKET CONTEXT

Airbus and Boeing have record backlogs, approaching 8 years even at increased production rates

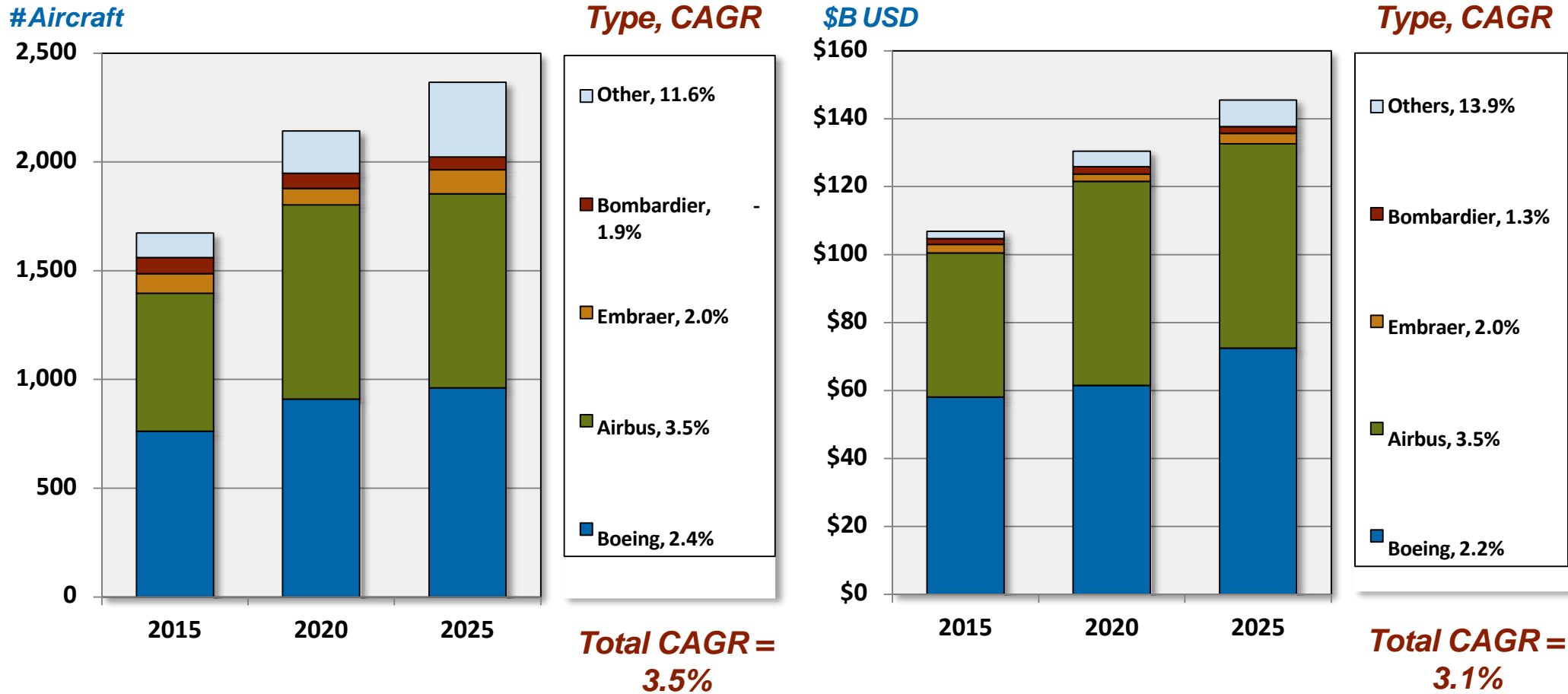


Source: ICF Research, Boeing, Airbus, Bombardier, Embraer

MARKET CONTEXT

Through 2025, air transport production will grow 3.5% annually, along with total value at 3.1% per annum

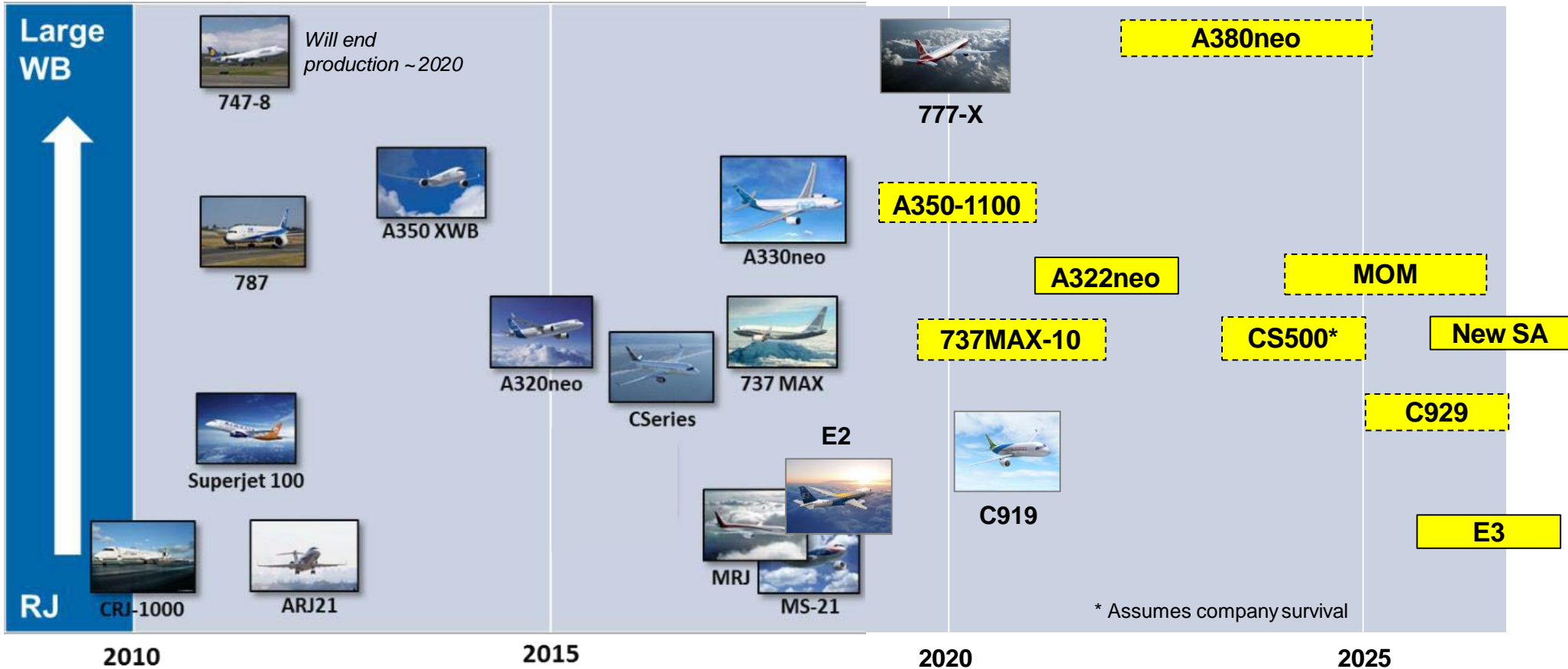
2015-2025 Air Transport Aircraft Production
By OEM



Source: ICF Research & Analysis, Figures in Constant 2015 Dollars

ICF's anticipates mostly re-engine programs in the near-term

New Aircraft Outlook



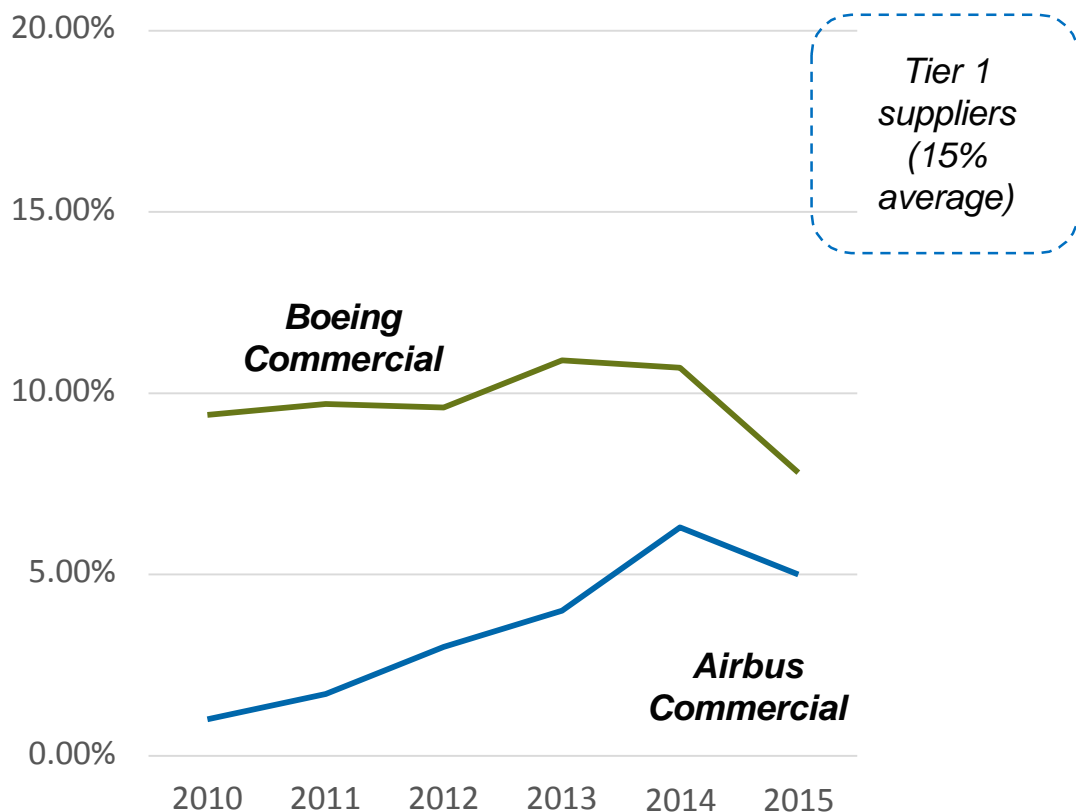
* Assumes company survival

- **Airbus** will prioritize the A350-1100; it may follow with a stretch A322neo and A380neo; a new single aisle (SA) likely ~2030
- **Boeing** will stretch and re-wing the MAX in lieu of a MOM white sheet to fend off the A321neo; the MOM will wait until the mid-late 2020s...possibly in a family concept with a new single aisle similar to the 757/767
- **Bombardier** will just survive after more government aid and/or entering a JV; it will launch the CS500 later this decade
- **Embraer** and **Comac** will bring new aircraft to the market in the late 2020s

Source: ICF analysis

Aircraft OEMs are substantially less profitable than most Tier 1 suppliers...

Aircraft OEM Profitability









- Aircraft OEMs perceive the risk-reward equation to be out of balance relative to more profitable Tier 1 and aeroengine OEMs
- Airbus's profitability is steadily improving from low single digits earlier this decade
- Boeing would be less profitable if it did not use program accounting (cumulative ~\$30B loss on 787)

Figures are EBIT (Airbus) and Operating Profit (Boeing)

Source: Airbus, Boeing.

