

Presented by:

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Airline Engineering & Maintenance: North America ***MRO Forecast & Trends***

September 16, 2015 – Chicago, USA



Today's Agenda:



MRO Forecast



Meet the Frackers!



The *not-so-mighty-mighty* BRIC House



May 2010–May 2014



founded 2001,
joined ICF in 2011



founded 1963,
joined ICF in 2007



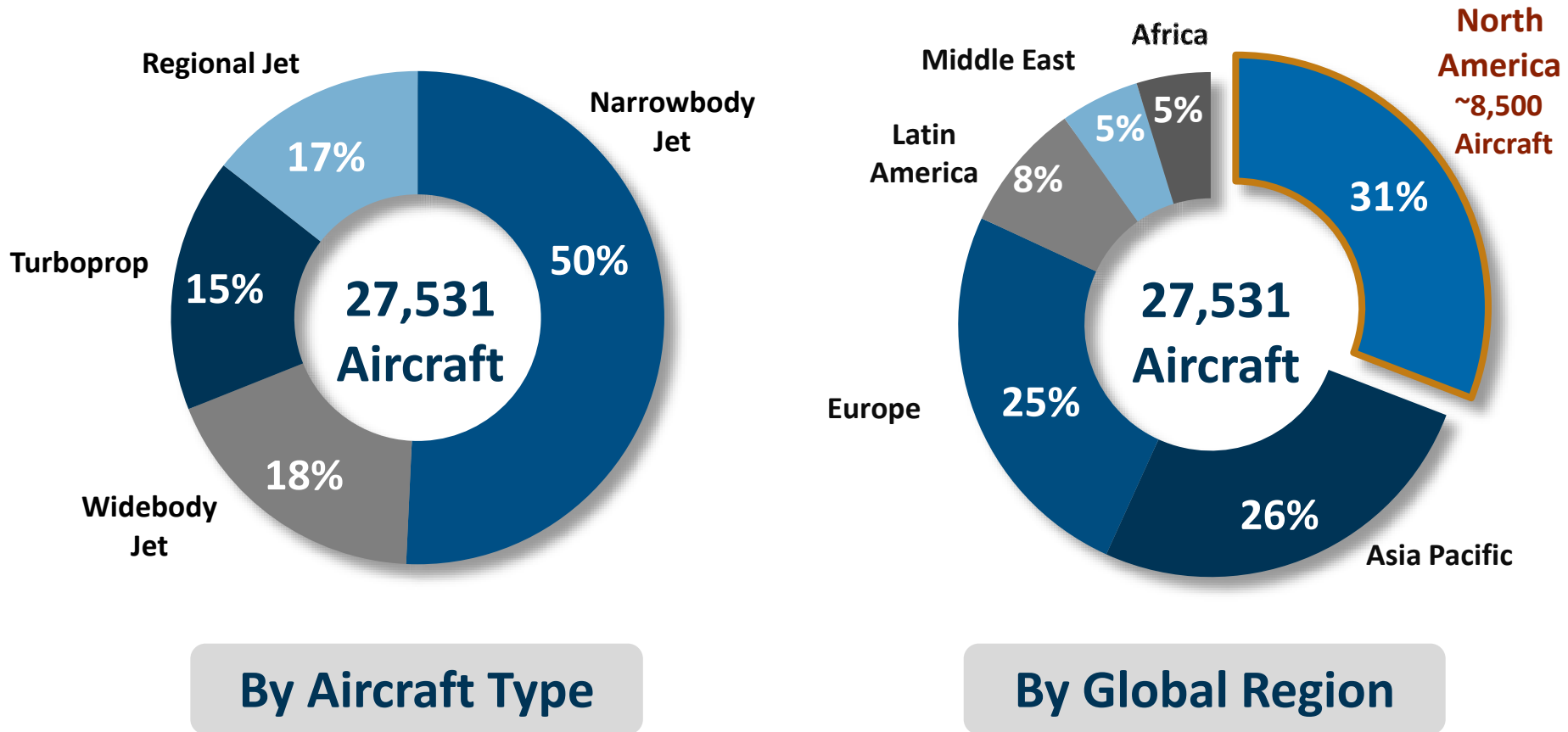
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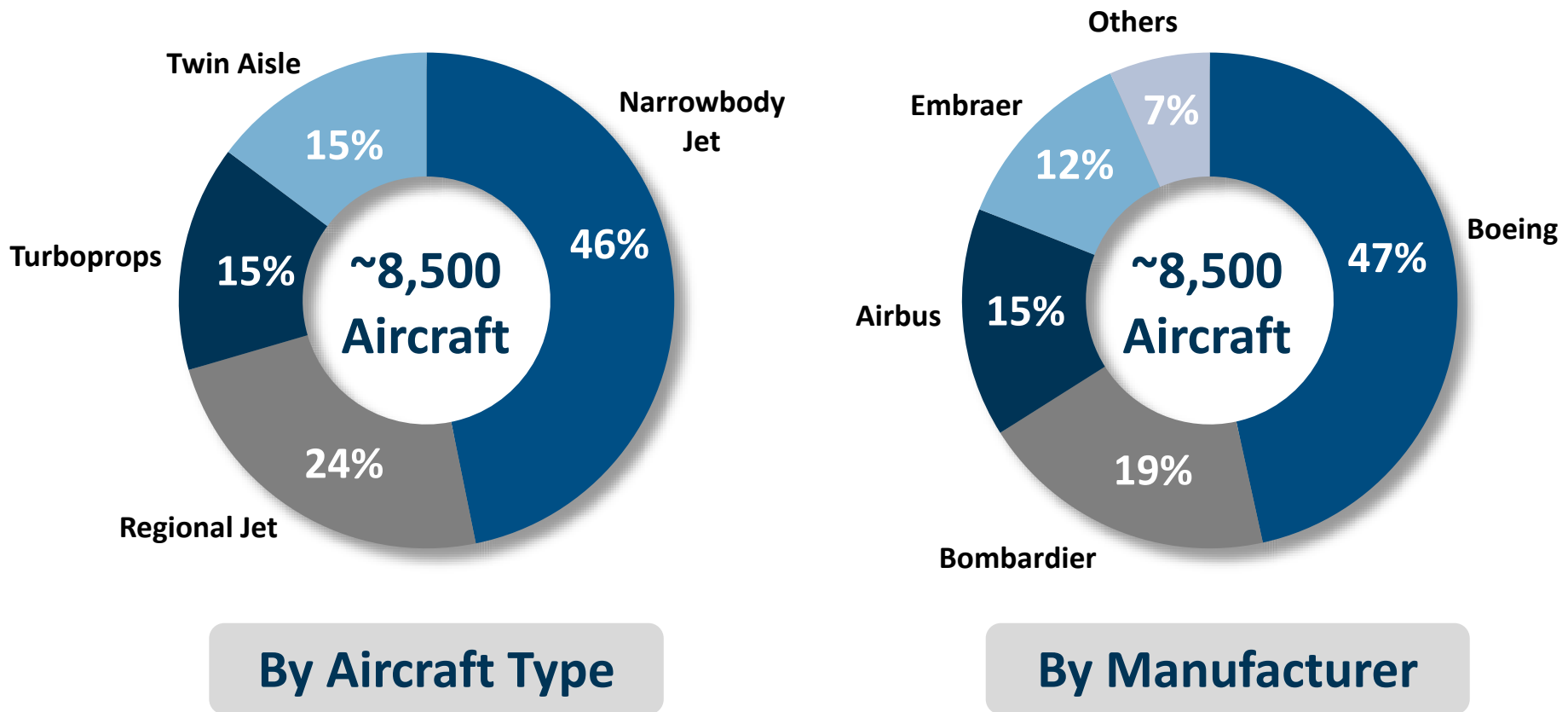
The current civil air transport fleet consists of over 27K aircraft

