



Key Trends Shaping the AEC Industry

Building Engineering & Construction Conference | October 18, 2016

Overview

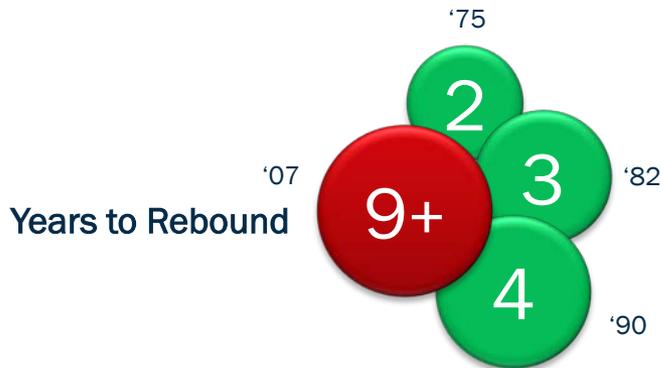
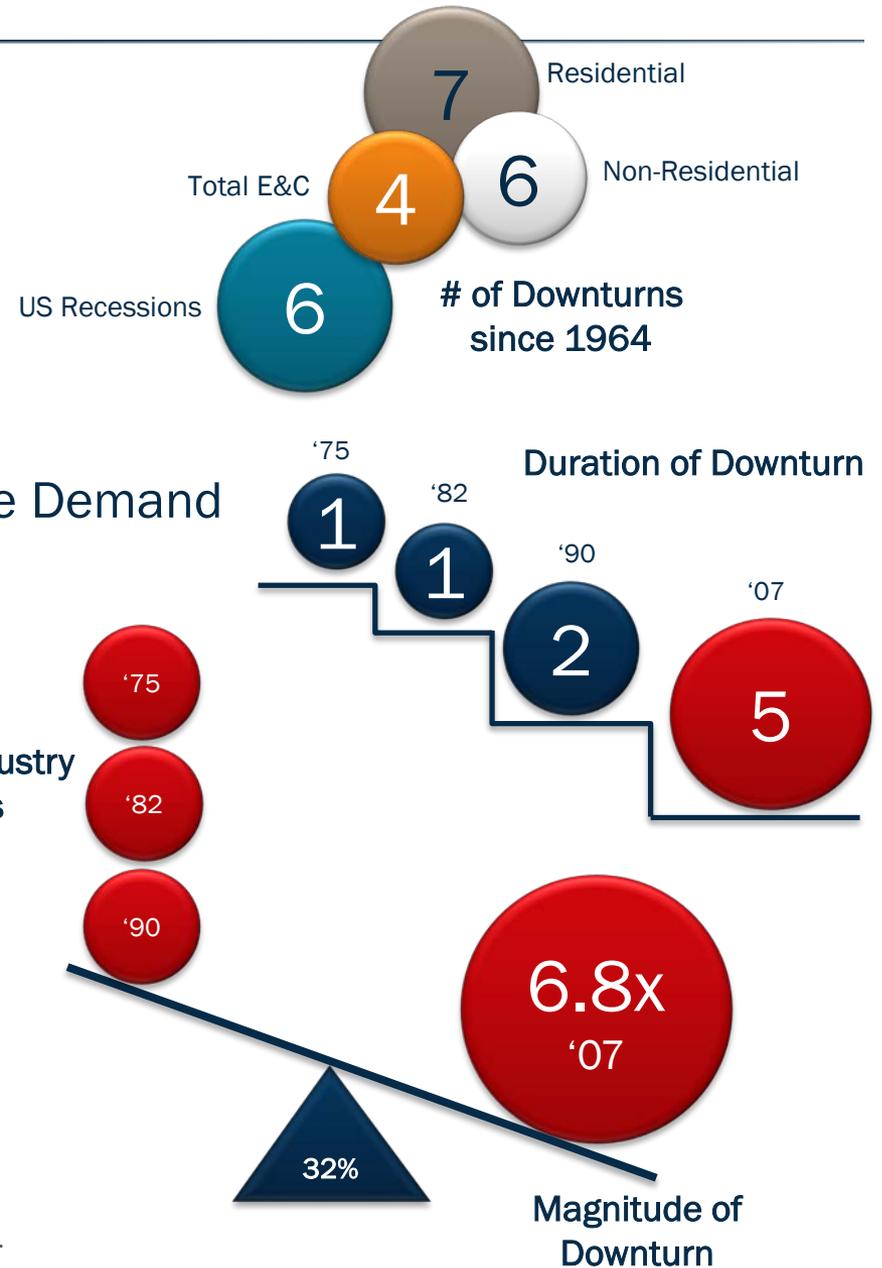
- **Macroeconomic trends**
- **E&C market performance by sector**
- **Looking ahead**

Economic Trends



Economic Recovery

- ❖ Eighth year of growth
- ❖ Prosperity amidst uncertainty
- ❖ Uneven recovery
- ❖ Energy, Industrial, Civil Infrastructure Demand



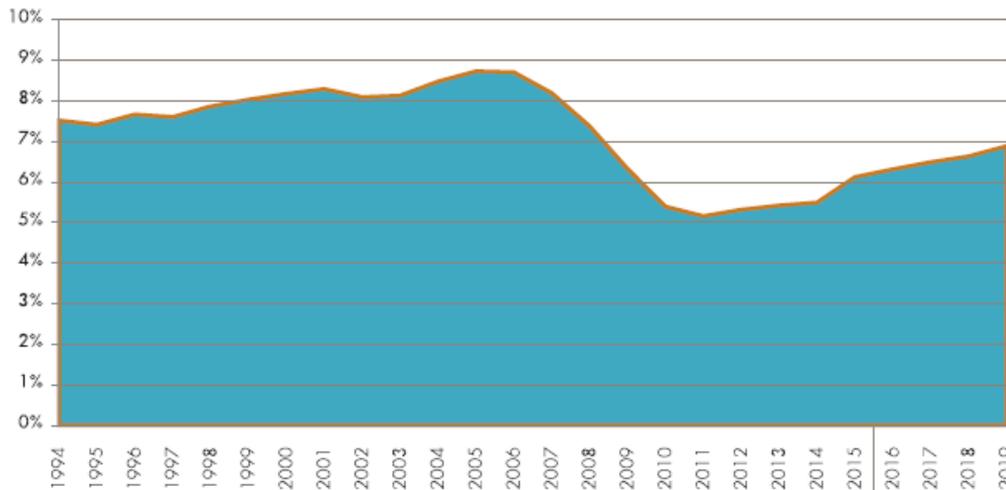
Has E&C Lost its Place in the Broader Economy?

The overall economy has grown by \$4 Trillion since 2007 while the construction industry has not recovered to 2007 spending

CONSTRUCTION SPENDING AND NOMINAL GDP



CONSTRUCTION AS A PERCENTAGE OF GDP



The E&C industry has declined as a % of the overall economy. What are the implications of an industry downturn prior to a full recovery?