...and are engaging in several cost reduction initiatives to increase profitability

Initiative		Activity
New commercial terms		<ul style="list-style-type: none"> • <i>Unilateral price reductions and revised terms</i> • <i>“No fly” lists for suppliers that don’t participate</i>
Part redesigns		<ul style="list-style-type: none"> • <i>Value engineering</i> • <i>Material substitution</i>
New processes		<ul style="list-style-type: none"> • <i>Shift to lower cost process</i> • <i>Leverage new processes</i>
Selective vertical integration		<ul style="list-style-type: none"> • <i>Expand role in profitable product segments</i> • <i>Assume system integration role</i> • <i>Gain access to lucrative aftermarket revenue</i>
Aggregation & Dual Sourcing		<ul style="list-style-type: none"> • <i>Aggregate fragmented segments (e.g. fasteners, interior parts)</i> • <i>Shift to dual sourcing</i>
Capture revert		<ul style="list-style-type: none"> • <i>Where possible, capture revert from suppliers</i> • <i>Work with supply chain integrators to close loop on material</i>

Source: ICF

Agenda

MRO Market Forecast & Key Battlegrounds



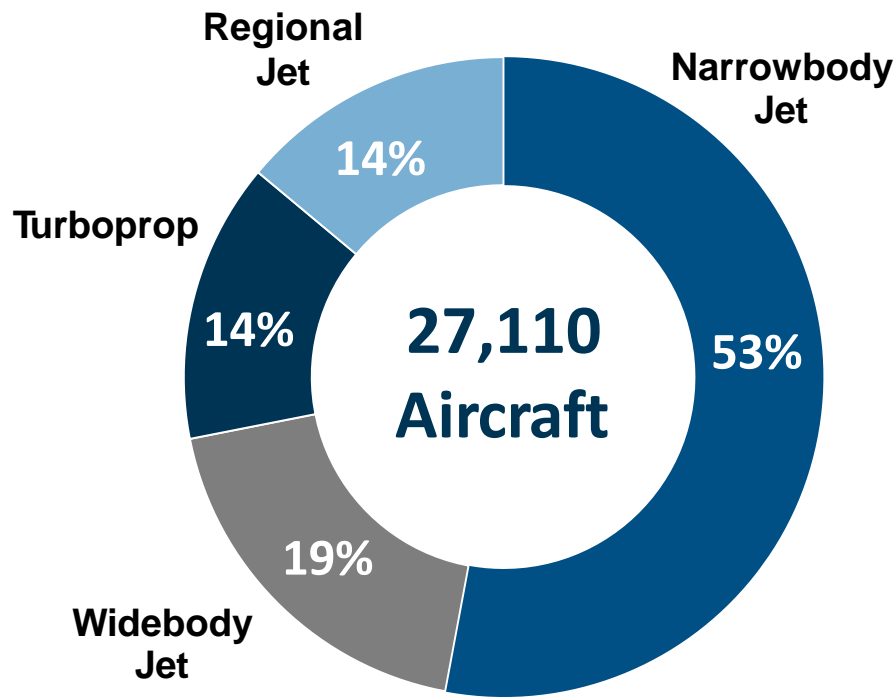
Market Context



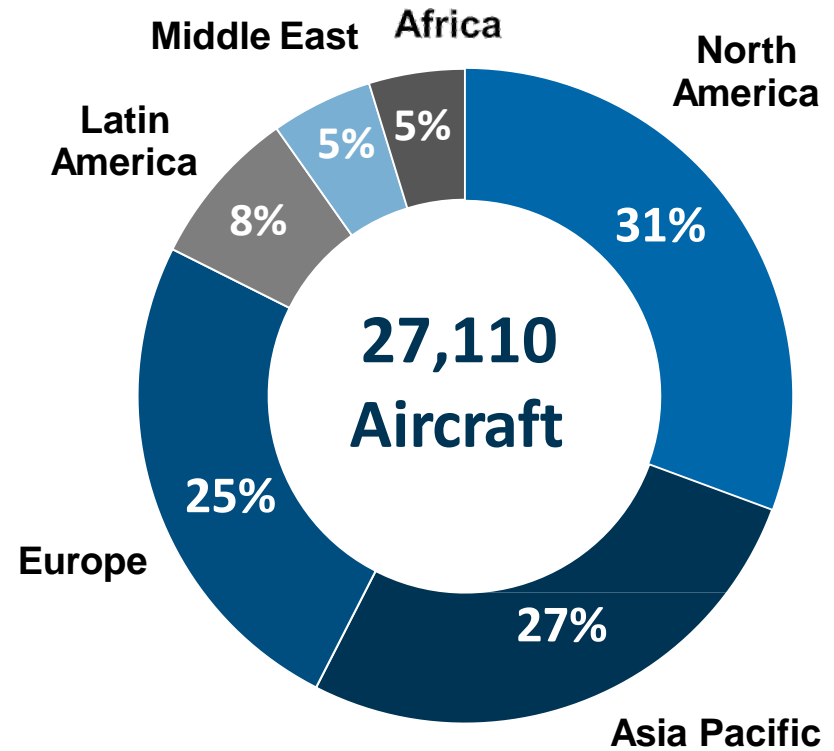
MRO Forecast & The Battlegrounds

What's Happened To MRO?

The current commercial air transport fleet consists of over 27K aircraft



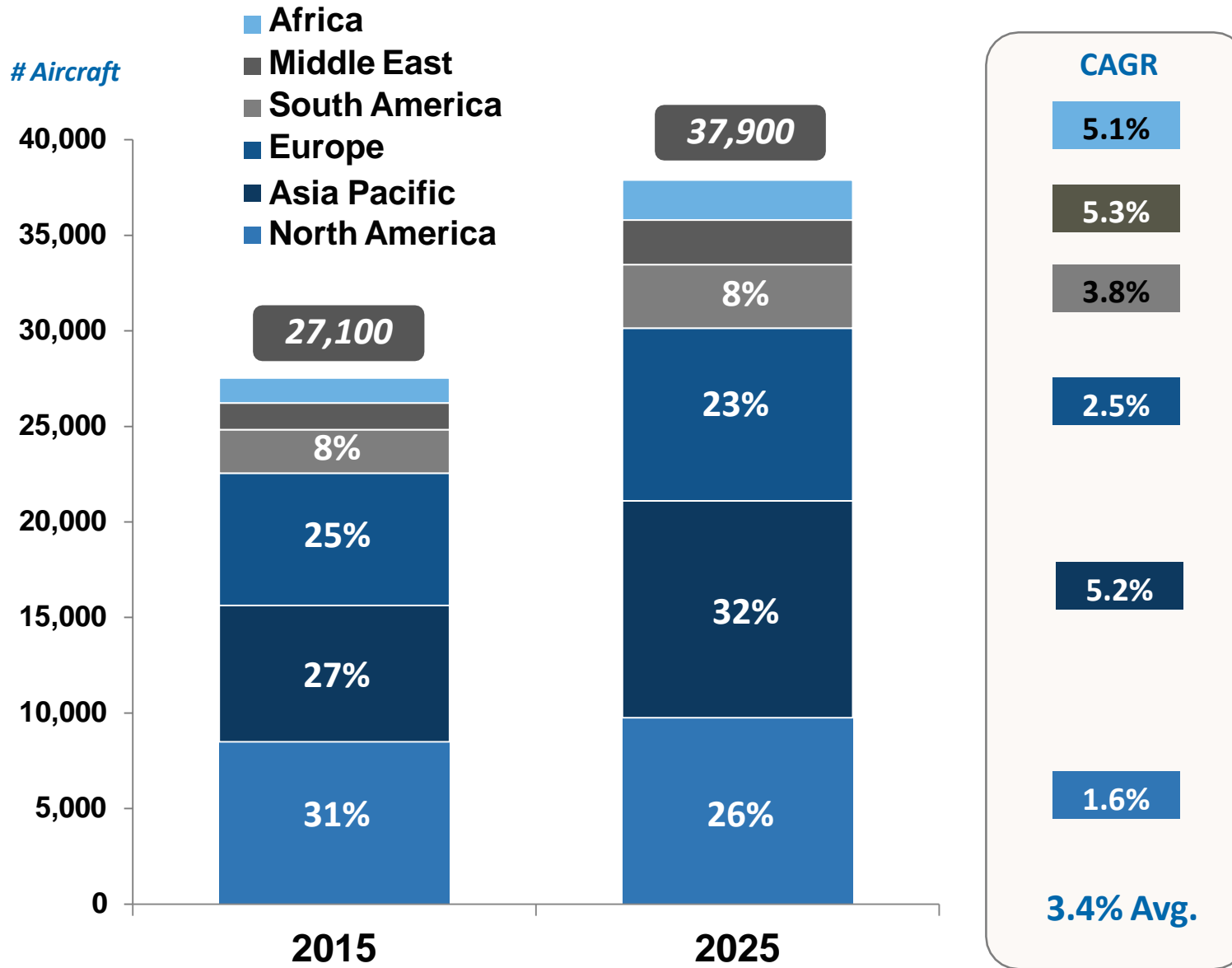
By Aircraft Type



By Global Region

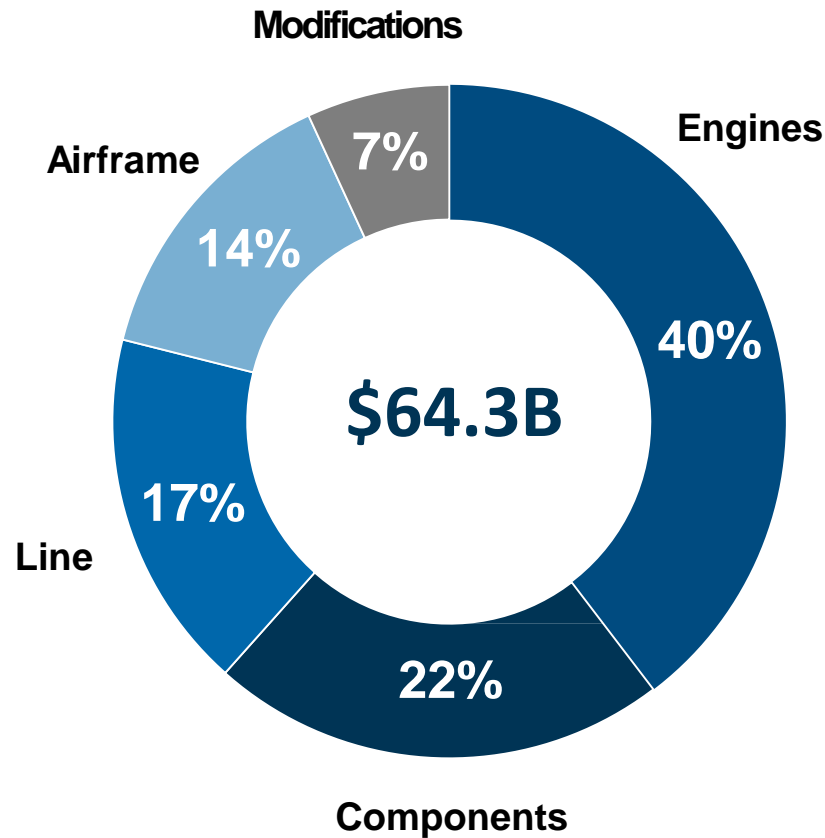
Source: ICF International; Forecast in 2015 \$USD, exclusive of inflation

The combination of strong air travel demand and the need to replace ageing aircraft will drive fleet growth at 3.4% annually

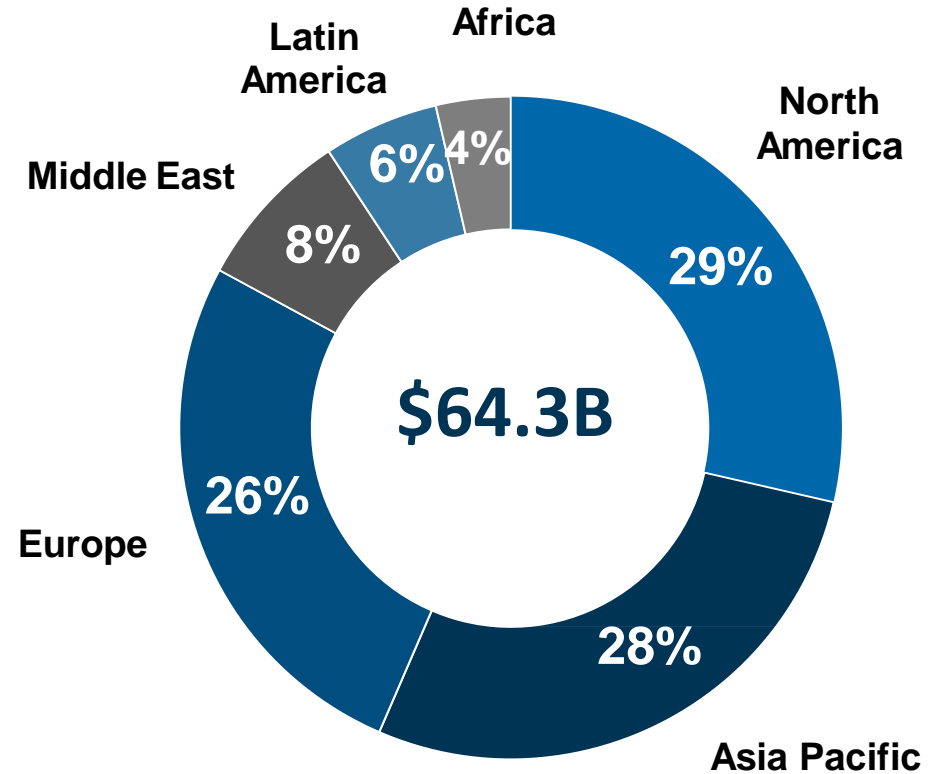


Source: ICF International; Forecast in 2015 \$USD, exclusive of inflation

Current air transport MRO demand is \$64.3B; with Asia equivalent to North America and Europe in market size