2014 Global Air Transport Fleet



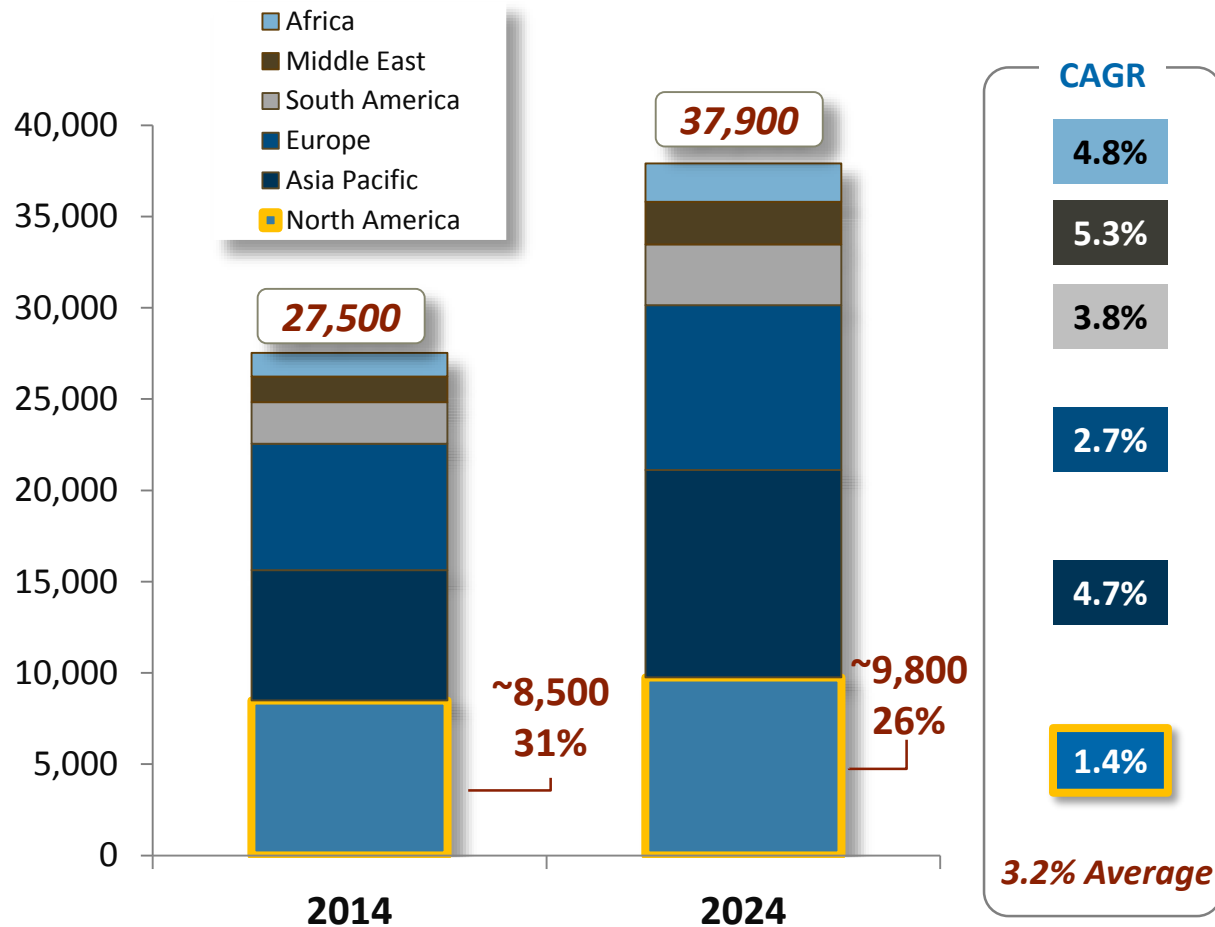
Narrowbody Jets account for 45% of the N. American Air Transport fleet; Boeing is the dominate OEM with 47% of the installed fleet

2014 North American Air Transport Fleet



The North American fleet will have limited growth over the next decade and the slowest growth globally – 1.4% CAGR; +1,300 aircraft

Air Transport Fleet Growth 2014–2024

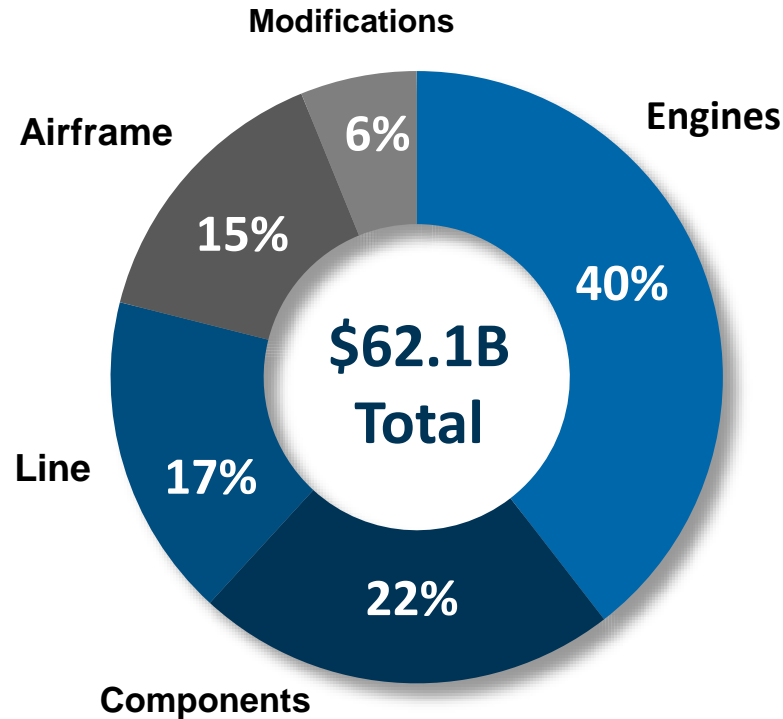


ICF Insight

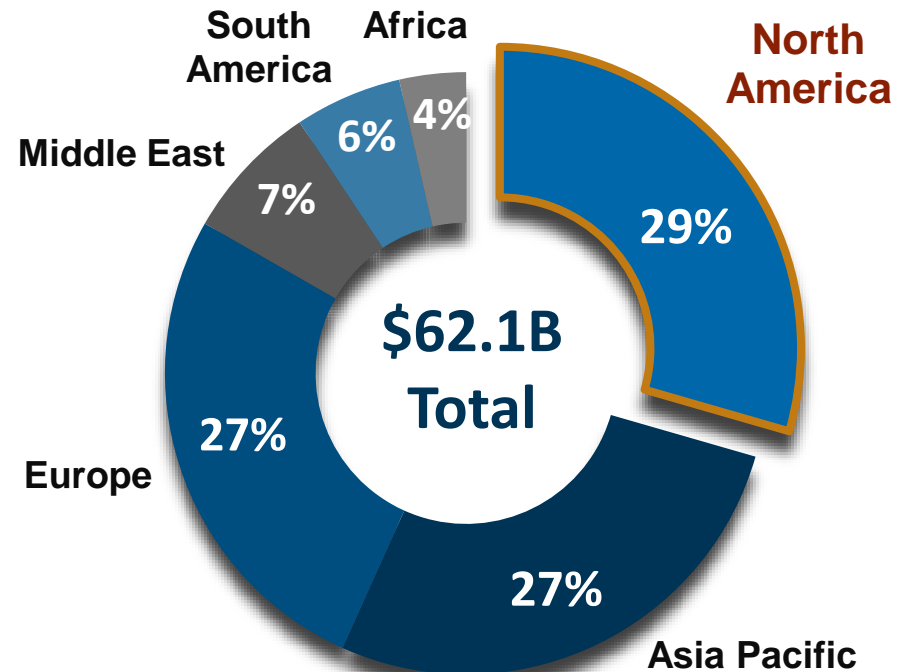
- Air travel growth of ~3.8%
- Fuel costs in \$80/bbl range
- ~19,000 aircraft deliveries
- ~8,600 aircraft retirements

The current air transport MRO market is **\$62.1B**; North America accounts for ~29% of global demand (~\$18.3B)

2014 Global MRO Demand



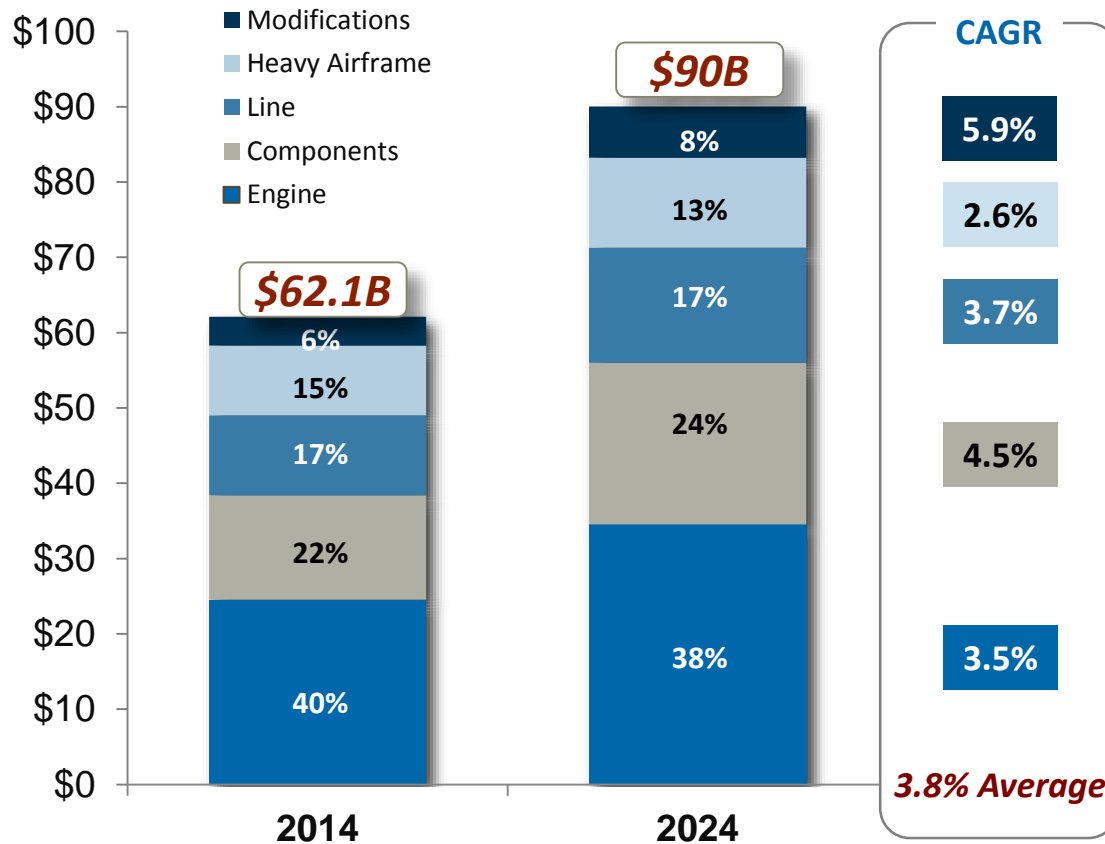
By MRO Segment



By Region

The global MRO market is expected to grow to **\$90B by 2024**, at **3.8% per annum**