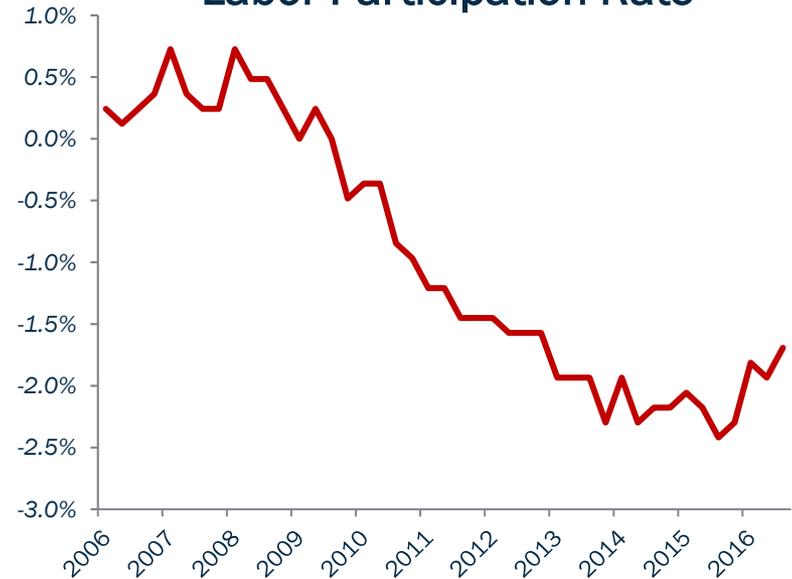
Source: FMI 2016 Q3 U.S. Construction Overview

Unemployment & Labor Participation Trends

Employment & Unemployment



Ages 24-54 Change Since 2006 Labor Participation Rate

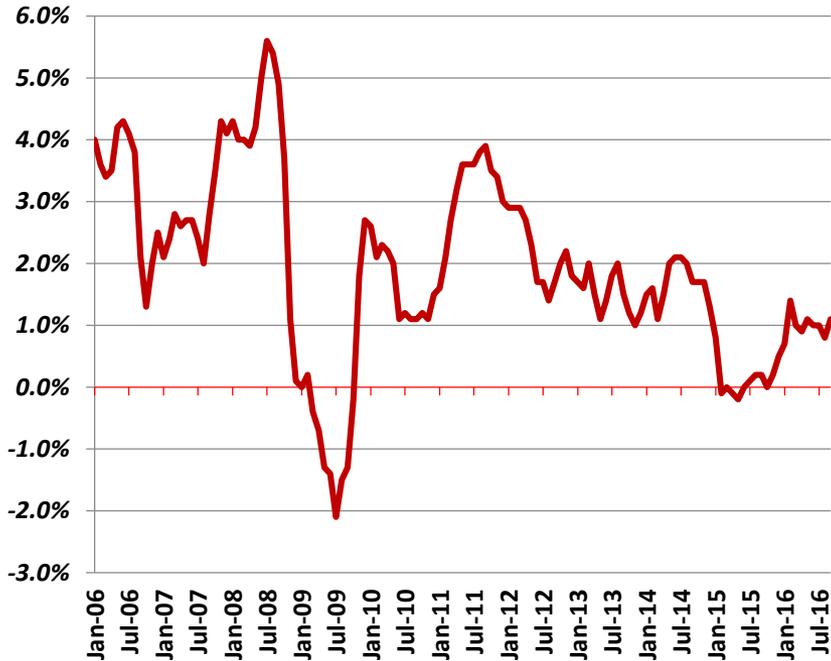


- Total employment continues to grow, with the construction unemployment rate reaching pre-recession levels

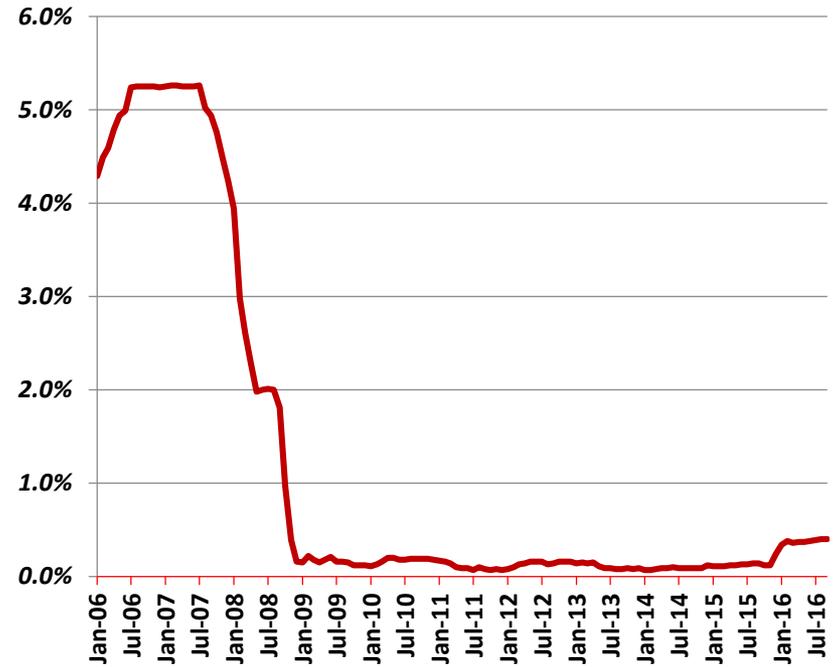
- Ages 24 -54 labor participation rate showing uptick in 2016 after downward trajectory since recession
- Labor force grew by 3M over past year (1%)

Inflation Remains Under Control

CPI 12-Month Percent Change



Effective Federal Funds Rate

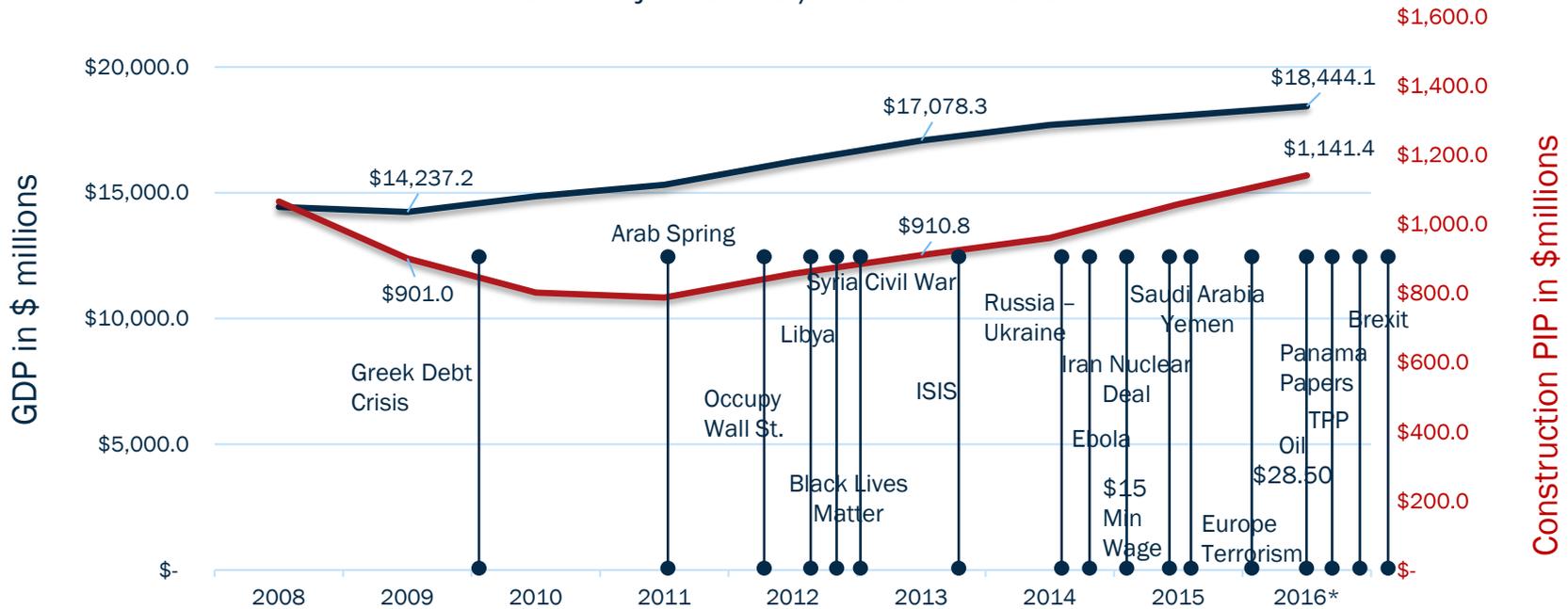


- Inflation remains in check

- Effective Federal Funds Rate at 0.40% in October 2016

A Persistent Recovery Amidst Global Chaos

U.S. GDP and Construction Spending and Major Political/Economic Events



Source: FMI 2016 Q3 U.S. Construction Overview



NRCI vs. ABI vs. EBI Engineering Business Index

61.4

The ACEC Engineering Business Index (EBI) rose in Q3 to 61.4, signaling higher market optimism after posting an all-time low of 60.2 in the 2nd quarter.