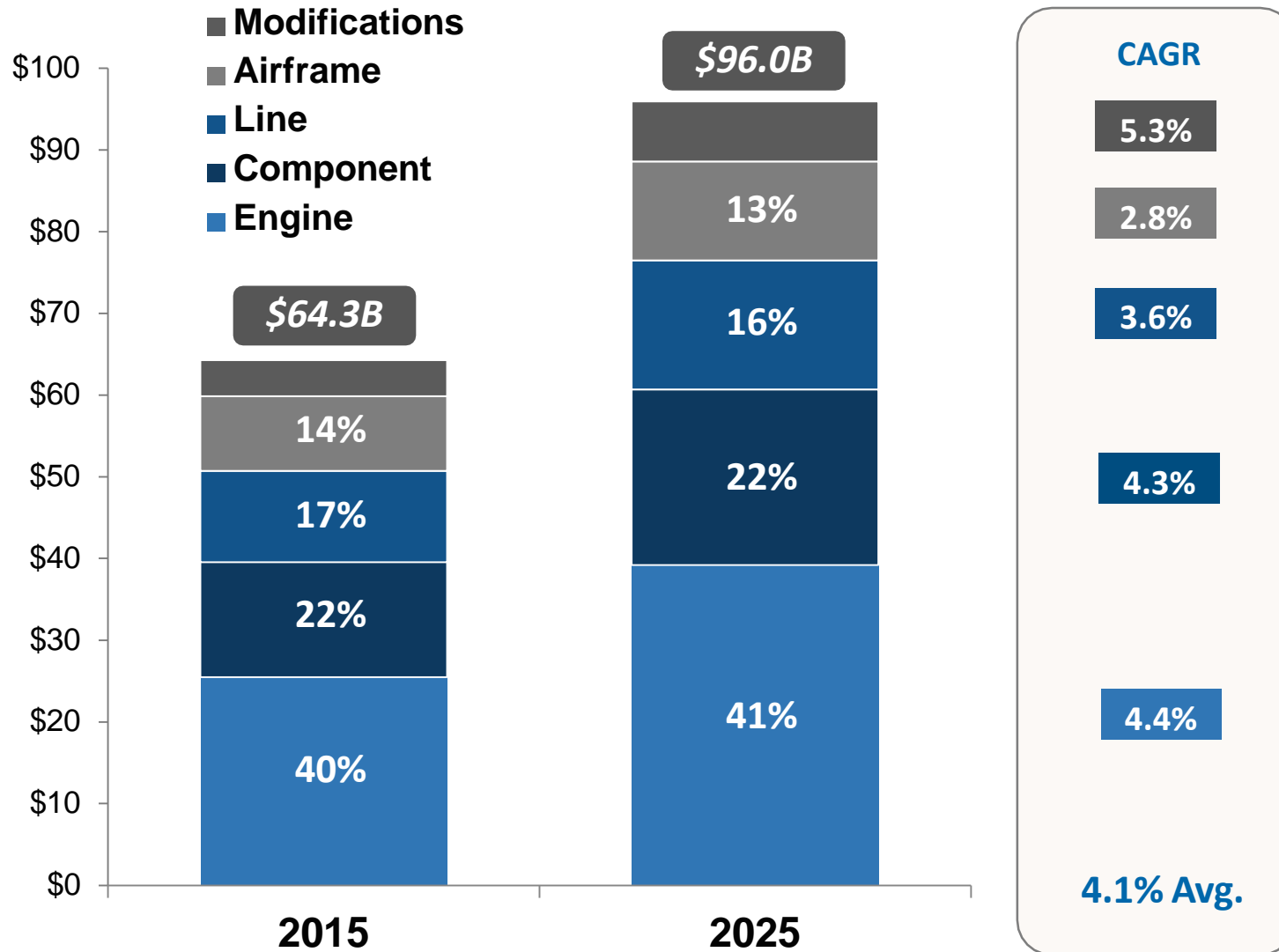
By MRO Segment



By Global Region

Source: ICF International; Forecast in 2015 \$USD, exclusive of inflation

The global MRO market is expected to grow by 4.1% per annum to \$96B by 2025

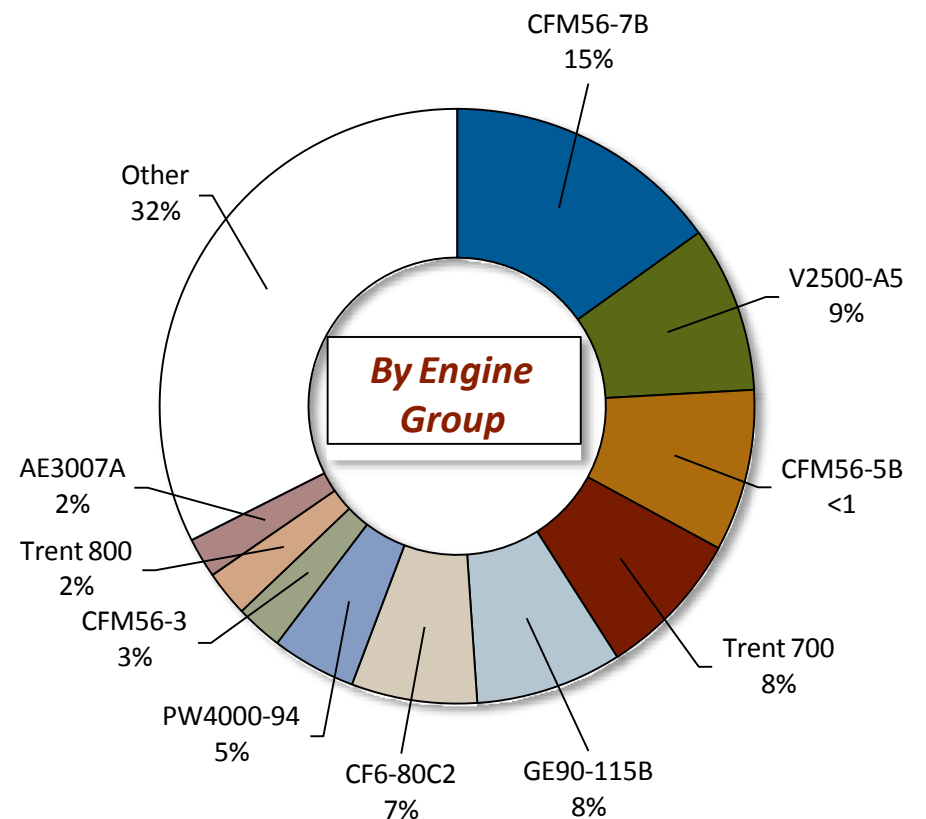
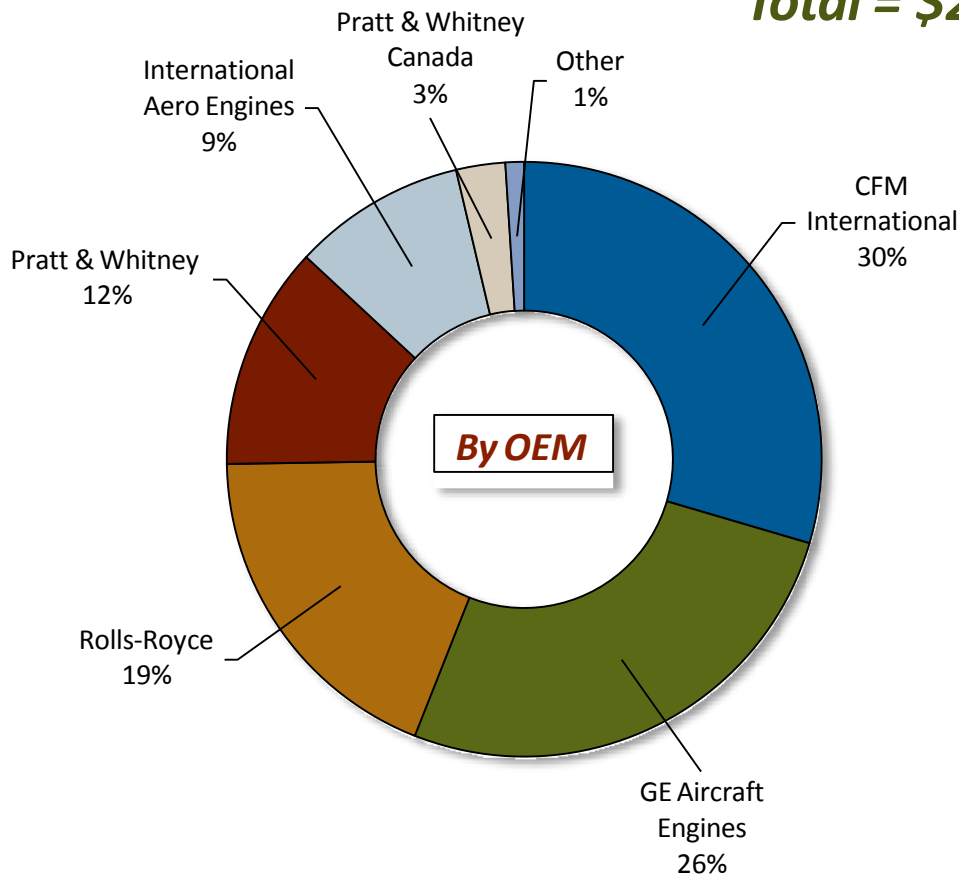


Source: ICF International; Forecast in 2015 \$USD, exclusive of inflation

The air transport engine MRO market stands at \$25 billion; the top five platforms account for about half of the total demand