Global MRO Spend 2014–2024 (\$B)

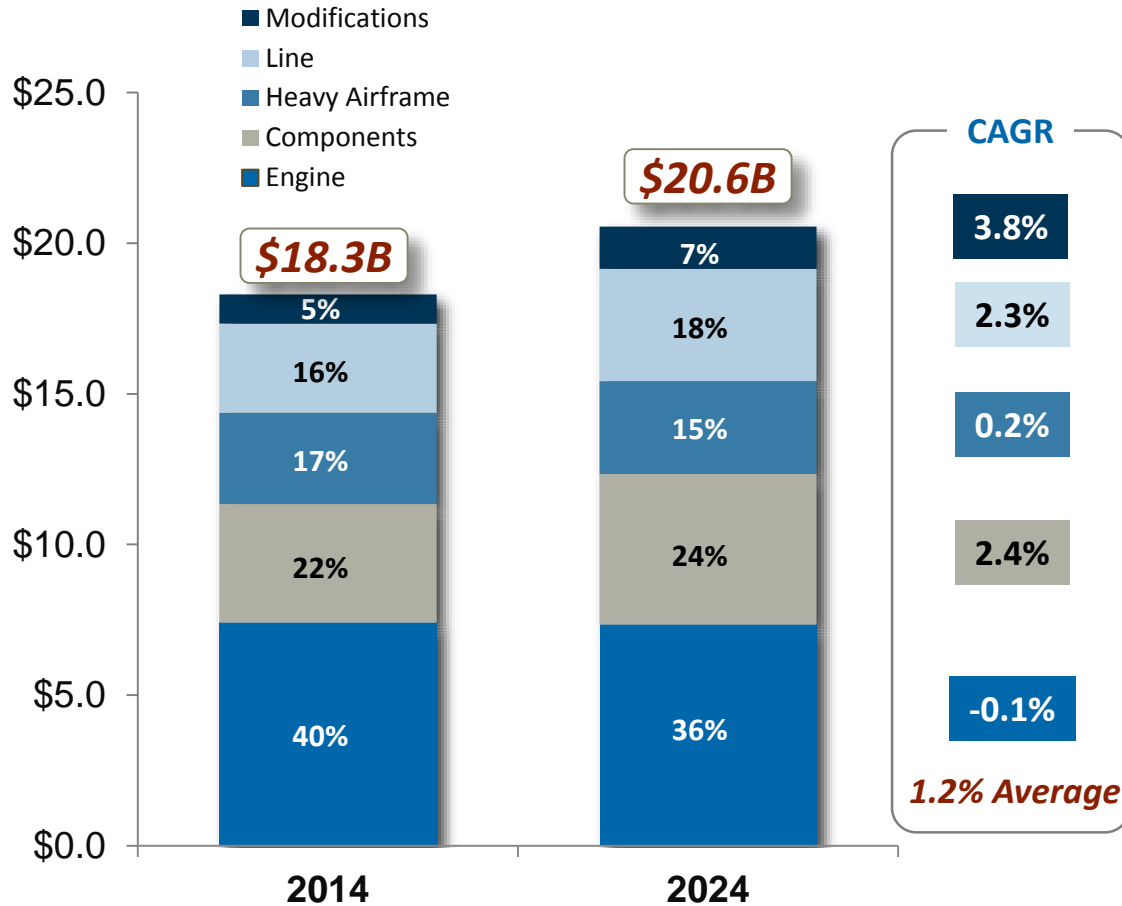


ICF Insight

- Average growth is forecast to be **3.8% CAGR**
- The strongest drivers of growth are the **engine** and **component** markets
- **Reduced labor intensity** of airframe heavy checks as the fleet renews and increased intervals...offset in emerging markets by increasing labor rates
- **Aircraft upgrades** (e.g. interiors, winglets) drive high modifications growth

The North American MRO market is expected to grow to **\$20.6B** by 2024, at 1.2% per annum

North America MRO Spend 2014–2024 (\$B)



ICF Insight

- North American MRO spend growth will be driven by component maintenance
- While the Engine MRO spend is not expected to grow over the next decade, Engine MRO will remain the largest maintenance segment in 2024
- Modification spend will grow at 3 times the rate of the overall North American MRO market (3.8% CAGR vs. 1.2%)



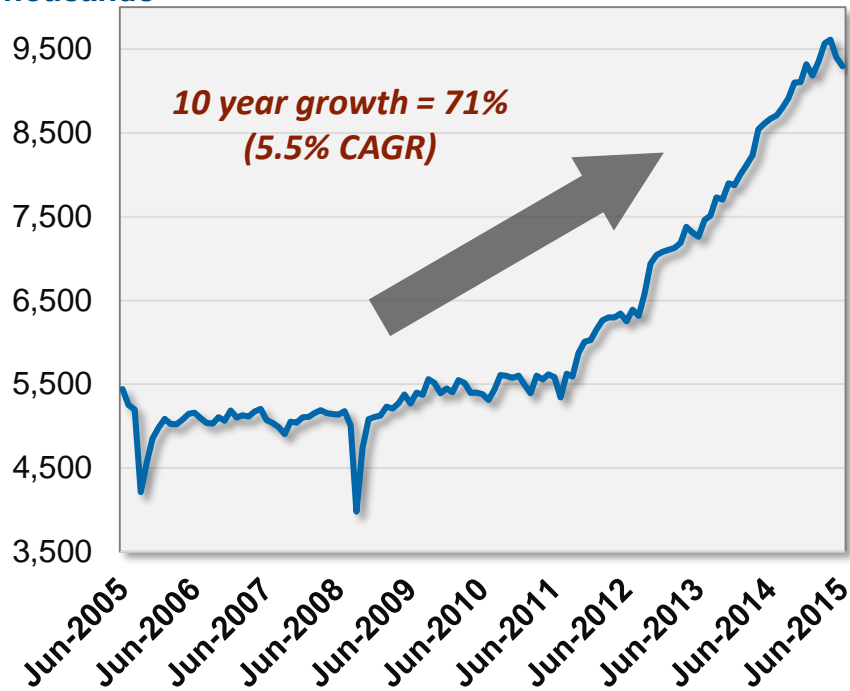
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U.S. crude oil and natural gas production *have soared* in recent years...

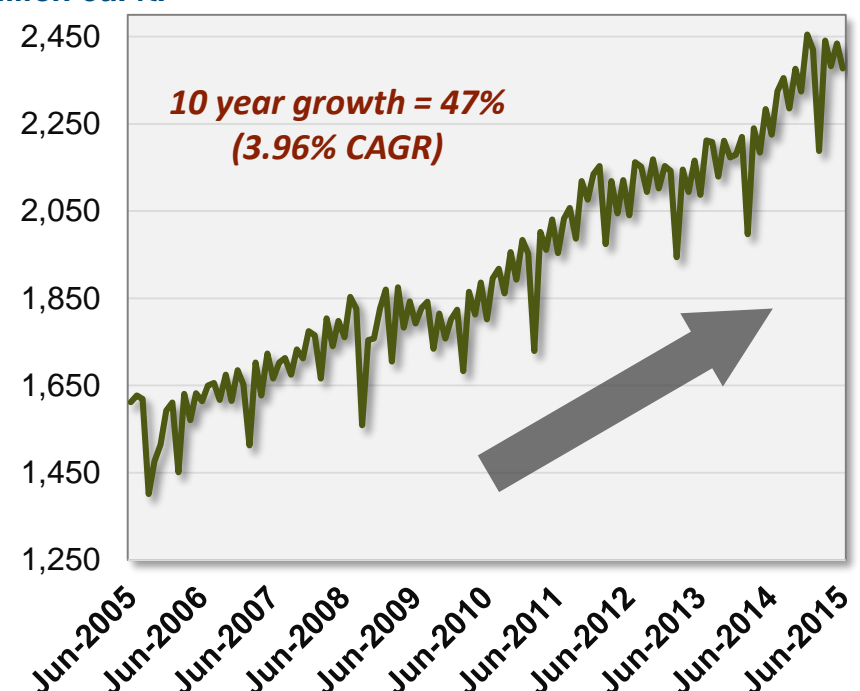
U.S. Crude Oil Production
(Barrels / day)

Thousands



U.S. Natural Gas Production
(Monthly marketed production)

Billion cu. ft.