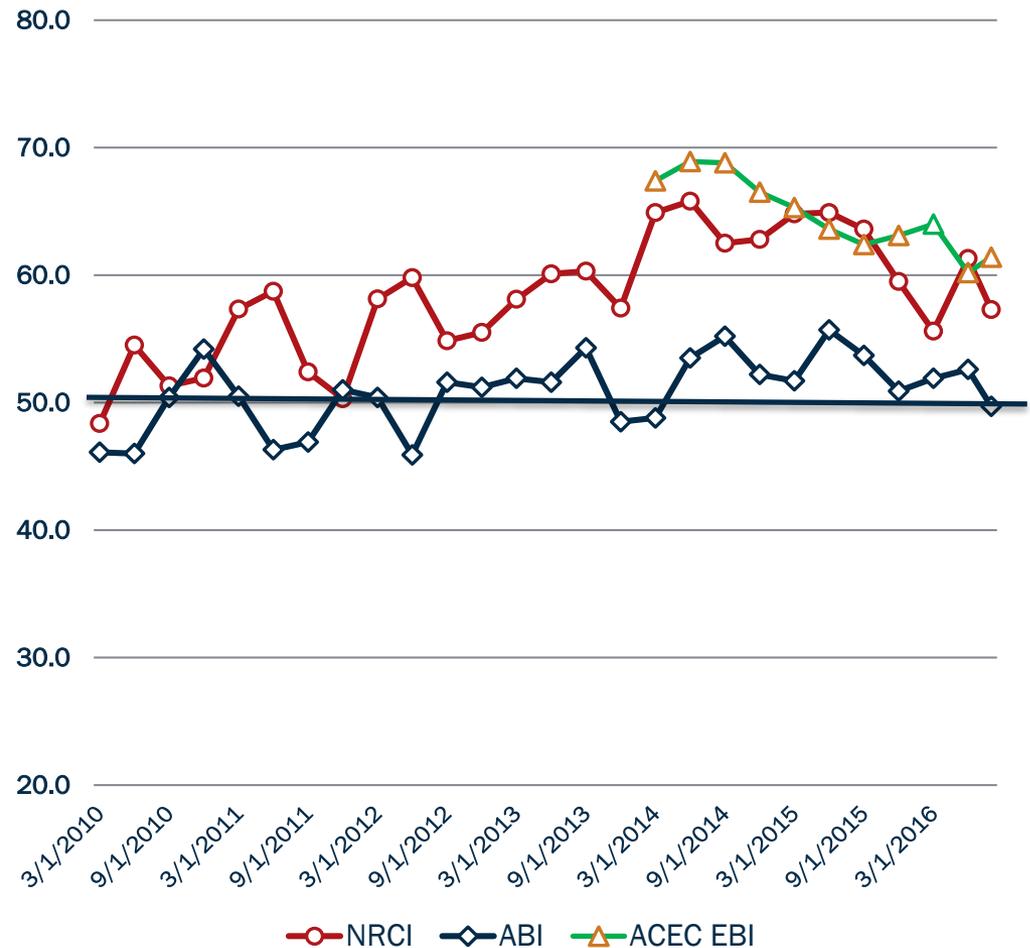
57.3

At 57.3 for the 3rd quarter of 2016, the NRCI score dropped slightly from the previous reading of 61.3. Further declines are expected in the fourth quarter reading.

49.7

The ABI fell in the 3rd to 49.7, marking the first time the index conveyed a contraction in billings activity since Q1 of 2014.

EBI vs ABI vs NRCI



Source: AIA, ACEC, FMI

E&C Performance and Outlook – Put-in-Place by Segment



2016 Engineering & Construction Highlights

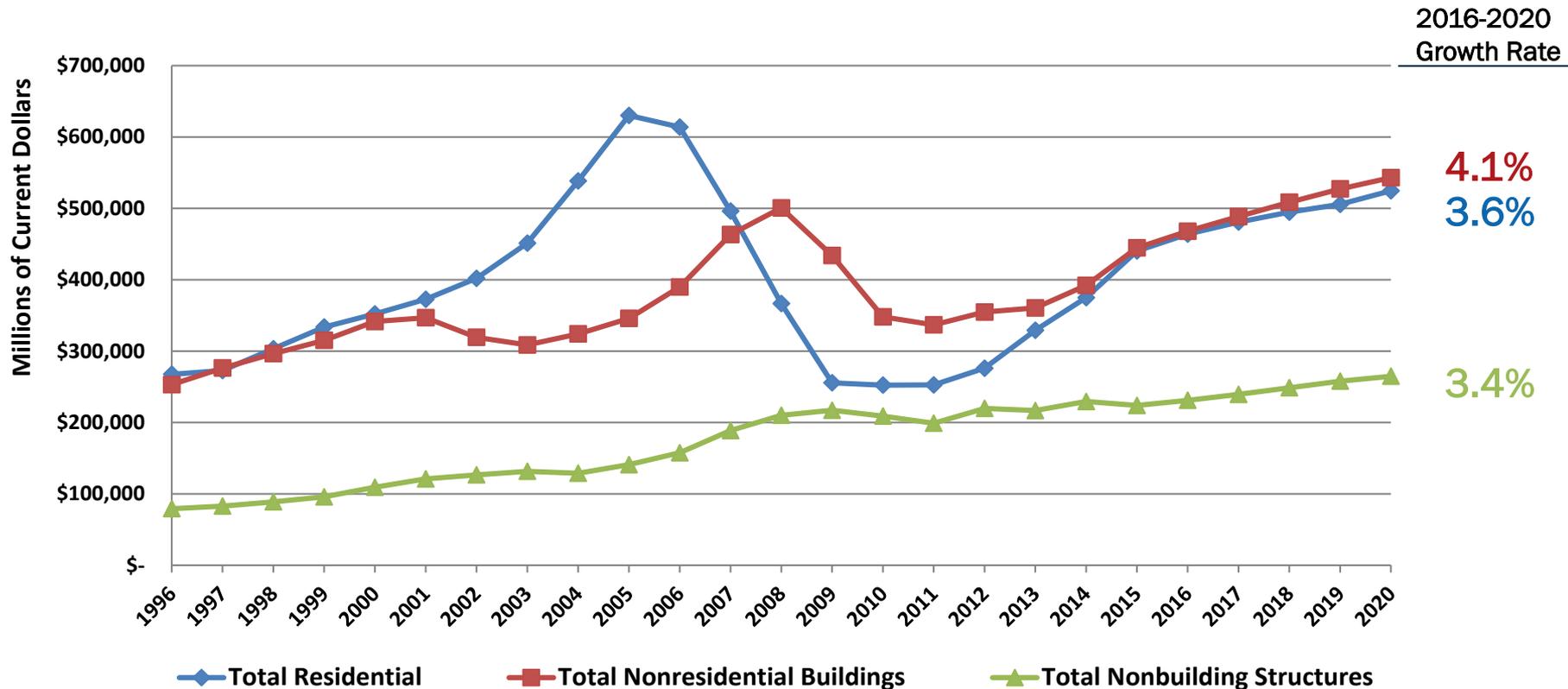
- **Strongest percentage gainers in 2016**
 - Lodging (18.0%)
 - Office (16.0%)
 - Amusement and Recreation (8.0%)
 - Power (8.0%)
- **High-volume nonresidential segments in 2016**
 - Power (\$93.9 billion)
 - Highway and Street (\$91.3 billion)
 - Education (\$86.4 billion)
- **Weakest segments in 2016**
 - Public Safety (-5.0%)
 - Water Supply (-4.0%)
 - Sewage and Waste Disposal (-3.0%)