2015 Engine MRO Market

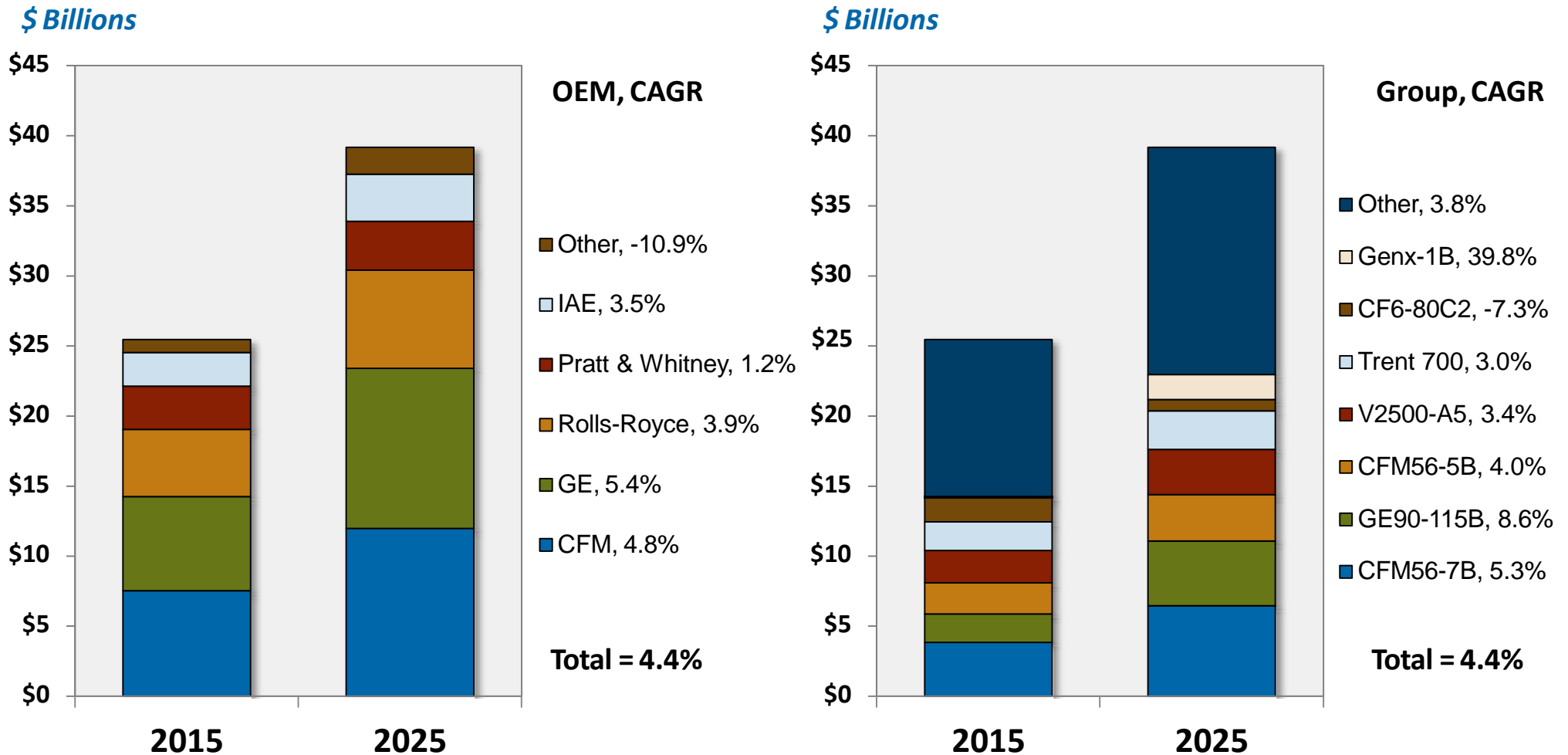
Total = \$25.5 Billion



Source: ICF International

Engine MRO demand will grow about 4.4% annually through 2025, a period that will witness production ramp-ups and new engines

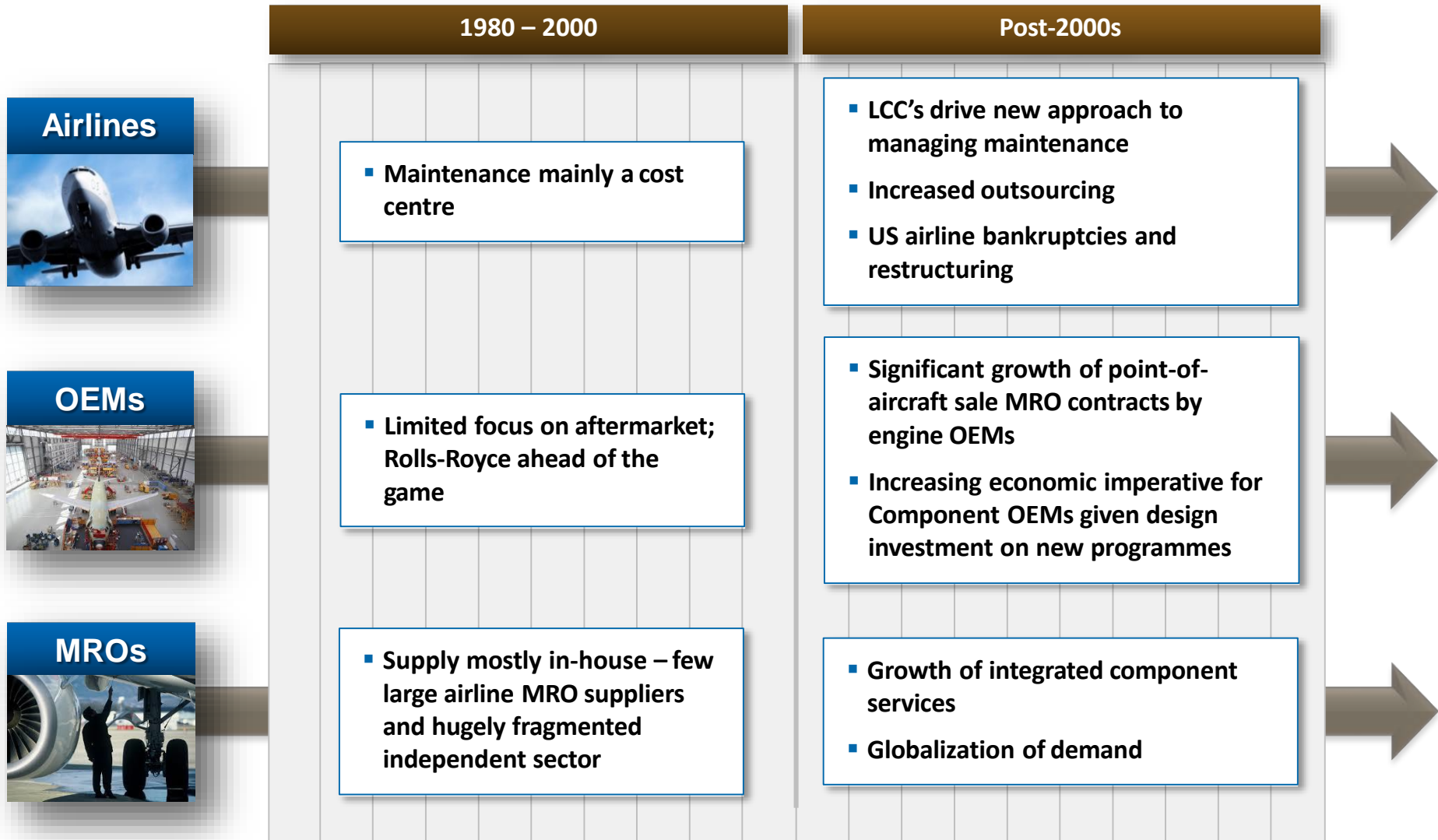
2015 – 2025 Air Transport Engine MRO Forecast By Engine OEM & Engine Group



Source: ICF International

The aftermarket has evolved from being an afterthought to a market of significant importance and a revenue opportunity

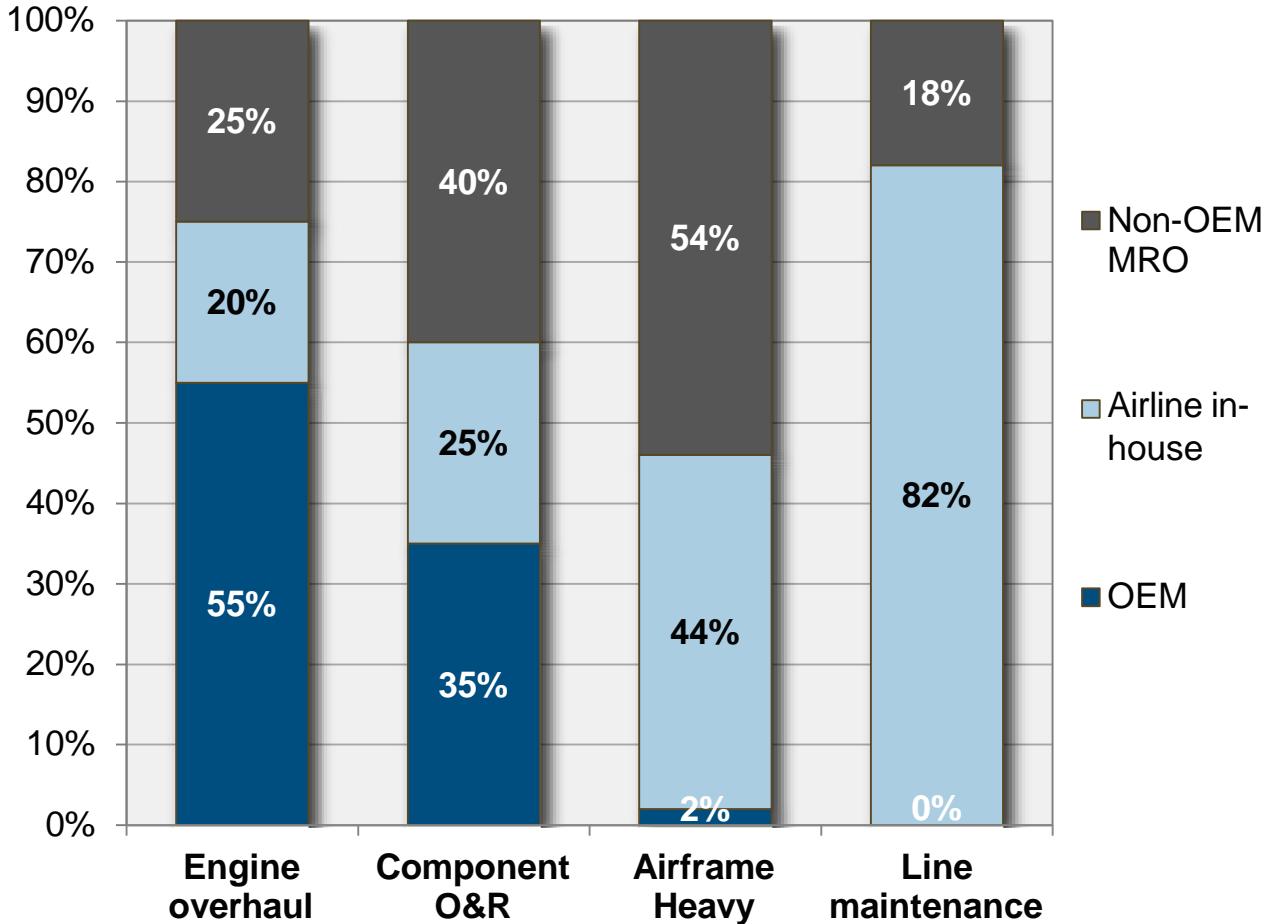
The aftermarket has evolved from a cost centre to a highly competitive market



Source: ICF International

Engine OEMs have the most mature and strongest OEM position across the main air transport aftermarket segments

Air Transport Supply (2015)



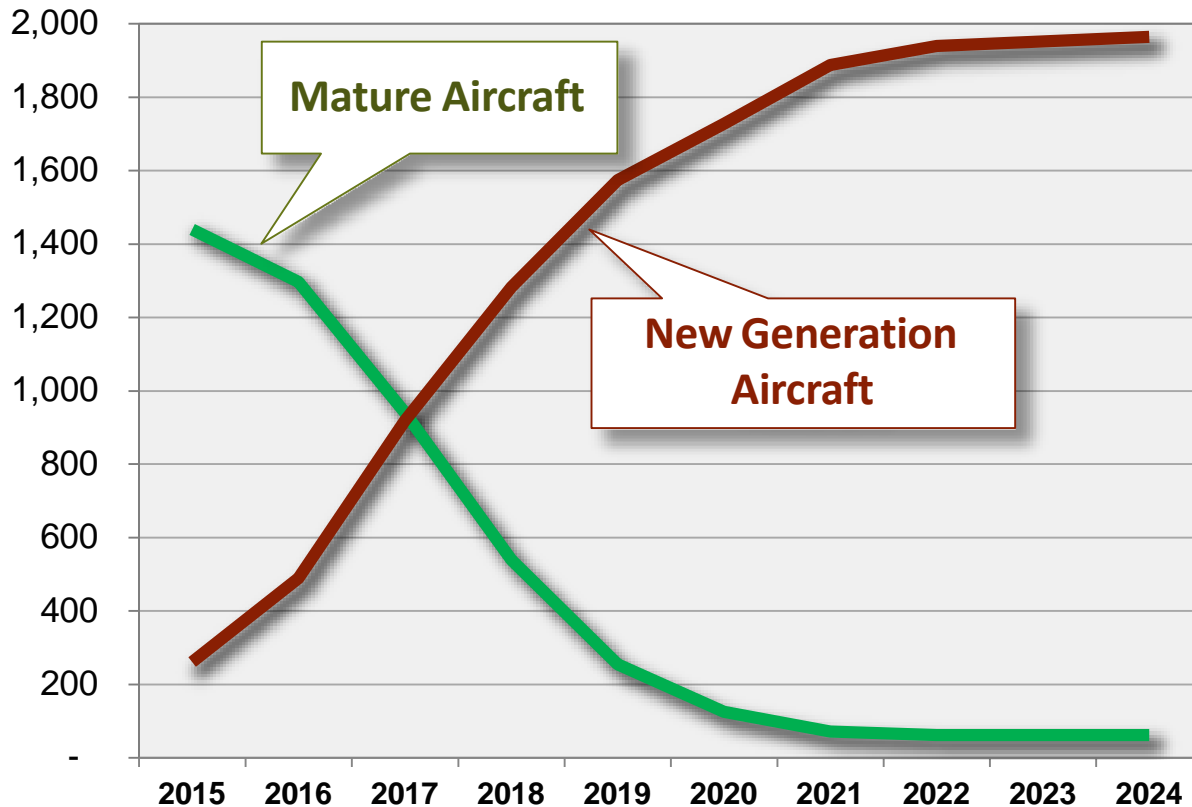
Highlights

- OEMs tend to have the strongest share in the more material intensive markets (e.g. engine overhaul)
- Component OEM market share lower than engine OEMs
- Aircraft OEMs have an almost non-existent position in the airframe-related aftermarket