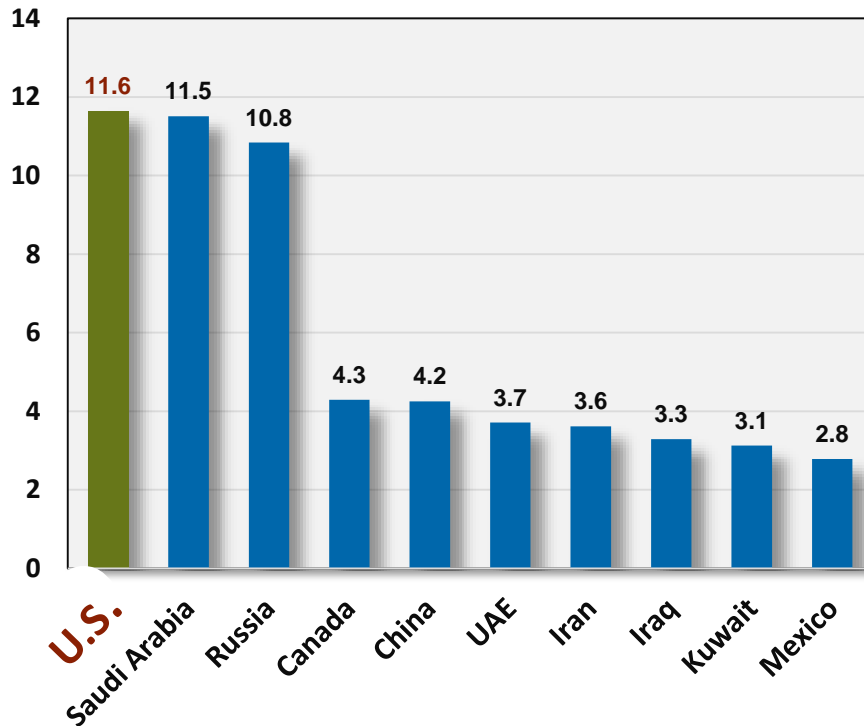


Breakthrough technologies in horizontal drilling and hydraulic fracturing (aka fracking) resulted in a US-led energy revolution

...making the U.S. a global powerhouse in energy production

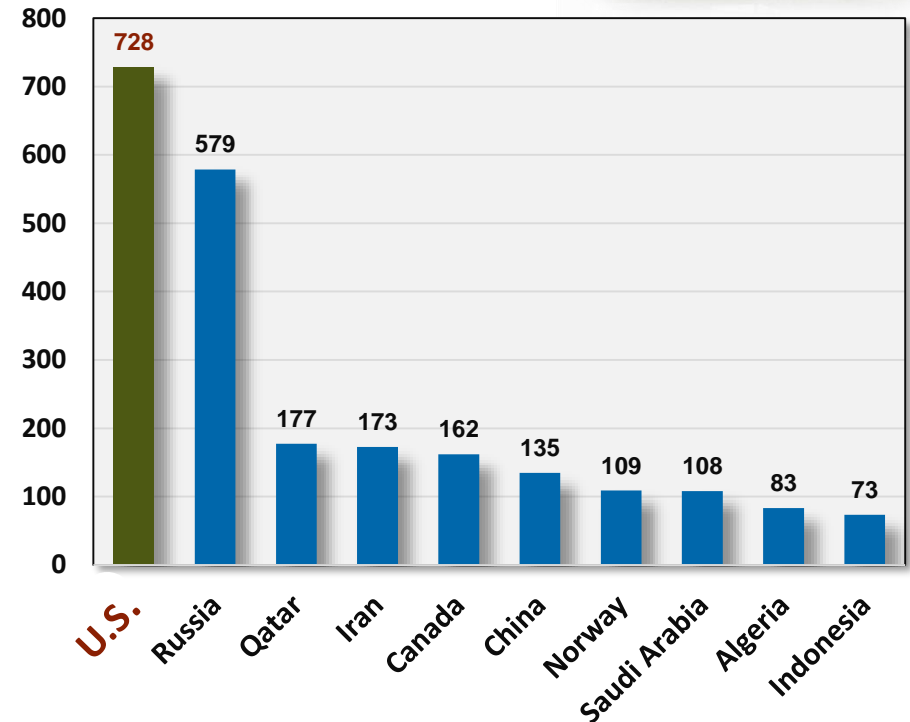
Global Oil Production

(Million Barrels per Day as of June 2015)



Global Natural Gas Production

(Billions of Cubic Meters as of June 2015)

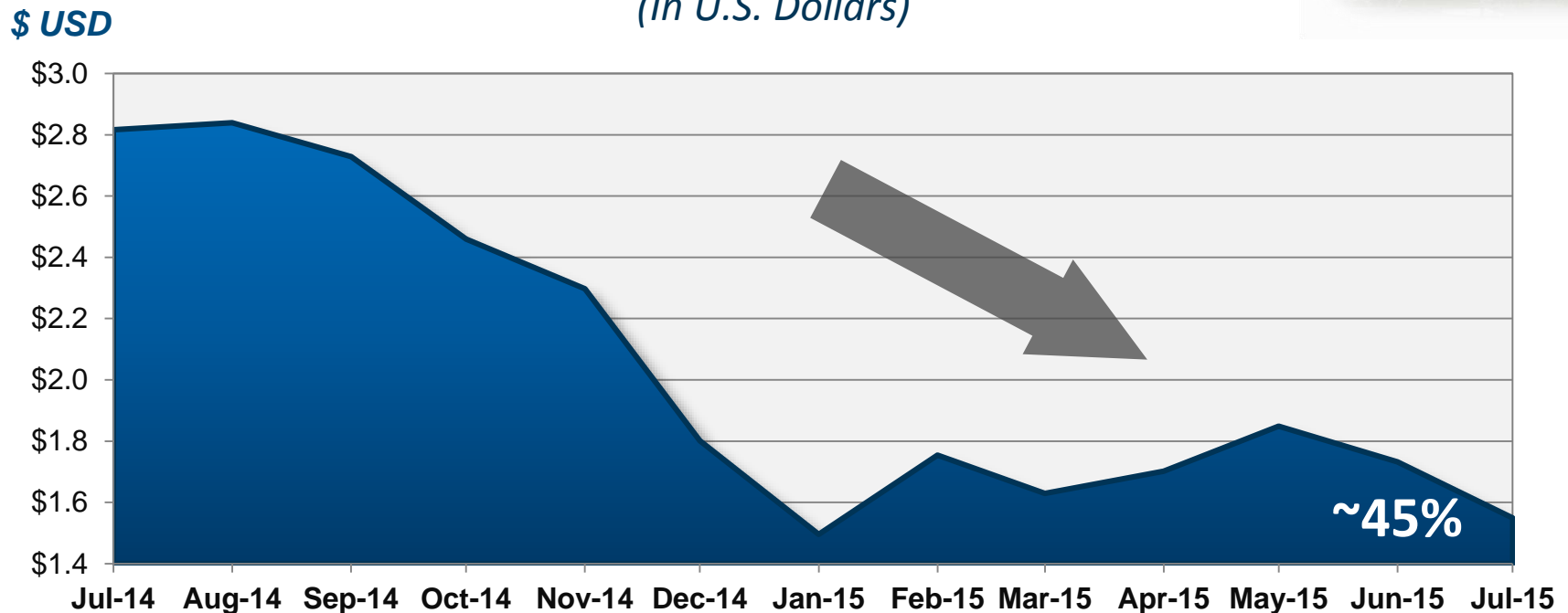


The US energy revolution has disrupted the global economic and geopolitical balance of power