Source: FMI 2016 Q3 U.S. Construction Overview

Construction Put in Place

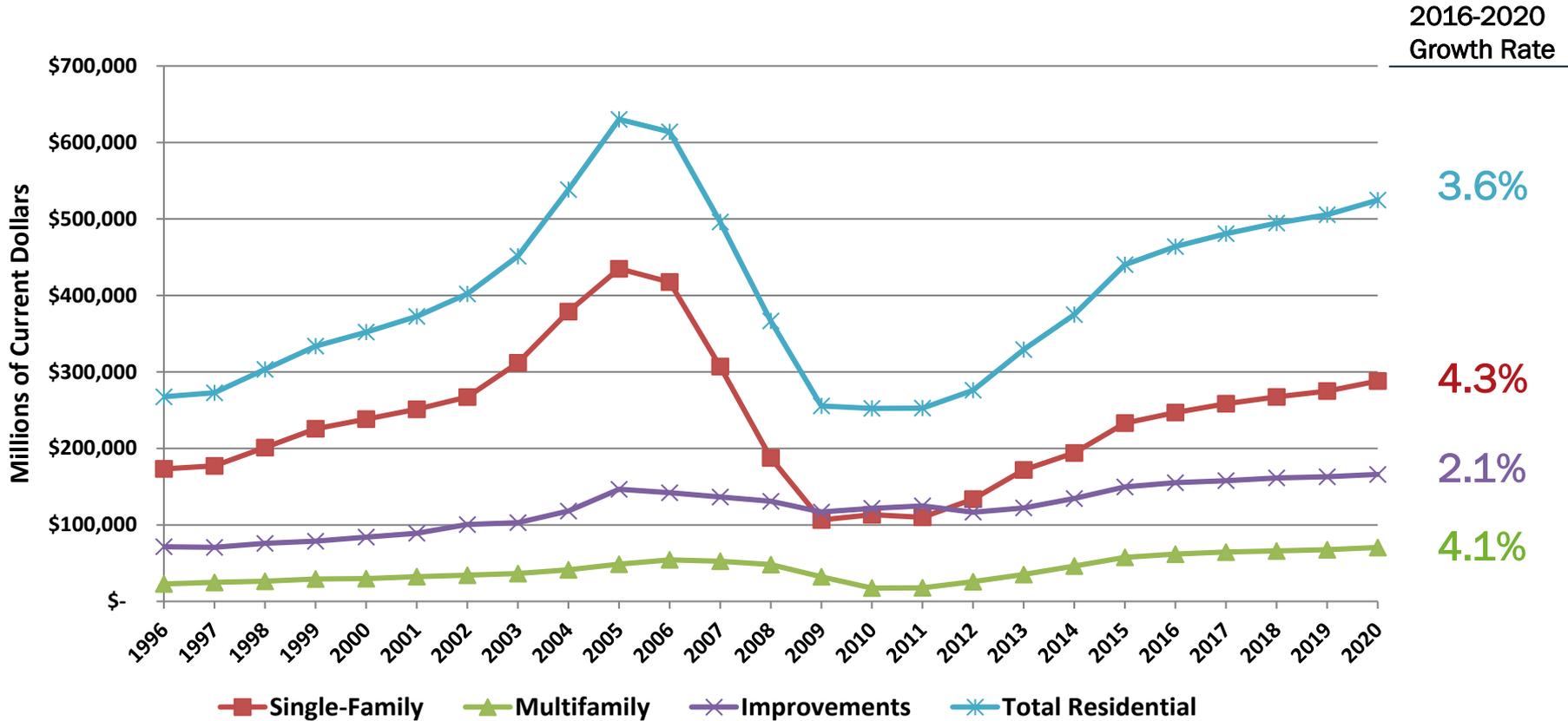
3rd Quarter 2016 Forecast (based on Q2 2016 Actuals)



Source: FMI 2016 Q3 U.S. Construction Overview

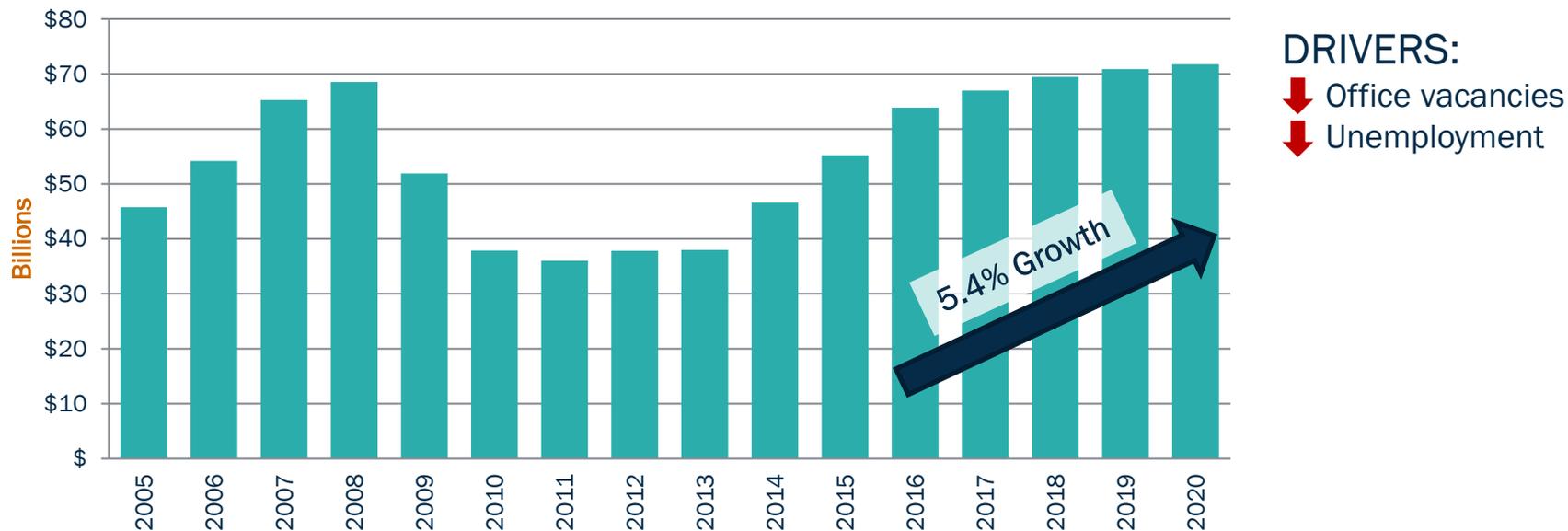
Residential Put in Place

3rd Quarter 2016 Forecast (based on Q2 2016 Actuals)