Source: ICF International

The ramp up and introduction of new generation aircraft creates the opportunity to change the aftermarket supply chain

Aircraft deliveries (units)



Highlights

- New aircraft with higher reliability, lower manhours and complex technology change the business case for establishing MRO capability
- ...especially with greater airline focus on financial returns
- This is a catalyst to change the MRO supply model....
- Creating new opportunity for OEMs and aftermarket providers

Source: ICF International

Agenda

MRO Market Forecast & Key Battlegrounds



Market Context



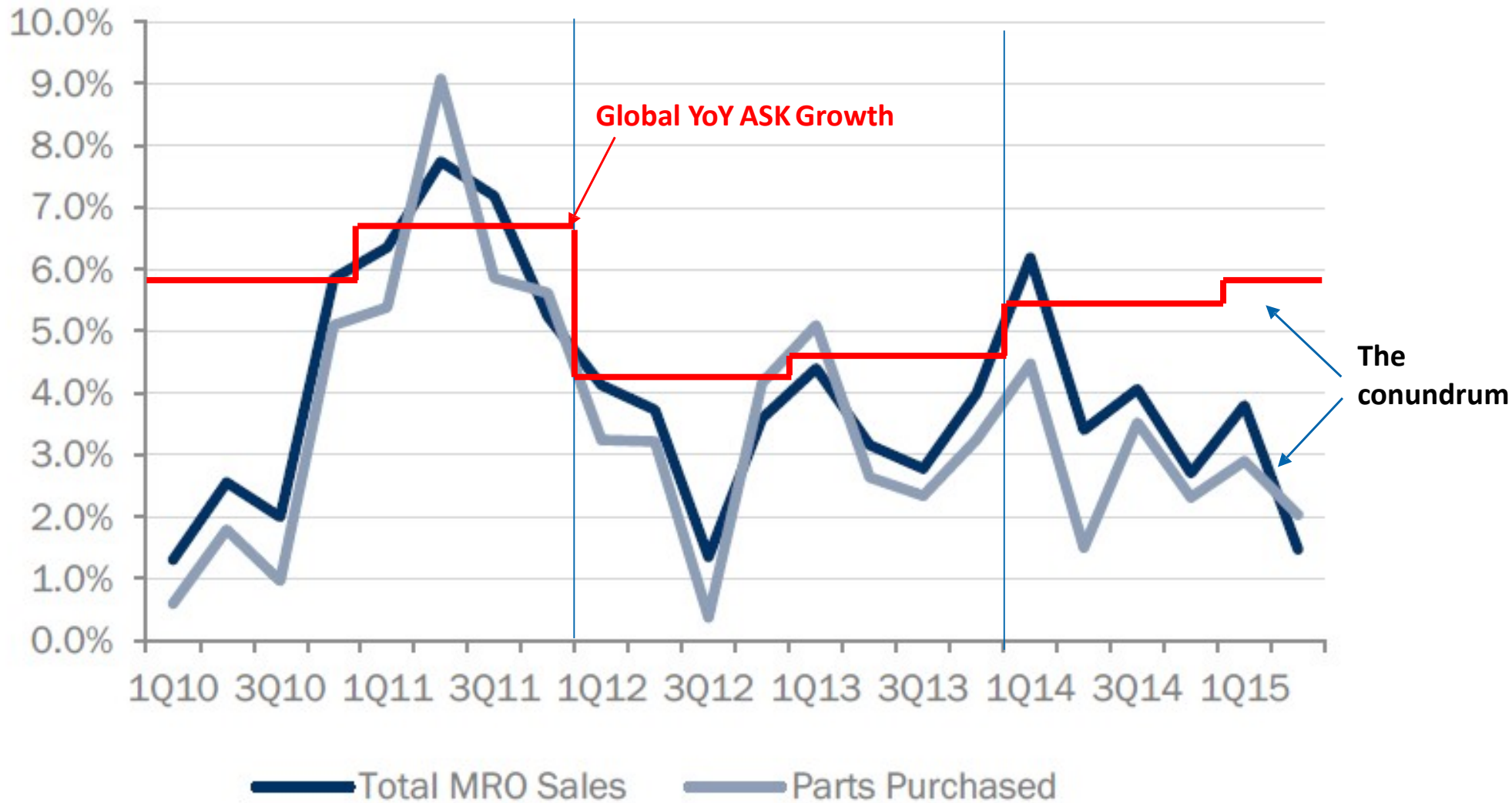
MRO Forecast & The Battlegrounds

What's Happened To MRO?

WHAT HAPPENED TO AFTERMARKET DEMAND?

MRO demand growth is considerably lower than global capacity growth...

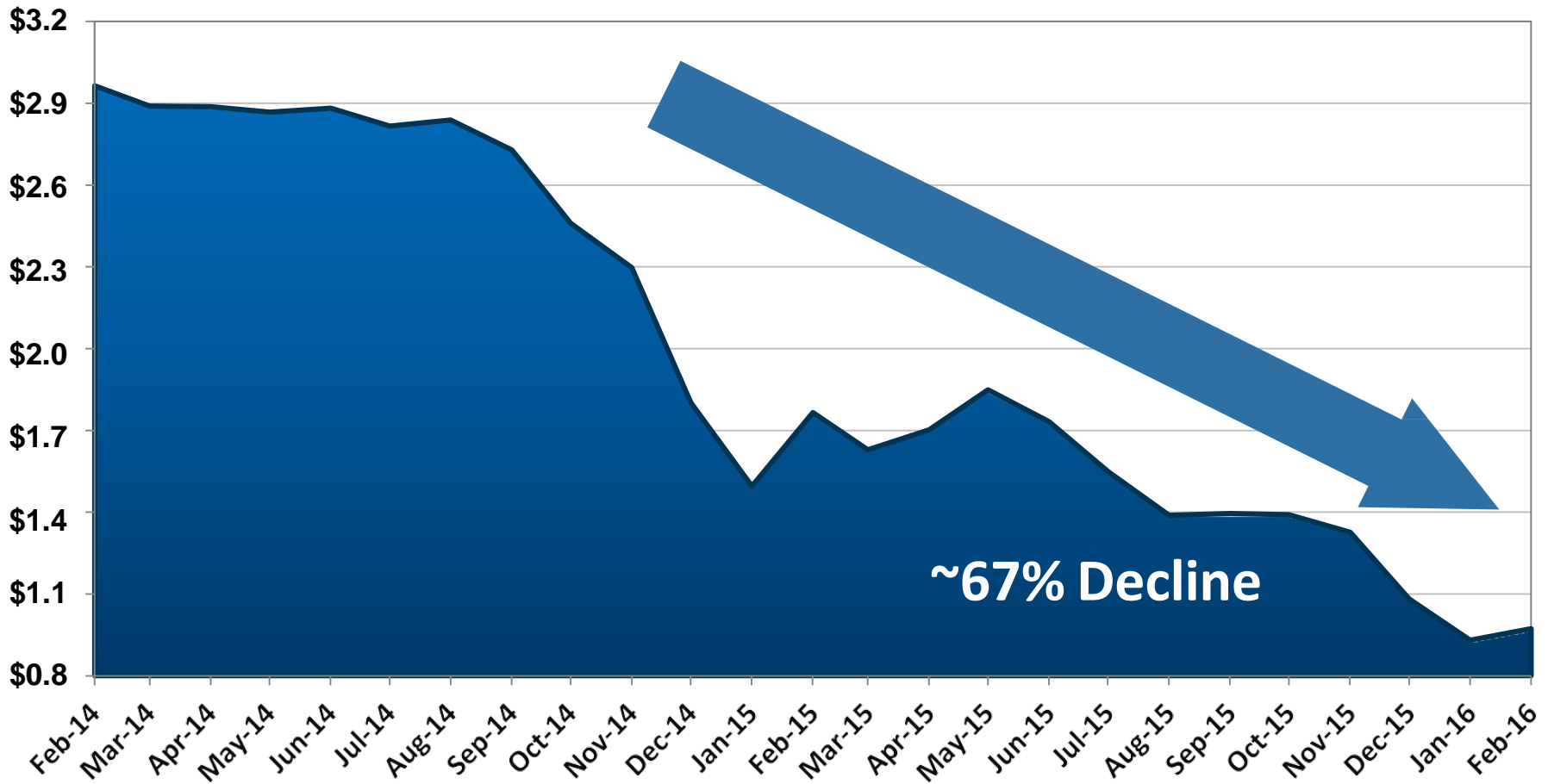
MRO Demand Growth vs Global Capacity (ASK) Growth



Sources Canacord Genuity, ICAO

...And airlines are enjoying lower fuel prices

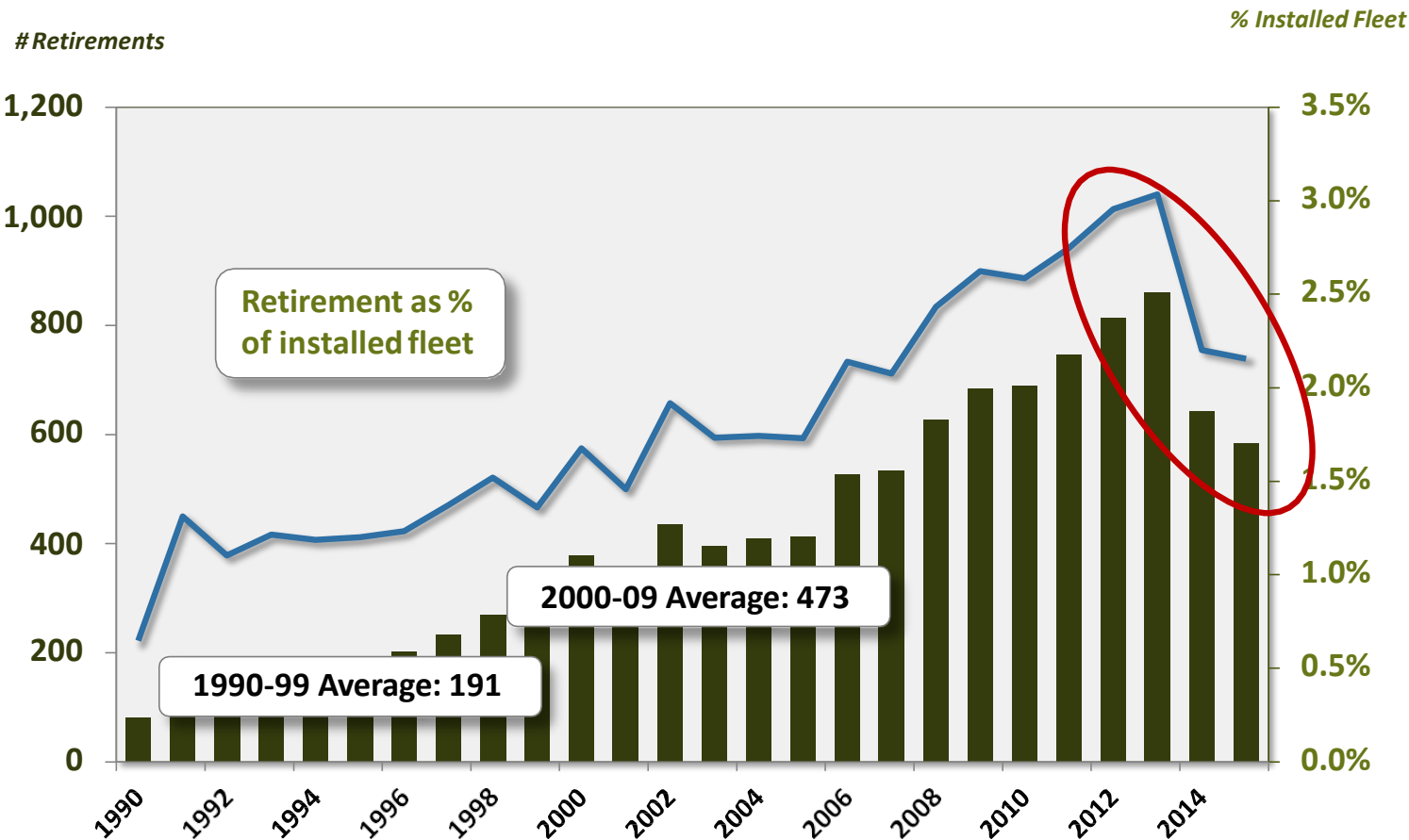
U.S. Gulf Coast Jet Fuel Price per Gallon