Aviation fuel costs have *dropped* over 45% during the past 12 months

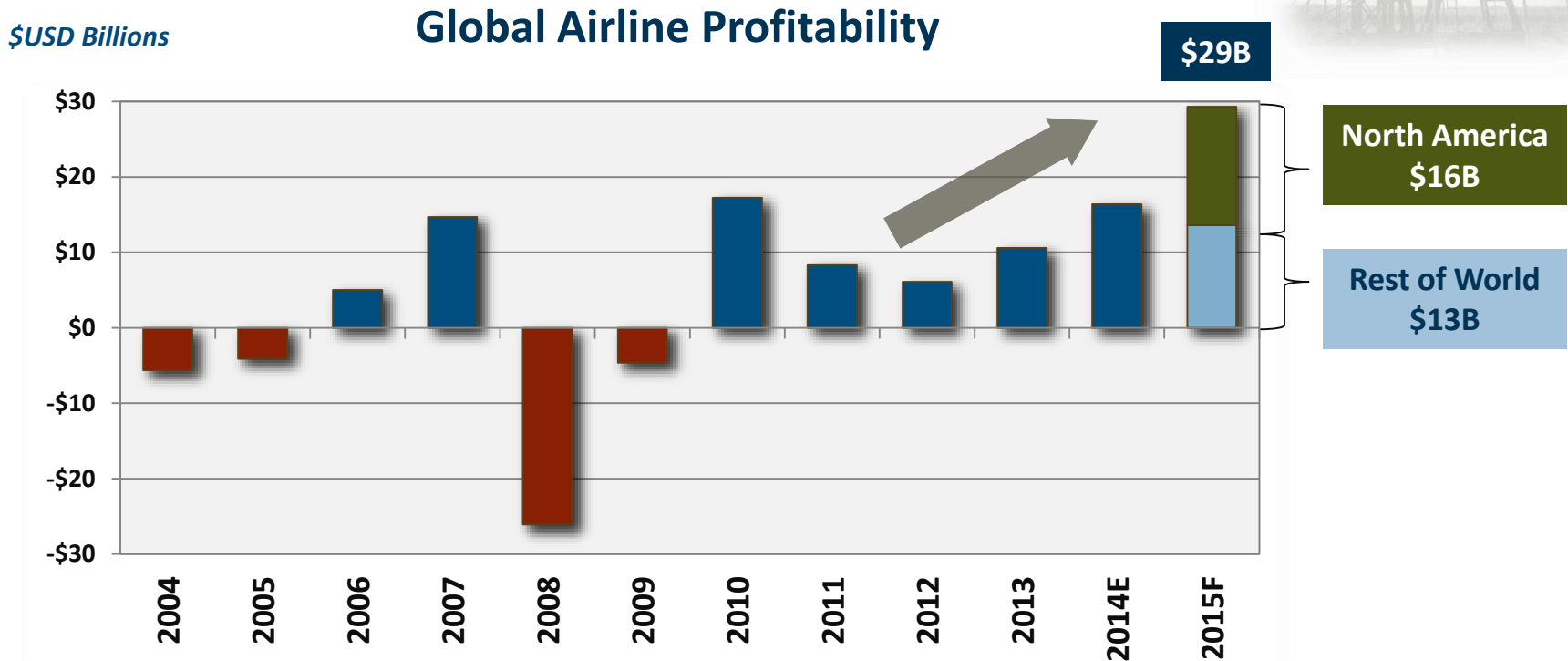


U.S. Gulf Coast Jet Fuel Price per Gallon
(In U.S. Dollars)



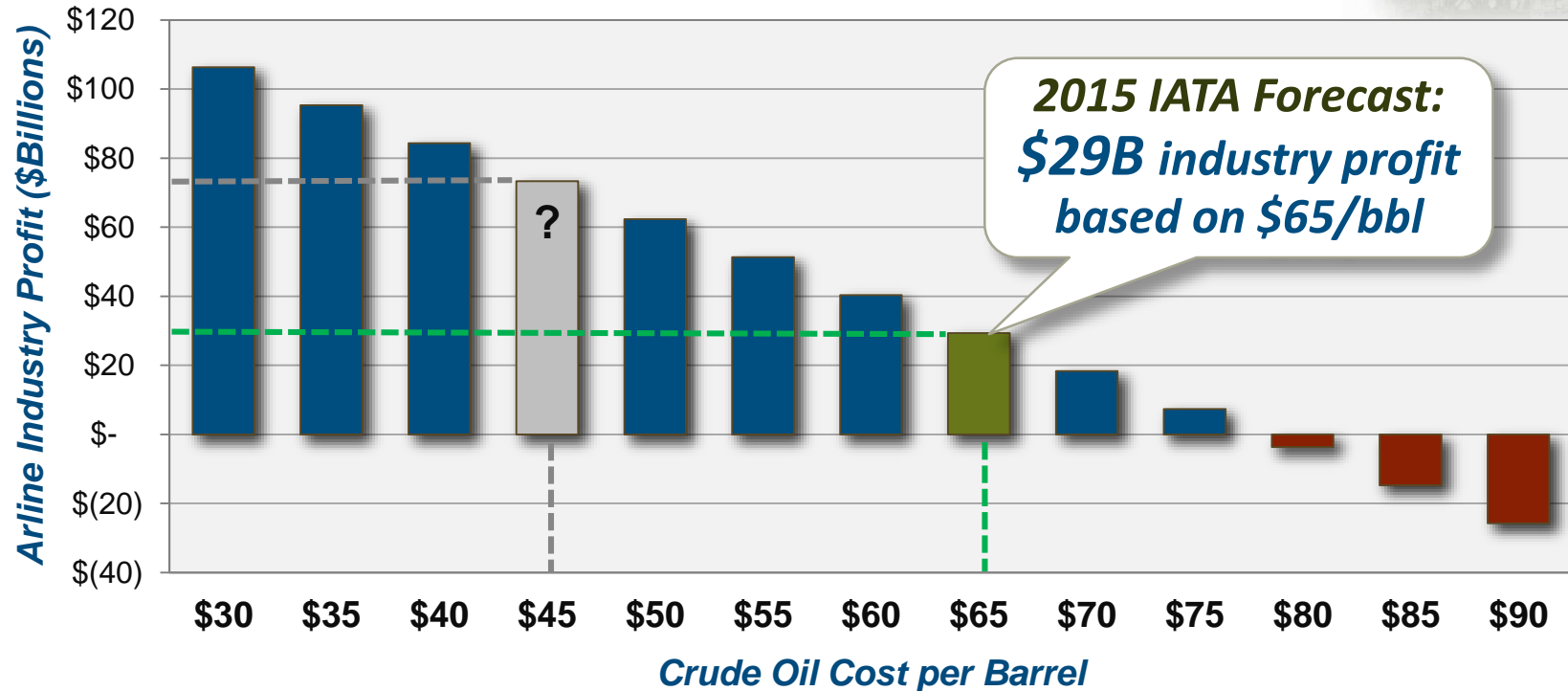
Should these low fuel costs continue, there will be repercussions throughout the aviation & MRO supply chain

With up to 40% of an airline's operating costs driven by fuel, the airline industry has *successfully returned to profitability*



However, recent airline profit windfalls are not a global phenomena; more than half the profits are enjoyed by North American Carriers

Current industry forecasts are based on \$65/bbl – given today's price, *tremendous short-term upside exists...*

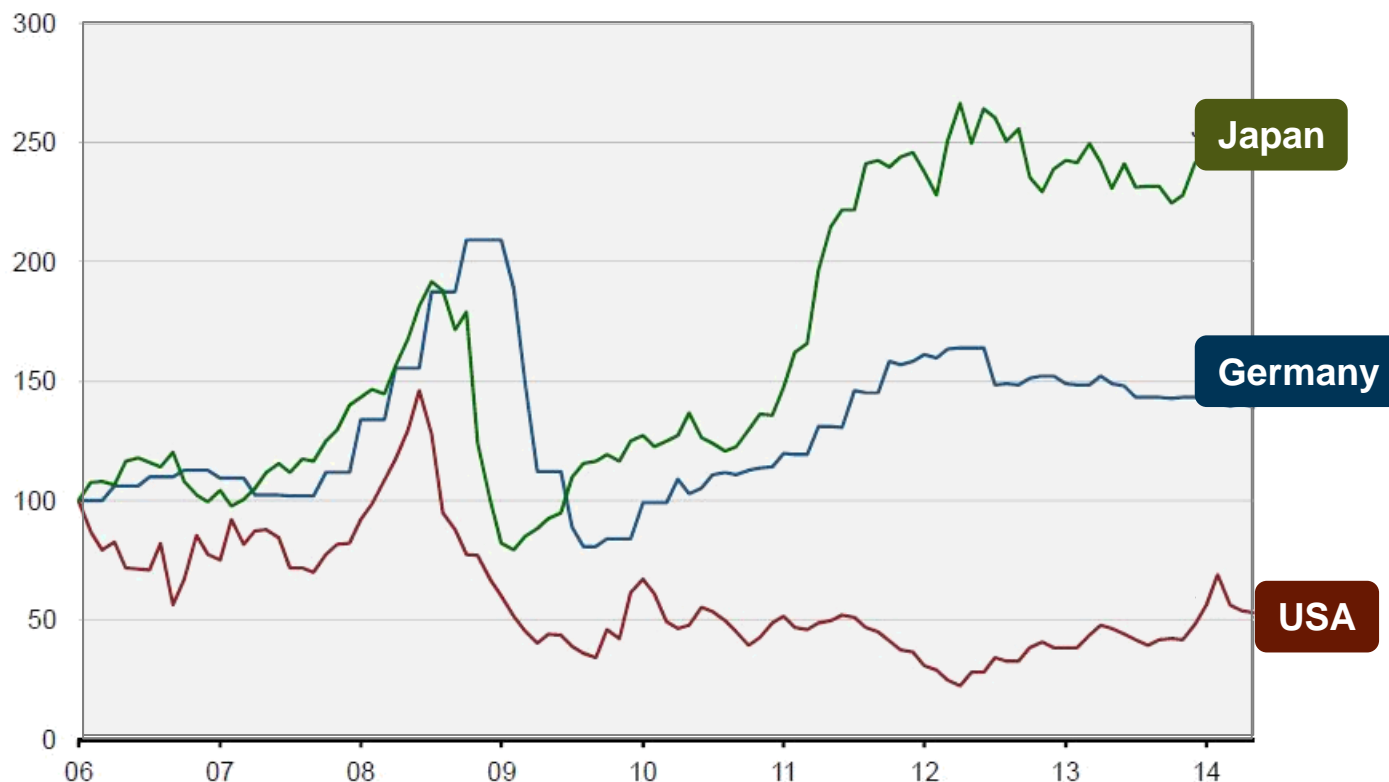


Caution: Low fuel costs may lead to increased capacity and new market entrantsultimately eroding hard fought profitability...