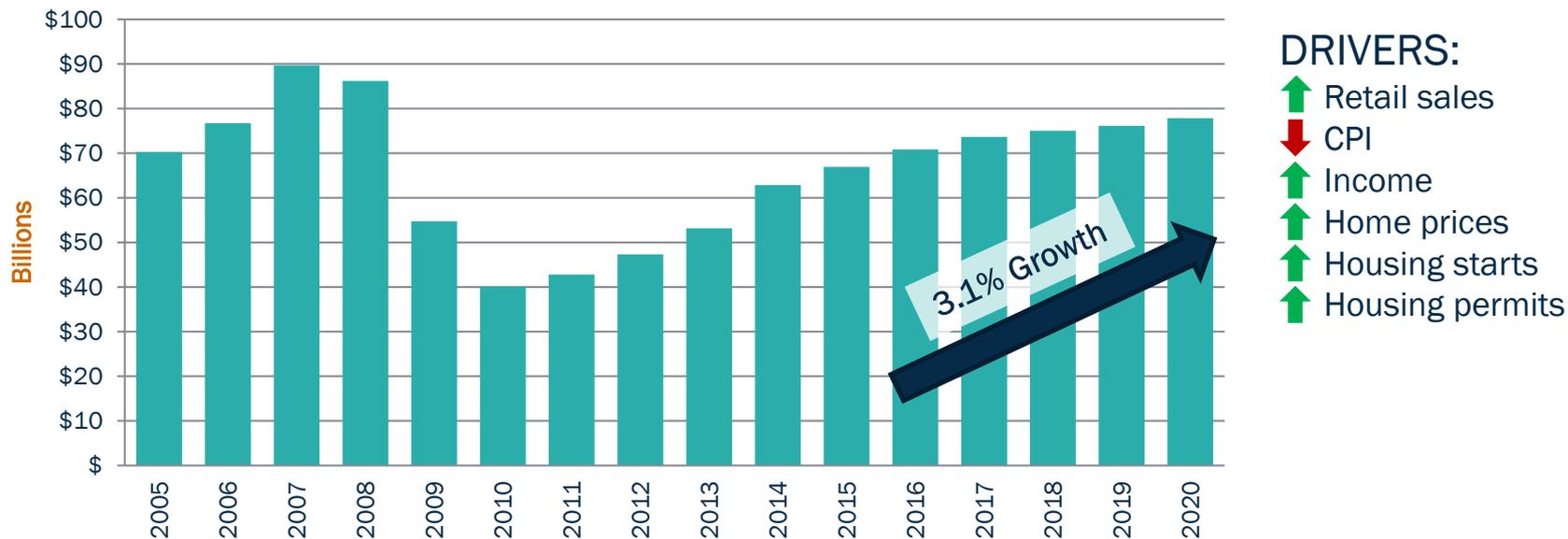
Source: FMI 2016 Q3 U.S. Construction Overview

Office



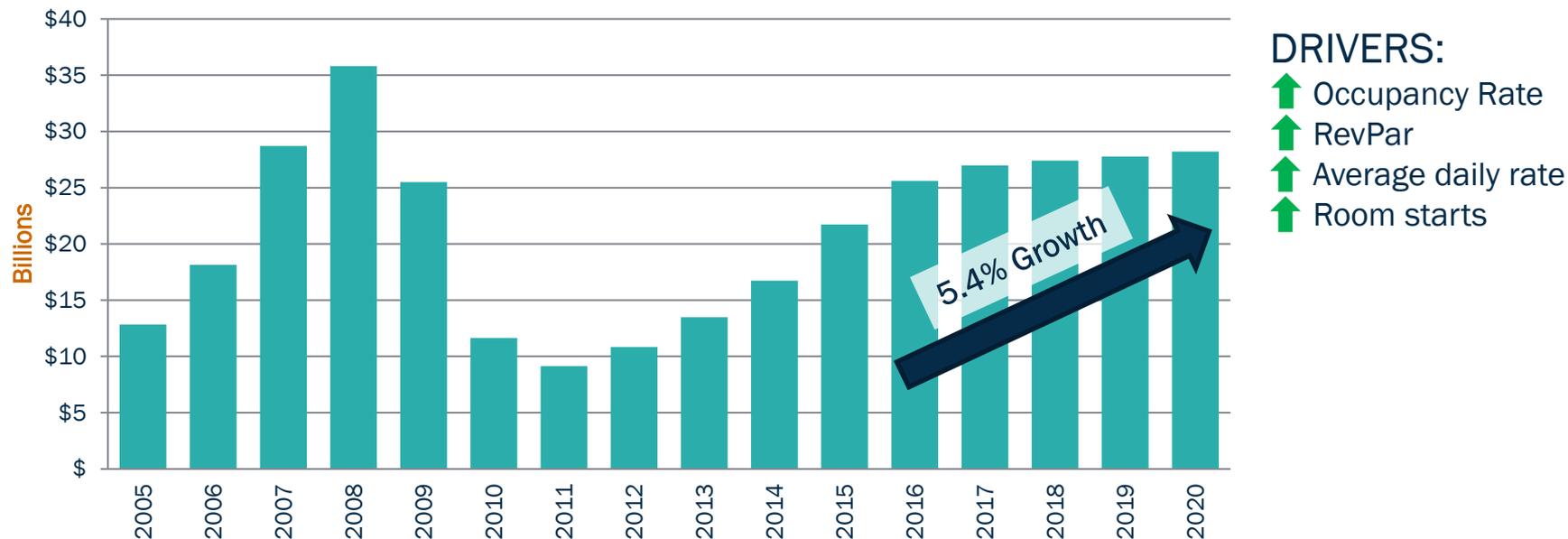
- Office construction will follow strong growth of 18% in 2015, with still robust growth of 16% in 2016
- Commercial mortgage debt rising along with prices as investors pursue yield
- Continued growth in the technical sector and in larger metropolitan areas like New York City will keep rents and absorption of new space high

Commercial



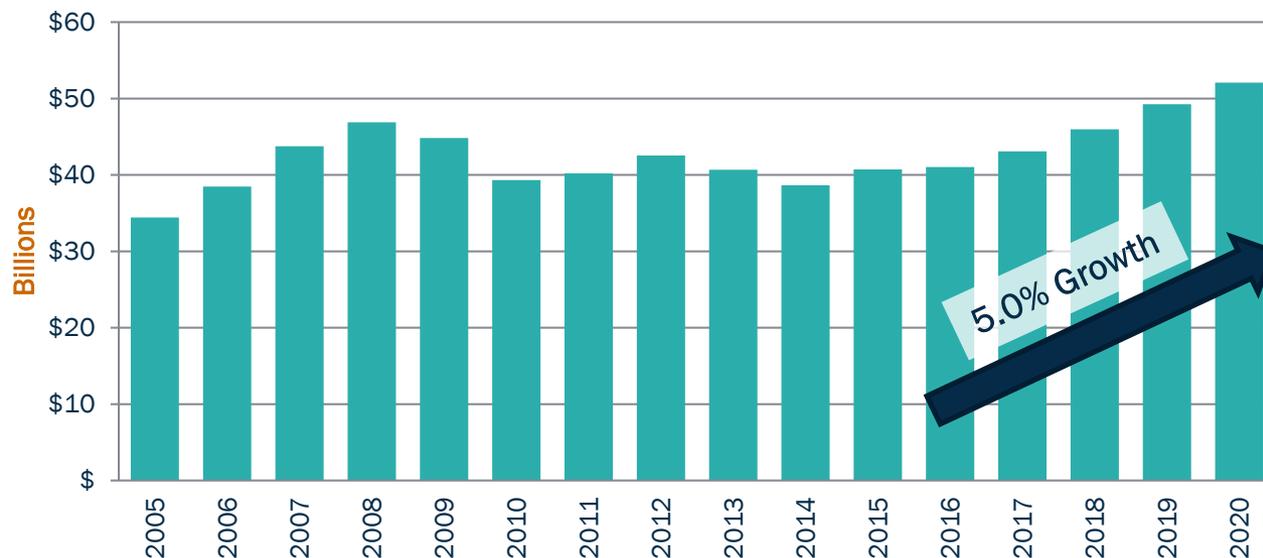
- Solid growth of 6% in 2015 should continue through 2016, then drop to 4% and lower
- Strong growth in specialty retail and start-ups in major metros
- Warehouse and data centers to support non-store retailers
- Strong residential growth supporting commercial retail

Lodging



- Our latest forecast expects growth to slow to 18%, after reaching 30% in 2015
- Highest growth rate among nonresidential segments
- At \$25.6 billion in 2016, this market is well below the 2008 high of \$35.8 billion
- Current level is more sustainable, driven by a mix of new venues and refurbishments
- Though new supply is starting to exceed absorption rates