Continued lower fuel prices may encourage airlines to keep older in service for longer... as has already started to happen

Potential Impact:

- Airline capacity increases
- Reduced part-out feed stock for surplus market
- Increase in airframe and engine MRO spend on older airframes
- Less pressure OEM new parts sales
- Higher used part values / pricing

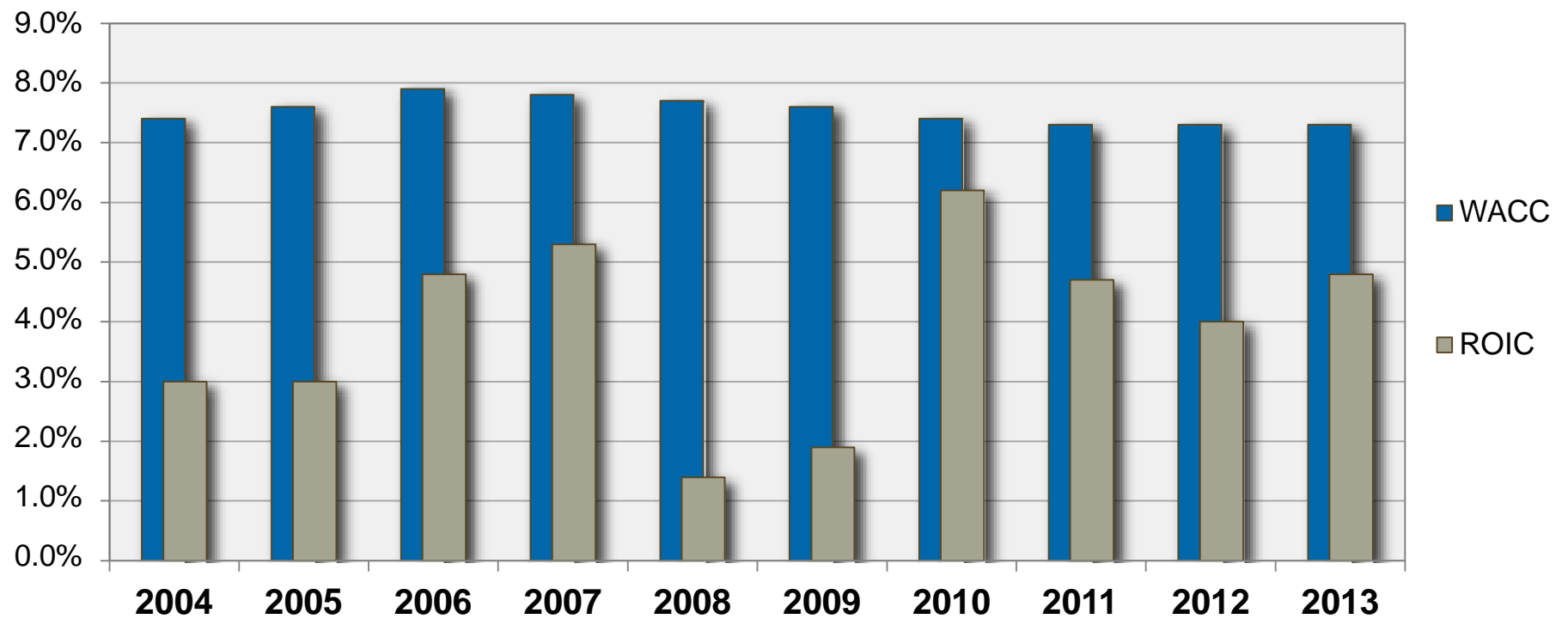


ICF believes that four major trends are behind the aftermarket shortfall



Historically, airlines have not generated investor returns, and some airlines are intent to improve this...

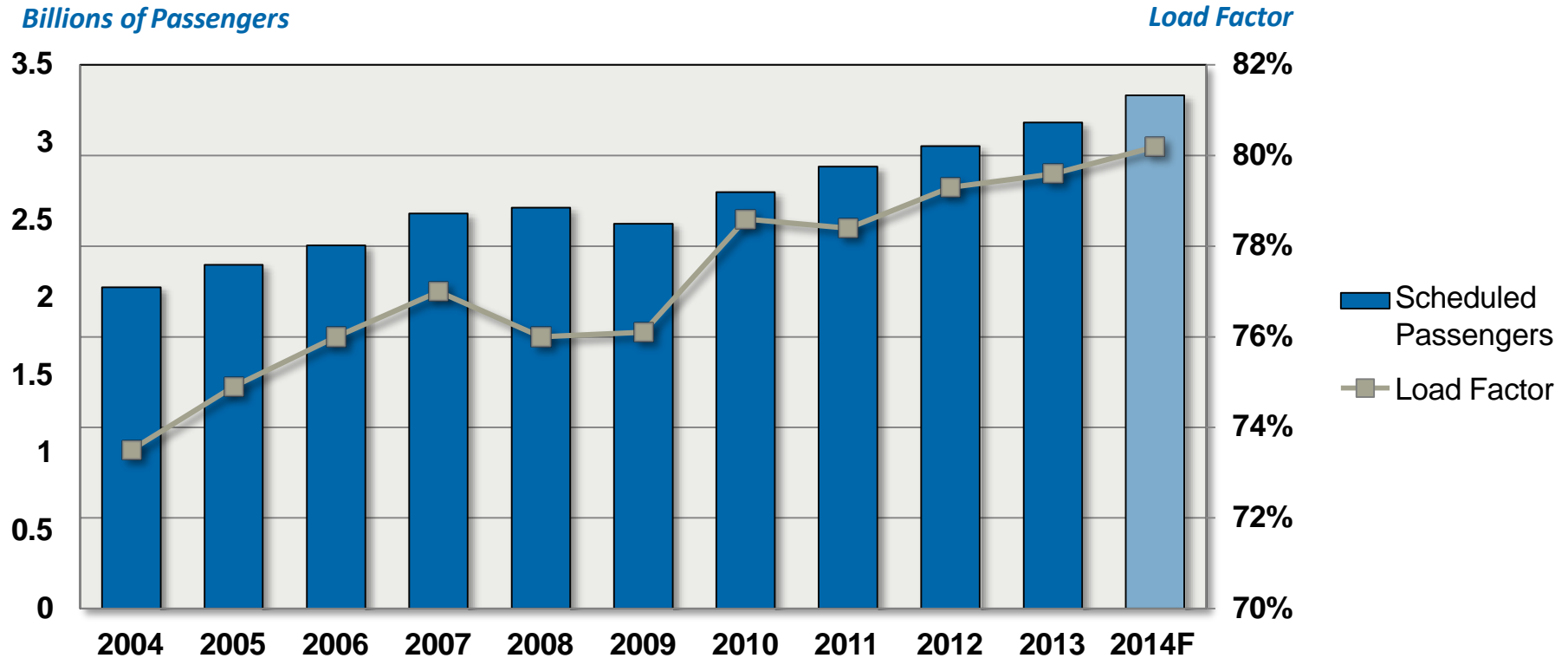
2004-2013 Global Airline ROIC vs. WACC



Source: McKinsey / IATA

...and for these airlines, capacity management and asset utilization are replacing market share as key metrics

2004-2014 Global Airline Scheduled Passengers



The airlines have historically been run by operationally-minded people, who tended to throw planes onto routes in a fight for market share. The name of the game is now capacity management, and the decision makers are the finance people.

Derek Kerr, CFO, American Airlines

Source: ICF Research / IATA

WHAT HAPPENED TO AFTERMARKET DEMAND?

Delta Airlines is at the vanguard of this sea-change in airline management philosophy...



It's been about changing the mindset and the approach to the industry, and really treating the airline industry like any other industrial business. For that reason, we target 15% ROIC just like other high-quality industrial transports.

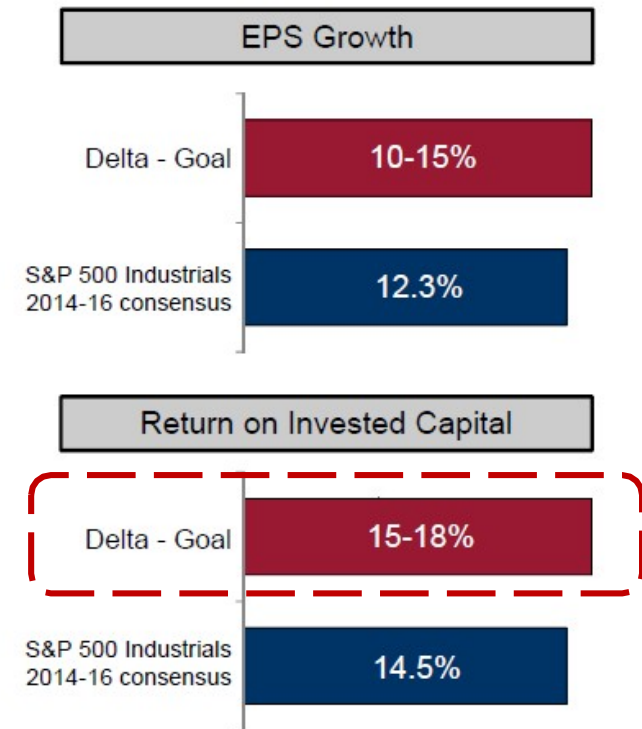
Richard Anderson, CEO, Delta Airlines

A High-Quality Company

Strong progress toward our long-term goals of generating solid margins and cash flow, an investment grade balance sheet and sustainable shareholder returns