The U.S. energy boom has provided a significant *energy cost advantage* vs. traditional manufacturing competitors



Natural Gas Price Index
(January 2006 = 100)



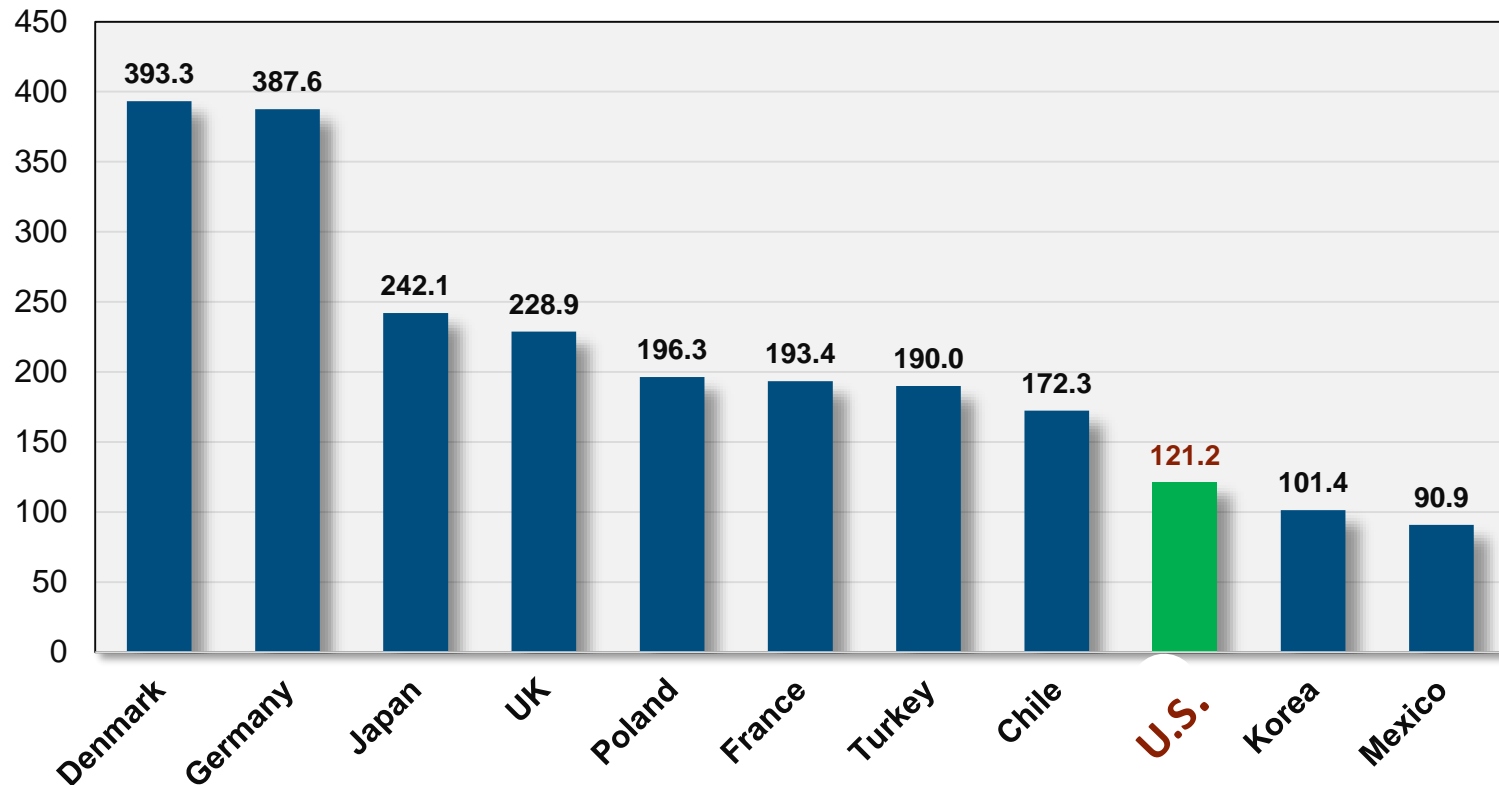
Globalization 2.0: Is Cheap Energy the New Cheap Labor?

Source: EIA

And its not just corporations that are benefitting from cheap energy; American's household electricity bills are *some of the lowest in the world*



\$USD / MWh Electricity For Households



Globalization 2.0: Is Cheap Energy the New Cheap Labor?



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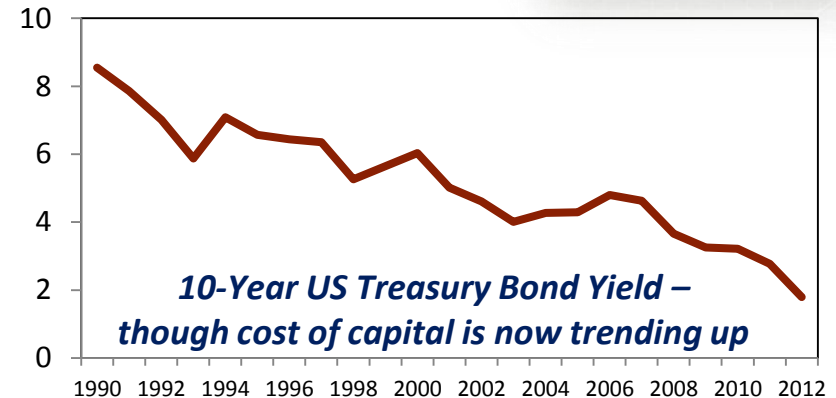
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Over the past decade, *four factors reshaped* the global aviation and aerospace industry...

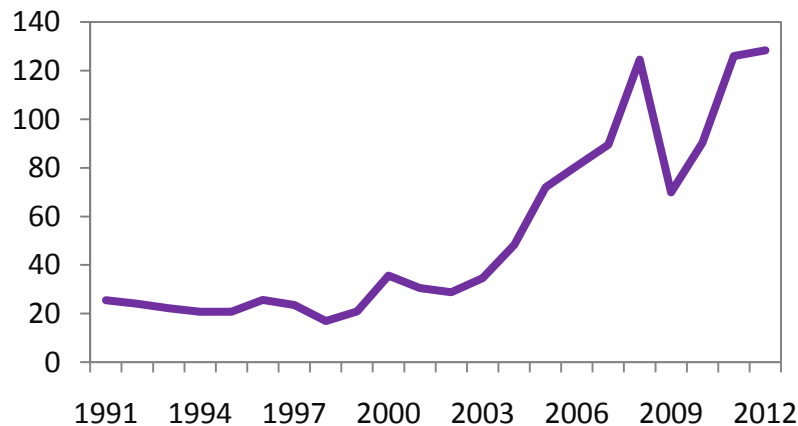
Economic Growth in Emerging Markets



Historically Low Interest Rates (%)



Historically High Jet A Fuel Prices (\$/BBL)