Health Care



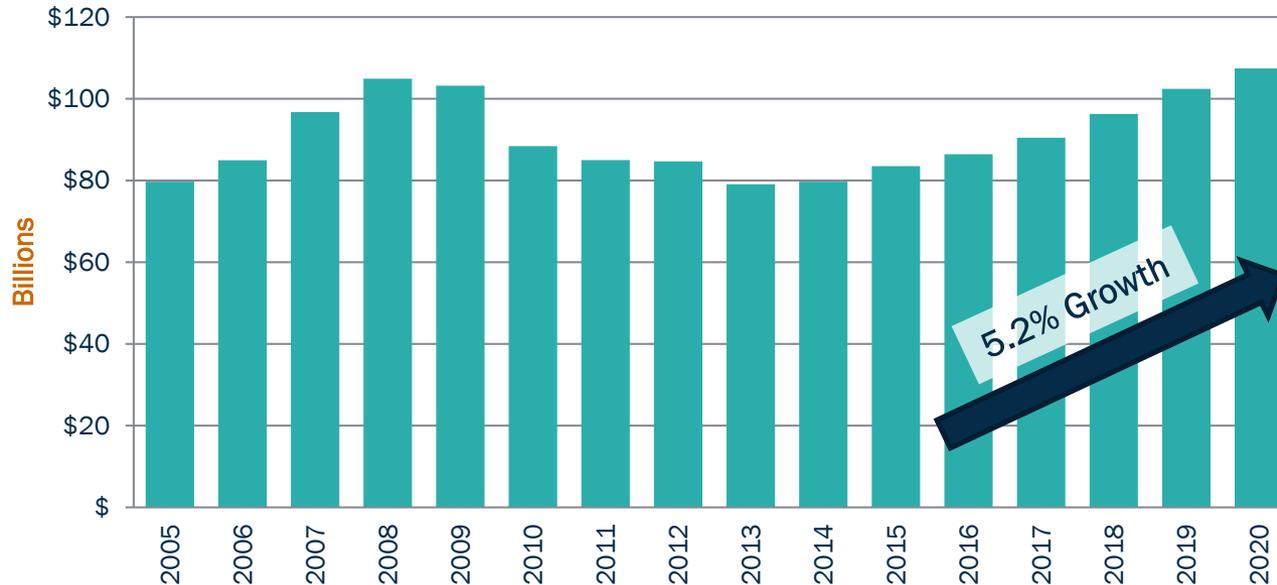
DRIVERS:

- ↑ Pop. change younger than 18
- ↑ Pop. change 18-24
- ↑ Stock market
- ↑ Gov. spending
- ↑ Nonresidential structure investment

- FMI is forecasting \$41.0 billion in construction put in place for 2016 and 5% growth in 2017
- Expansion and renovation will outpace new construction
- Faster growth in ambulatory facilities
- The new hospital model is a medical center with clusters of medical office and patient towers

Source: FMI 2016 Q3 U.S. Construction Overview

Education

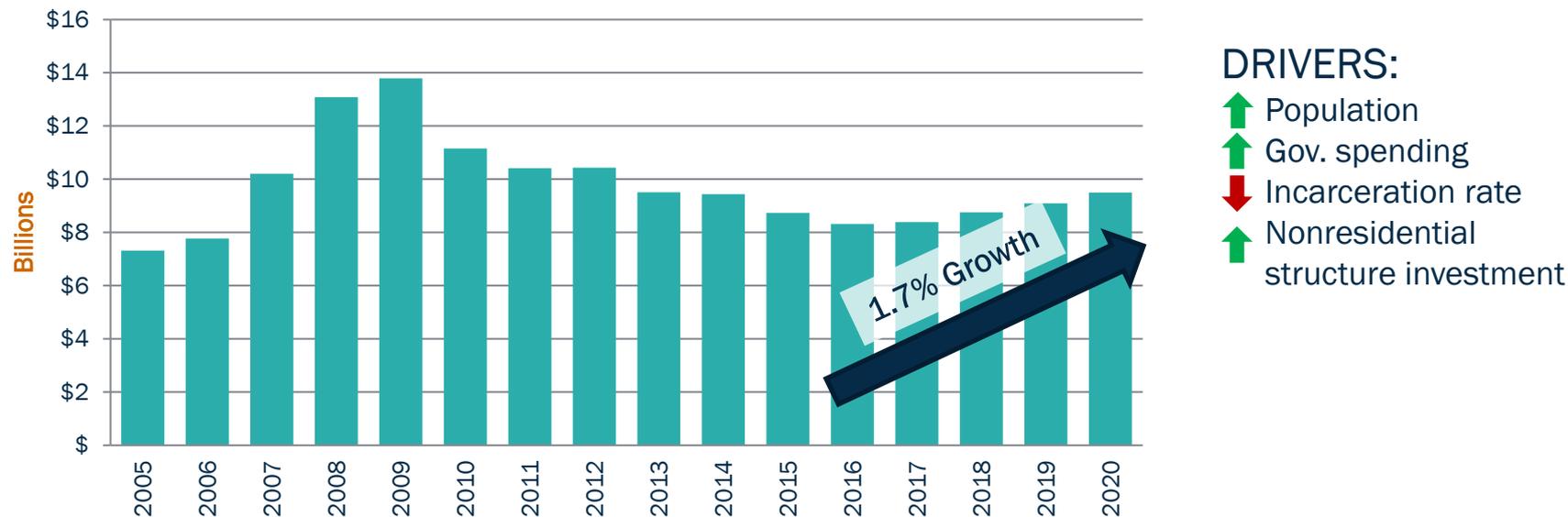


DRIVERS:

- ↑ Pop. change younger than 18
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- Expected low growth of 3% in 2016, increasing to 5.2% through 2020
- Renovation and additions to current school buildings will continue to grow in comparison to new school projects
- Enrollment growth of 2.5M over next three years
- Trends include green building, stronger security and increased federal funding
- New designs for schools will be more flexible for changing classrooms and greater use of natural light, with more use of modular building designs

Public Safety



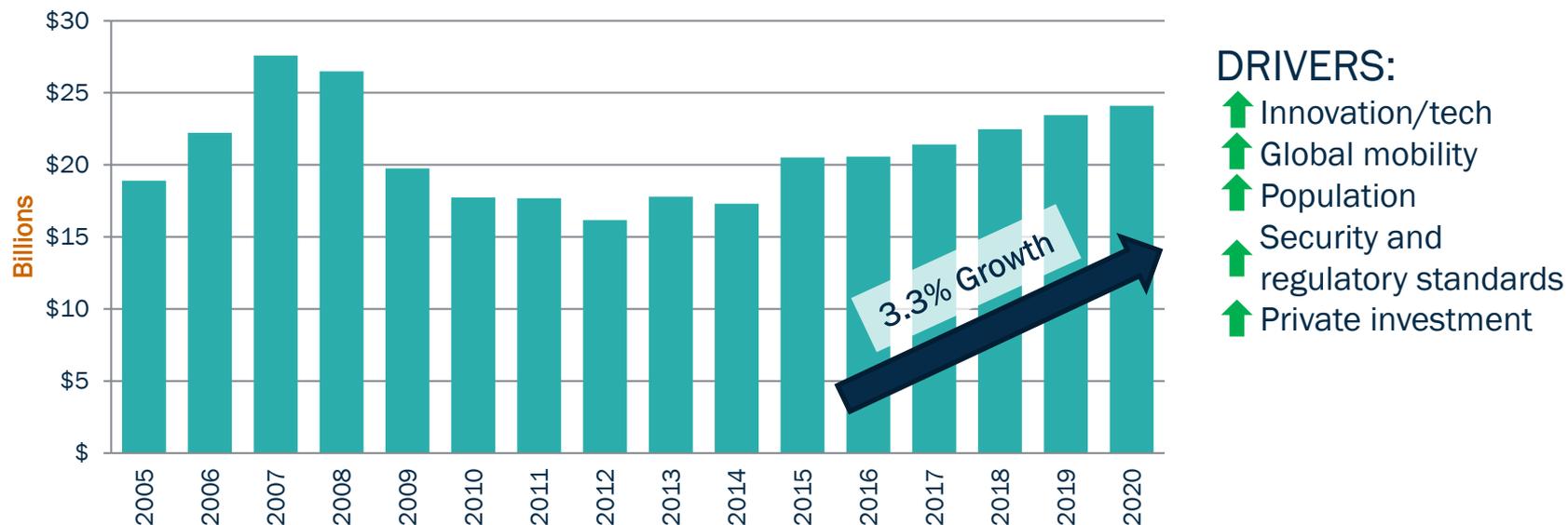
- Spending for public safety construction declined -8% in 2015 to \$8.7 billion.
- For 2016, we forecast a further decline of -5%
- Smallest prison population in a decade
- Decline of private prison use by Federal Bureau of Prisons