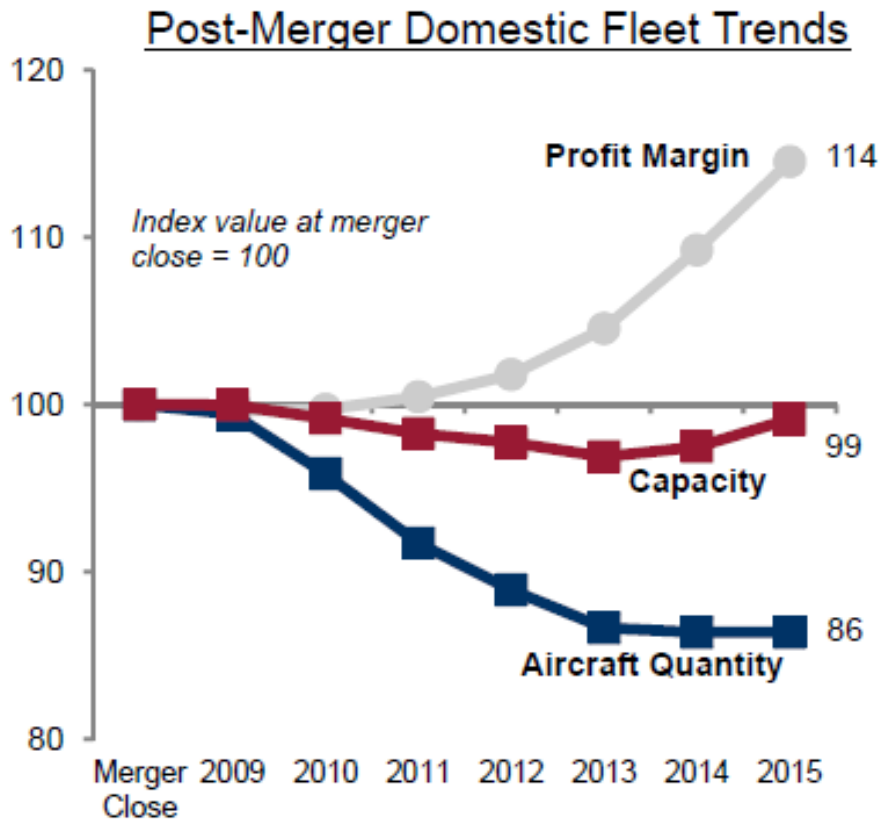
Long-Term Goals	
Operating Margin	<ul style="list-style-type: none"> • 11-14% operating margins • 2014: 13%
EPS Growth	<ul style="list-style-type: none"> • Annual EPS growth of 10%-15% after 2014 • 2014: 70% on pre-tax basis
ROIC	<ul style="list-style-type: none"> • 15-18% return on invested capital • 2014: 20%
Cash Flow	<ul style="list-style-type: none"> • \$6 billion annual operating cash flow and \$3 billion free cash flow • 2014: \$6 billion operating cash flow and \$3 billion+ free cash flow
Balance Sheet	<ul style="list-style-type: none"> • \$5 billion adjusted net debt by 2016 and pension at 80% funded status by 2020 • 2014: \$7.2 billion adj. net debt at year-end

Note: All results exclude special items; Delta ROIC reflects benefits of net operating losses



WHAT HAPPENED TO AFTERMARKET DEMAND?

Delta's approach to up-gauging results in the same capacity with 14% fewer aircraft...



- 2015 domestic capacity growth driven by higher gauge and better asset utilization
 - 3% higher capacity on flat departures and 11 fewer aircraft
- Increasing average seats per departure by 15% between 2012 and 2017:
 - Upgauging: Using 717, 737-900, and A321 deliveries to retire smaller gauge, less efficient aircraft
 - Modifications: Projects on over 110 aircraft in 2015, adding an average of nine seats per plane; over 450 aircraft have already been modified since 2007
- More efficient capacity generation drives margin expansion, cost productivity and better returns on invested capital
- Mix of new and used aircraft keeps ownership costs low, allows flexibility to quickly and efficiently adjust capacity levels
- Lowest ownership cost in the industry with lowest maintenance unit costs and best reliability

Source: Delta Airlines

WHAT HAPPENED TO AFTERMARKET DEMAND?

...Delta's philosophy results in reduce maintenance expenditures with OEM purchases as a last resort



Aircraft impacted

- MD80
- 767s
- 757s
- 747-400s

- Delta has a group dedicated to parting out aircraft and has purchased aircraft from other operators to cannibalize (e.g. SAS MD80s)
- Actively cannibalizes its own retired aircraft
- Recent repair volume fell by 20% partly through use of USM
- Leverages its internal engineering capability to develop DER repairs and modified repair scopes (e.g. hard time → on condition)
- Buys from OEMs only as last resort

"Opportunities to acquire older airplanes and harvest them for parts has provided significant savings for us going forward in terms of a lower-cost basis for the overhauls that we have"

Paul Jacobson, Delta CFO, Delta Airlines

"Historically in this industry, management teams became infatuated with new airplanes. Instead, we look at airplanes not as emotional decisions but as investment decisions. Each asset has to have a return on capital"

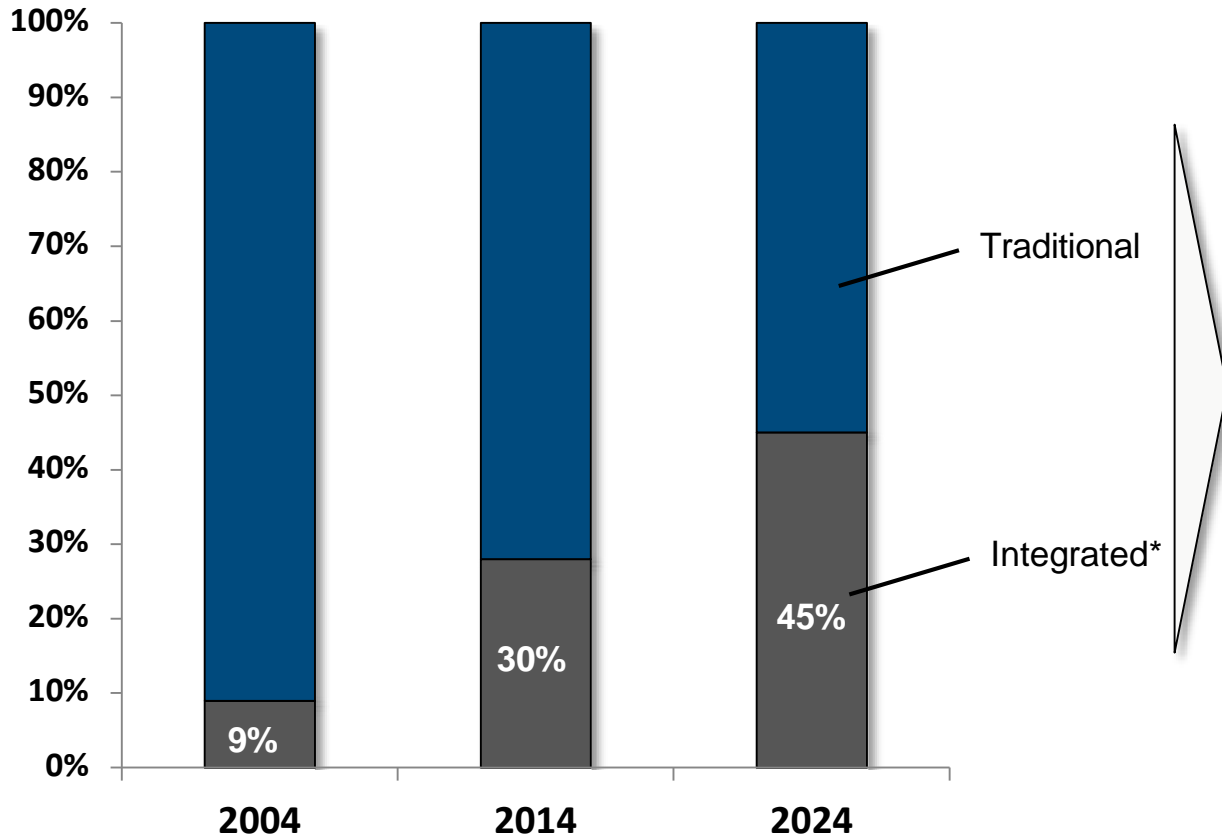
Richard Anderson, CEO, Delta Airlines



Source: ICF International

The share of integrated programs in component support is increasing, which is limiting initial provisioning sales

Component Support Buying Behaviour



Integrated Component Programs Penetration

777	787/A350
~20%	55%-70%

Growth Drivers

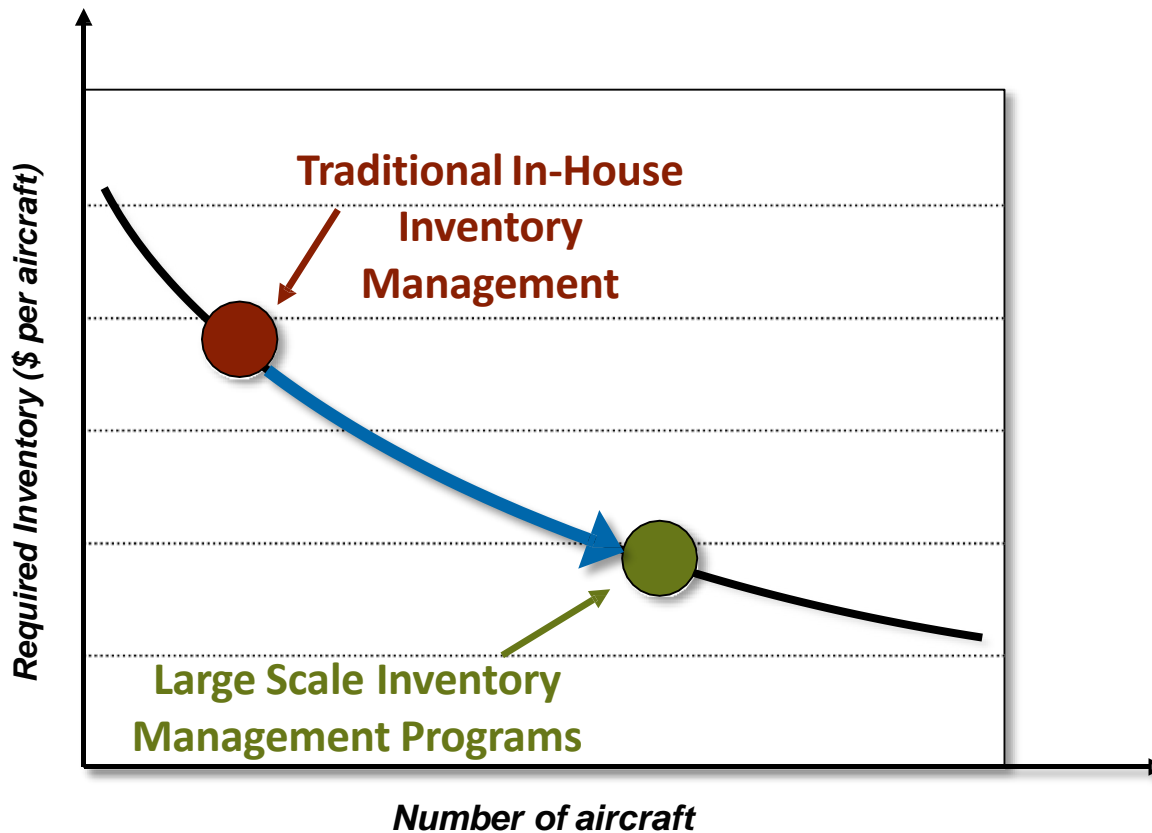
- *Small fleet size*
- *Perceived technology risk*
- *Improved ROIC*
- *Maintenance no longer core activity*
- *Predictable outgoings*
- *Attractive value propositions*
- *Lower investment, less infrastructure*

**Control of assets enables aftermarket players to support integrated programs more effectively:
The more inventory held by a supplier, the lower the inventory cost per aircraft supported**