New Technology Aircraft / Engines

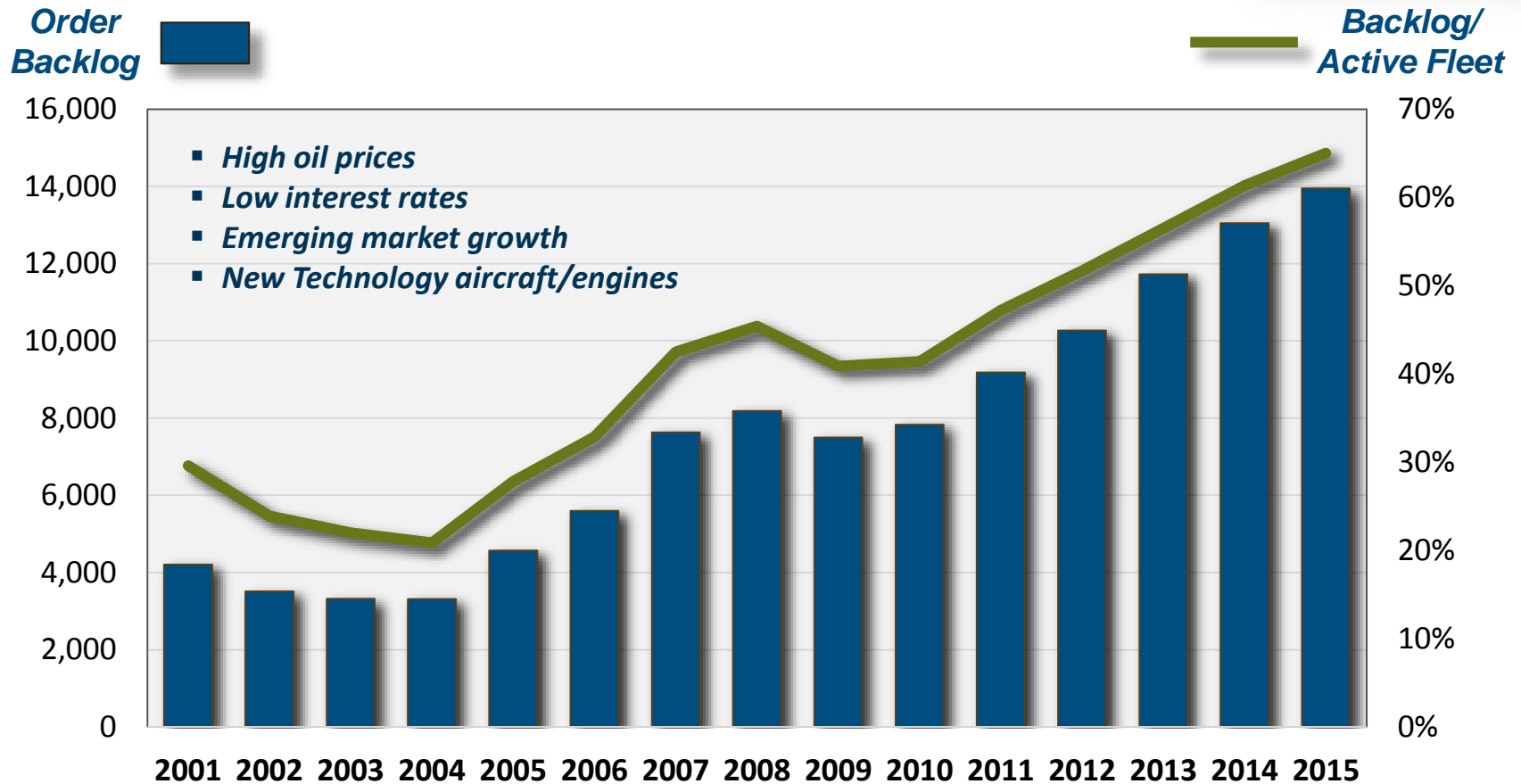


Source: ICF SH&E Analysis; Flightglobal ACAS 2013, ATA, US Federal Reserve

...Result: Aircraft OEM production backlog are at *historical record levels*



Commercial Aircraft OEM Production Backlog



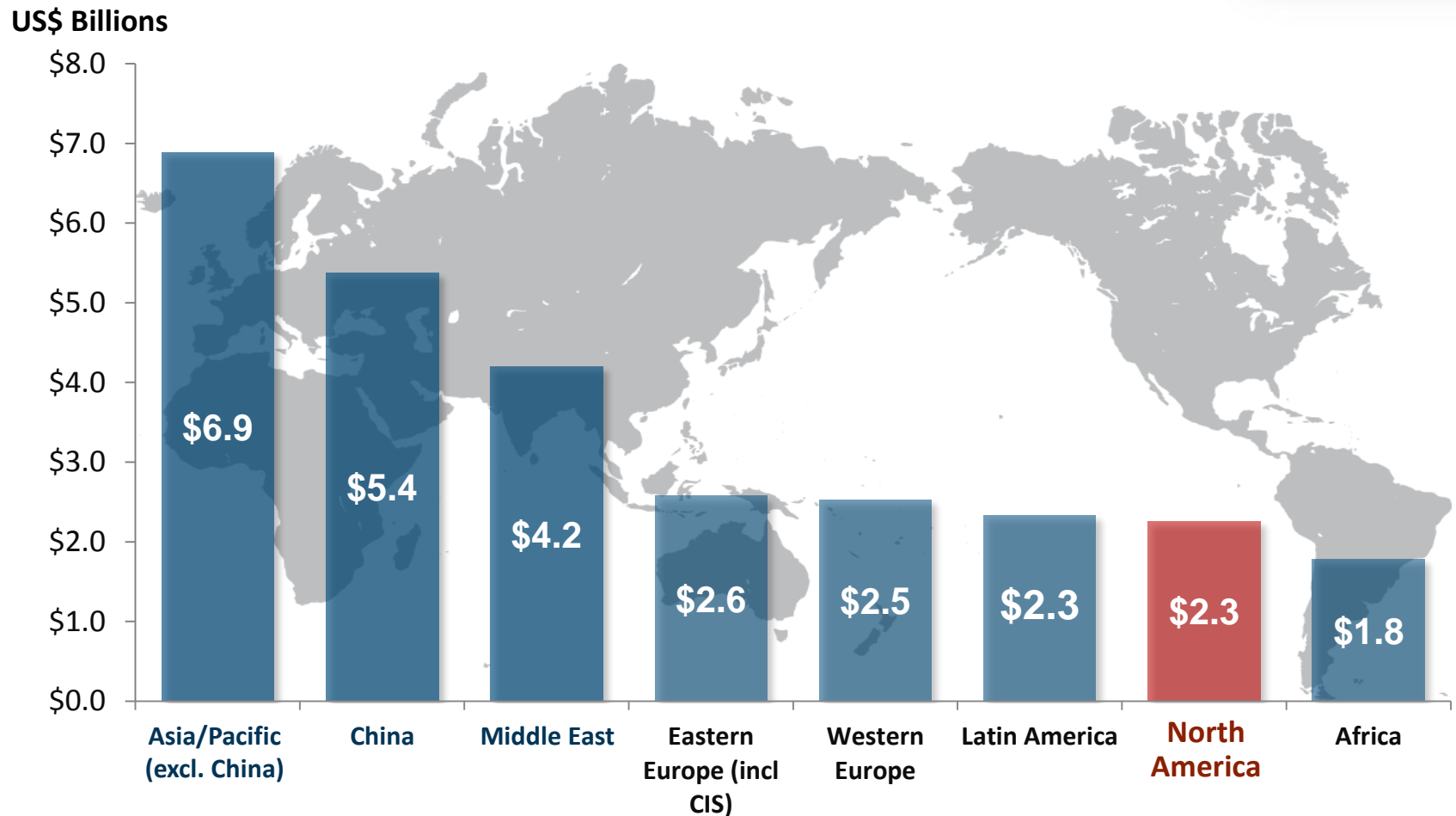
Note: includes narrowbody, widebody, and regional jets in commercial service. Excludes Russian-manufactured aircraft.

Only includes passenger, freighter, quick change and combi operational roles

Source: Flightglobal ACAS, April 2015

Accordingly, the Aerospace and MRO industry *center of gravity* is shifting east

Difference in \$ MRO Spend, 2024 vs. 2014 – By Global Region \$B



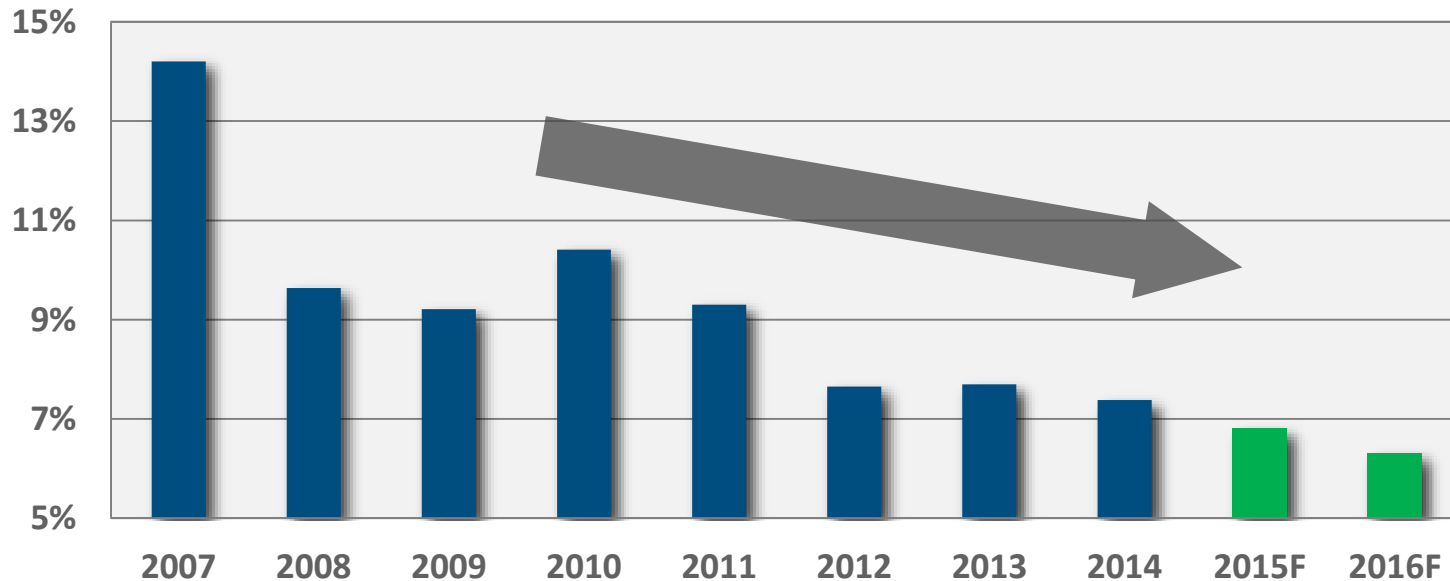
Source: ICF International
Forecast in 2014 \$USD, exclusive of inflation