Amusement and Recreation



- Reached a near record high of \$20.5BN (19% growth); slow to around 8% in 2016
- Large stadiums with mixed use projects lead this market
- Sports venues are promoted as job creators with the ability to revitalize many dilapidated areas around a city
- Competition in the gaming sector will draw business away from some existing gambling centers, such as Atlantic City and Las Vegas, as well as from other public arenas

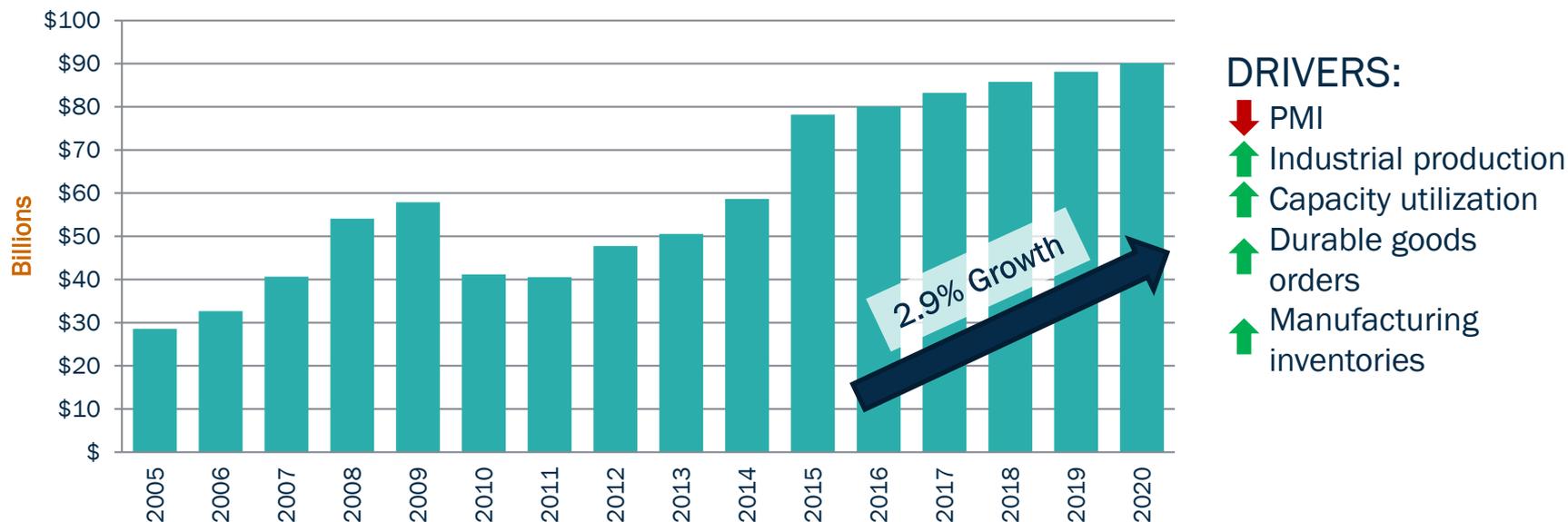
Communications



- Grew 19% in 2015, but was flat in 2016
- Communications infrastructure will continue to be challenged with keeping up with the technology as 4G moves to 5G and 4K video is already to move to 5K, pushing bandwidth and storage capacity
- Internet of Everything (IoE) is the new thing and ultimate demand driver
- “Mini towers” for increasing coverage and spectrum will proliferate rapidly in the next five years

Source: FMI 2016 Q3 U.S. Construction Overview

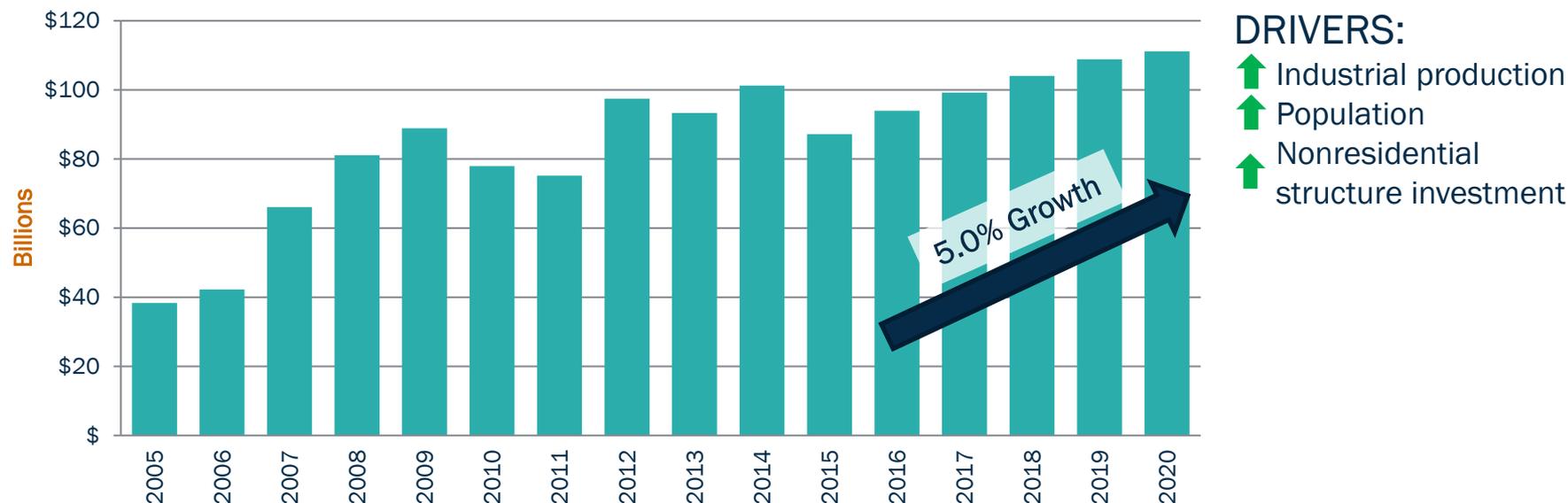
Manufacturing



- Manufacturing construction took a heavy hit during the Great Recession, but it has more than caught up as of 2015 with a whopping growth of 33% for the year and a more modest 2% growth expected for 2016
- Record level of manufacturing construction spending
- Opening of Panama Canal expansion is a boost for US Gulf ports
- O&G investment is soft but downstream petrochemical spending remains strong