Source: ICF International

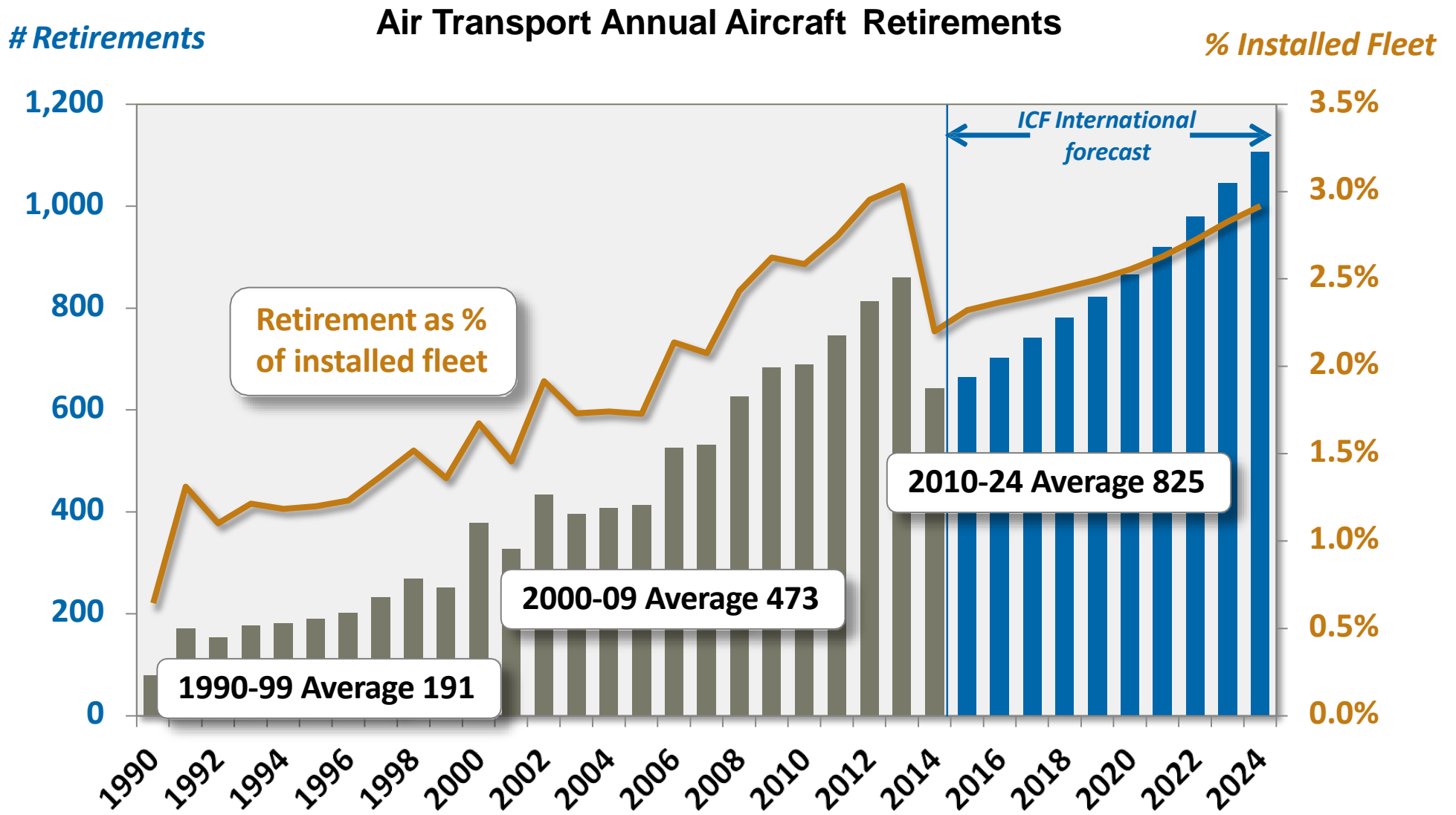
Pooling results in greater asset productivity...and less demand for initial provisioning

Notional Inventory Holding Curve



- The "start-up" inventory for the first aircraft is very high.
- When more aircraft are added to fleet, the start-up inventory is spread on more aircraft, and the required investment per aircraft is reduced.
- The scale effect flattens out when the pool reaches critical size.
- Inventory management firms with sufficient size and fleet size can take advantage of their scale and effectively move an operator down the inventory holding curve

The availability of used and serviceable material (USM) has grown with aircraft retirements in recent years...



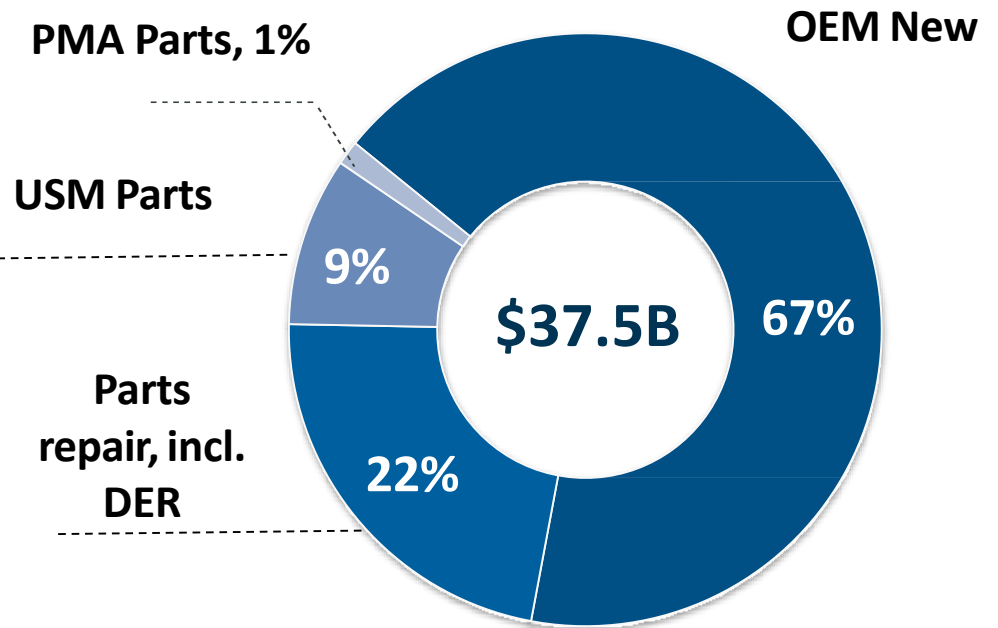
Includes Turboprops
 Source: FlightGlobal ACAS June 2015, Airline Monitor, ICF International Analysis

WHAT HAPPENED TO AFTERMARKET DEMAND?

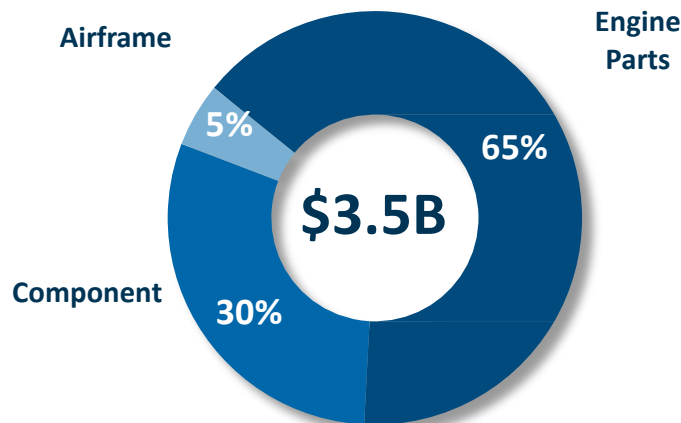
Total commercial aircraft material related spend is estimated to be \$37.5B with OEM new parts accounting for about two-thirds

- Alternative (to OEM new) parts choices today account for one-third of total material spend
- USM parts market is \$3.5B – and nine times greater than PMA
- Parts repair, including DER, is even higher

Air Transport MRO Material Related Spend



*Air Transport Surplus Parts Market**



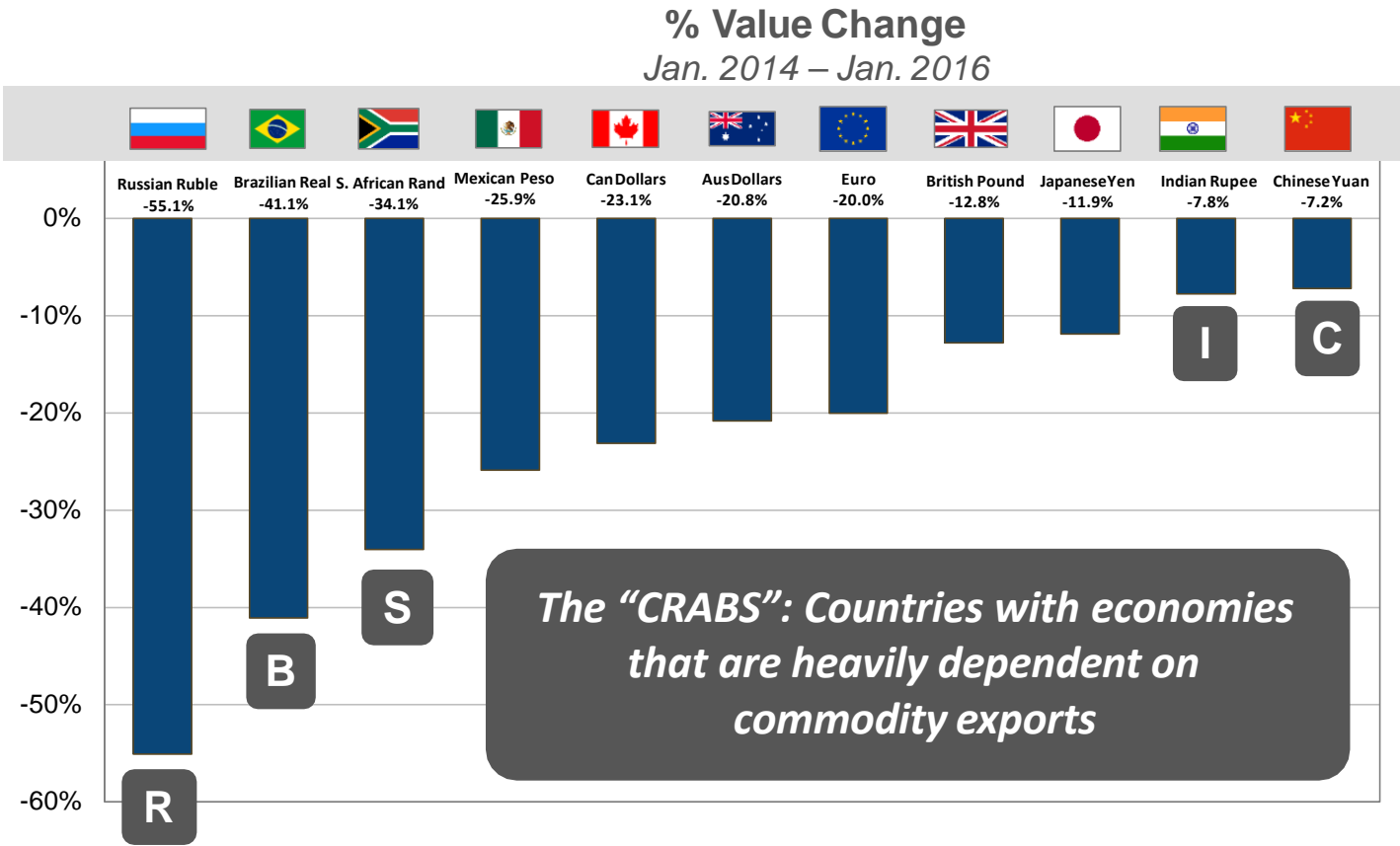
Over 80% of airlines have an active surplus parts strategy (up from 71% in 2013) according to Oliver Wyman

Total parts demand consists of OEM New + USM parts + PMA: Repair activity is outside this parts demand.
Source: ICF analysis

WHAT HAPPENED TO AFTERMARKET DEMAND?

Finally, the dramatic strengthening of the USD is weakening aftermarket results from some regions

Exchange Rates: January 2014 - present



- The USD has strengthened 20-35% since January for important currencies
- MRO material is typically priced in USD, thereby increasing input costs considerably to non-US MROs
- Anecdotal evidence suggests that MRO expenditures dropped in regions with large shifts in exchange rates

Source: Source: Oanda historical exchange rates, ICF International Analysis

ICF is one of the world's largest and most experienced aviation and aerospace consulting firms



Airports • Airlines • Aerospace & MRO • Asset Advisory

- **51 years in business (founded 1963)**
- **100+ professional staff**
 - Dedicated exclusively to aviation and aerospace
 - Blend of consulting professionals and experienced aviation executives
- **Specialized, focused expertise and proprietary knowledge**
- **Broad functional capabilities**
- **More than 10,000 private sector and public sector assignments**
- **Backed by parent company ICF International (\$937M 2013 revenue)**
- **Global presence — offices around the world**

New York • Boston • Ann Arbor • London • Singapore • Beijing • Hong Kong

SH&E
an ICF International Company
joined ICF in 2007

AeroStrategy
Management Consulting
joined ICF in 2011

GHK
joined ICF in 2012



Thank you!

For questions regarding this presentation, please contact:

Richard Brown
Principal
Aerospace & MRO Advisory

+44 (0)7718 893 833
richard.brown@icfi.com

icfi.com/aviation