However, after years of staggering GDP growth, China's economy has been *steadily slowing*



% of YOY
Growth

China GDP Year-on-Year Growth (%)



China's seemingly insatiable demand for global commodities was the primary driver of the BRICS economic growth

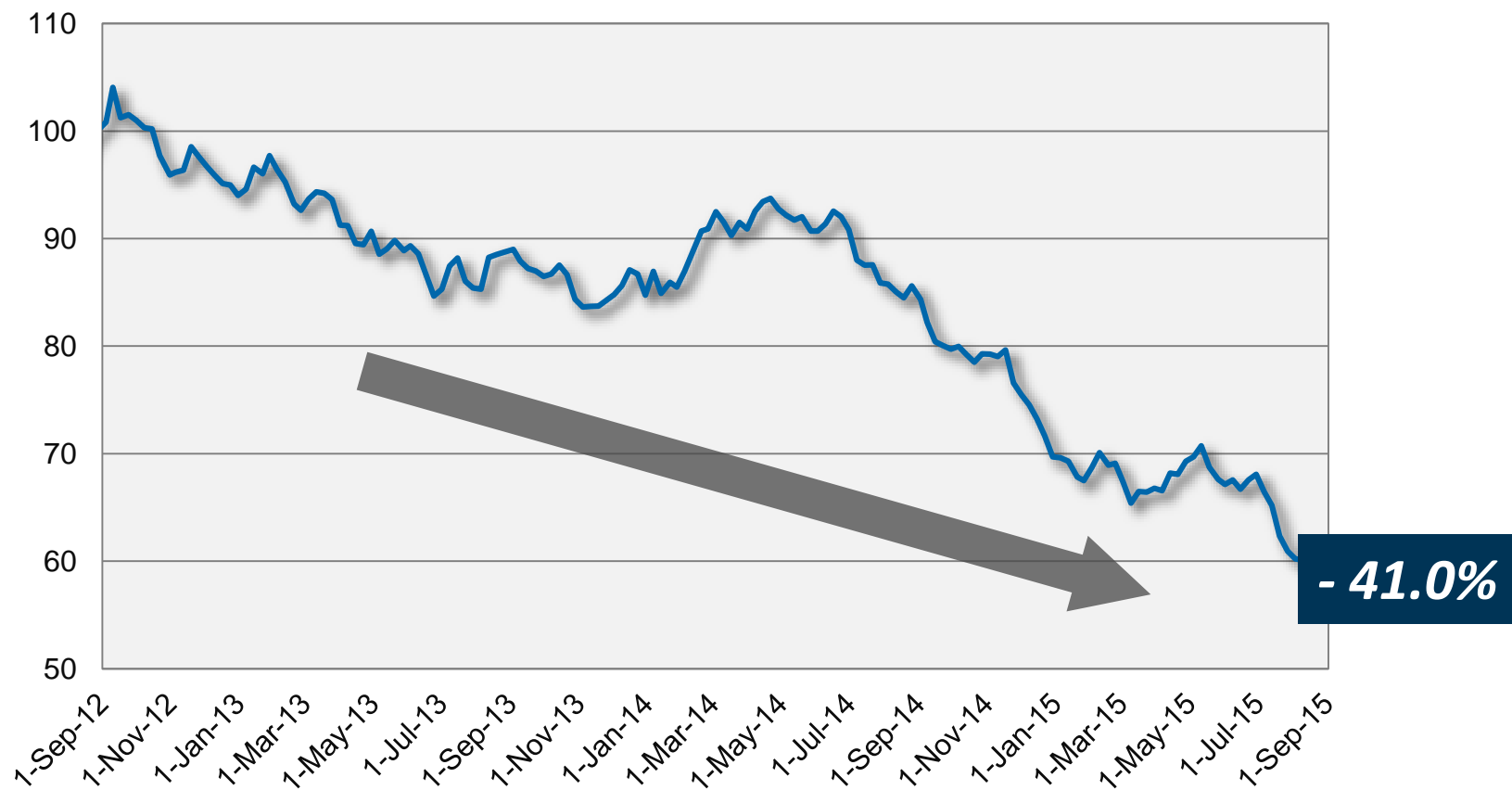
Following China's economic slowdown, global commodity prices have *deceased by approx. 40%* over the past 3 years



Dow Jones Commodity Indices (DJCI)

(September 2012 Indexed to 100)

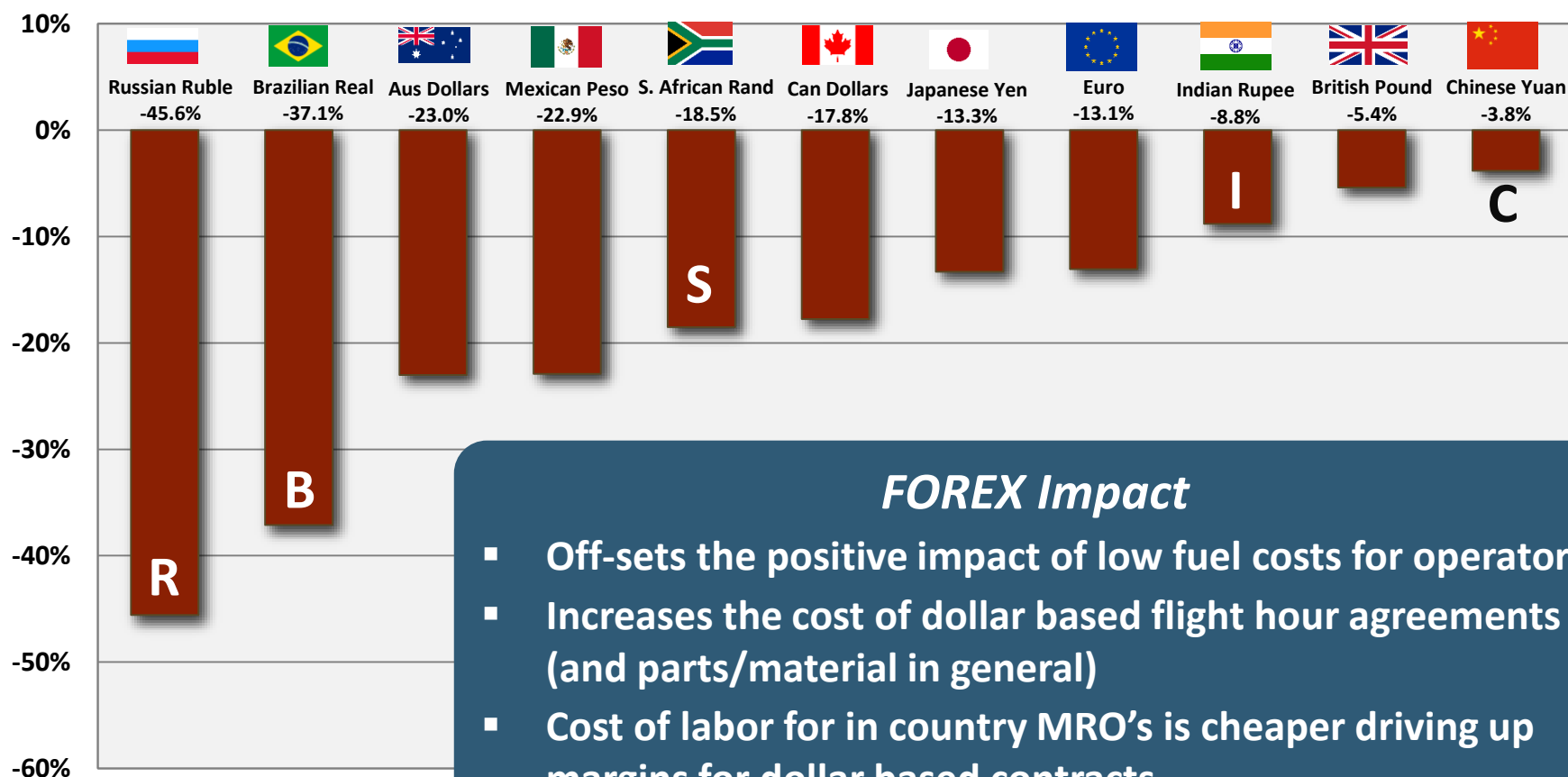
Indexed Values



The dramatic increase in oil & gas market supply and reduced demand for commodities has led to a *strengthened US Dollar*

% Change in Major Global Currency Exchange Rates vs USD

(Sept. 2014 –Sept. 2015)



FOREX Impact

- Off-sets the positive impact of low fuel costs for operators
- Increases the cost of dollar based flight hour agreements (and parts/material in general)
- Cost of labor for in country MRO's is cheaper driving up margins for dollar based contracts

In Summary...

- The US energy revolution has disrupted global economics and geopolitics (increased supply)
- Compounding this, the economic slowdown in China has dramatically impacted commodity dependent BRICS (decreased demand)
- These are the good ol' days for aircraft operators and OEMs (MROs remain a battleground)
- Globalization 2.0: Cheap energy may indeed be the new cheap labor

Thank you!

*For questions regarding
this presentation, please contact:*

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