Source: FMI 2016 Q3 U.S. Construction Overview

Power

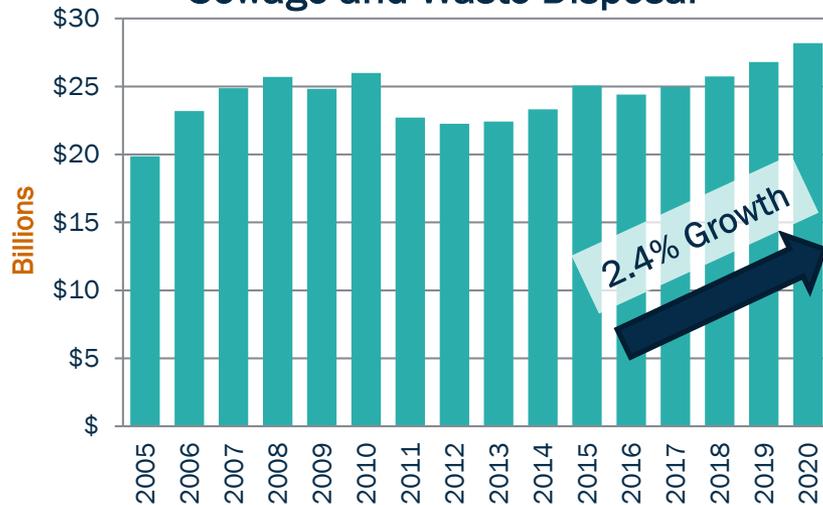


- After declining sharply in 2015, losing 14%, we expect growth to improve 8% in 2016 to reach \$93.9 billion for construction put in place
- Shift in industry away from coal
- Power companies are placing greater emphasis on incorporating renewables such as hydropower, solar and wind technology
- See continued consolidation as consumer power consumption drops

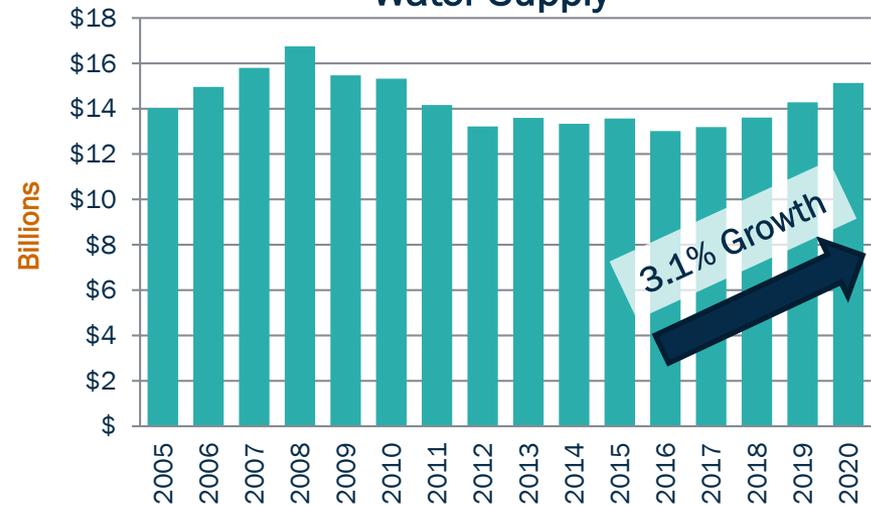
Source: FMI 2016 Q3 U.S. Construction Overview

Wastewater & Waste Disposal and Water Supply

Sewage and Waste Disposal



Water Supply



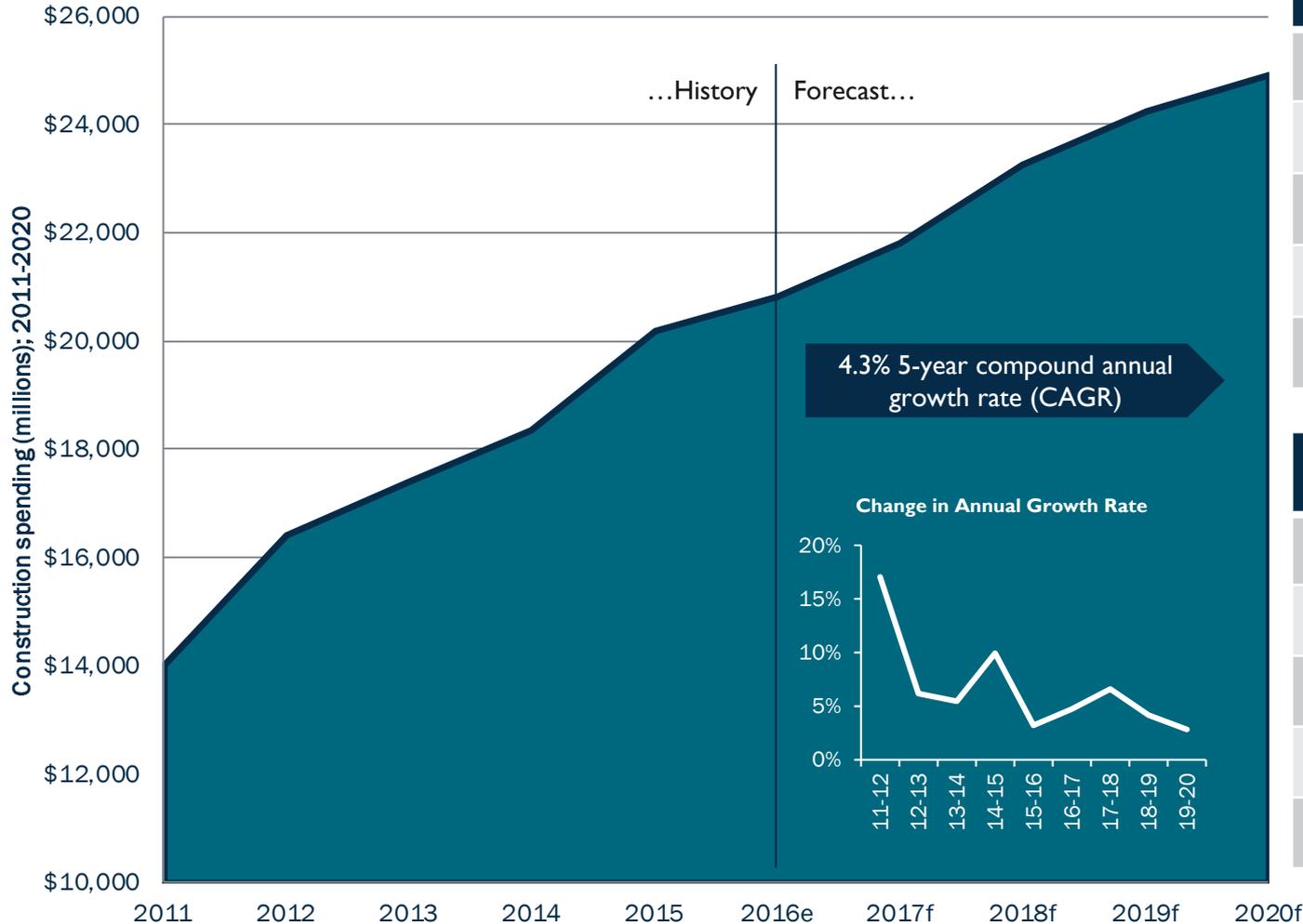
- Slow water infrastructure markets in the aftermath of the recession continue to build the backlog of necessary work as existing infrastructure ages
- Drivers
 - Aging infrastructure
 - Regulations (EPA consent decrees)
 - Access to funding

- Green construction practices, such as controlling runoff to help increase groundwater, will become the norm for improvements and new construction.
- Drivers
 - Aging infrastructure
 - Water scarcity
 - Access to funding

Minnesota's forecasted construction spending is expected to grow at a 4.3% compound annual growth rate through 2020 to reach nearly \$25 billion.

Construction Put in Place (CPIP) Spending, 5-year history; 5-year forecast

State of Minnesota 2011-2020



Largest Building Segments (2016-2020)	
Education	\$11.06 Billion
Power	\$11.04 Billion
Manufacturing	\$9.95 Billion
Healthcare	\$5.75 Billion
Office	\$5.15 Billion

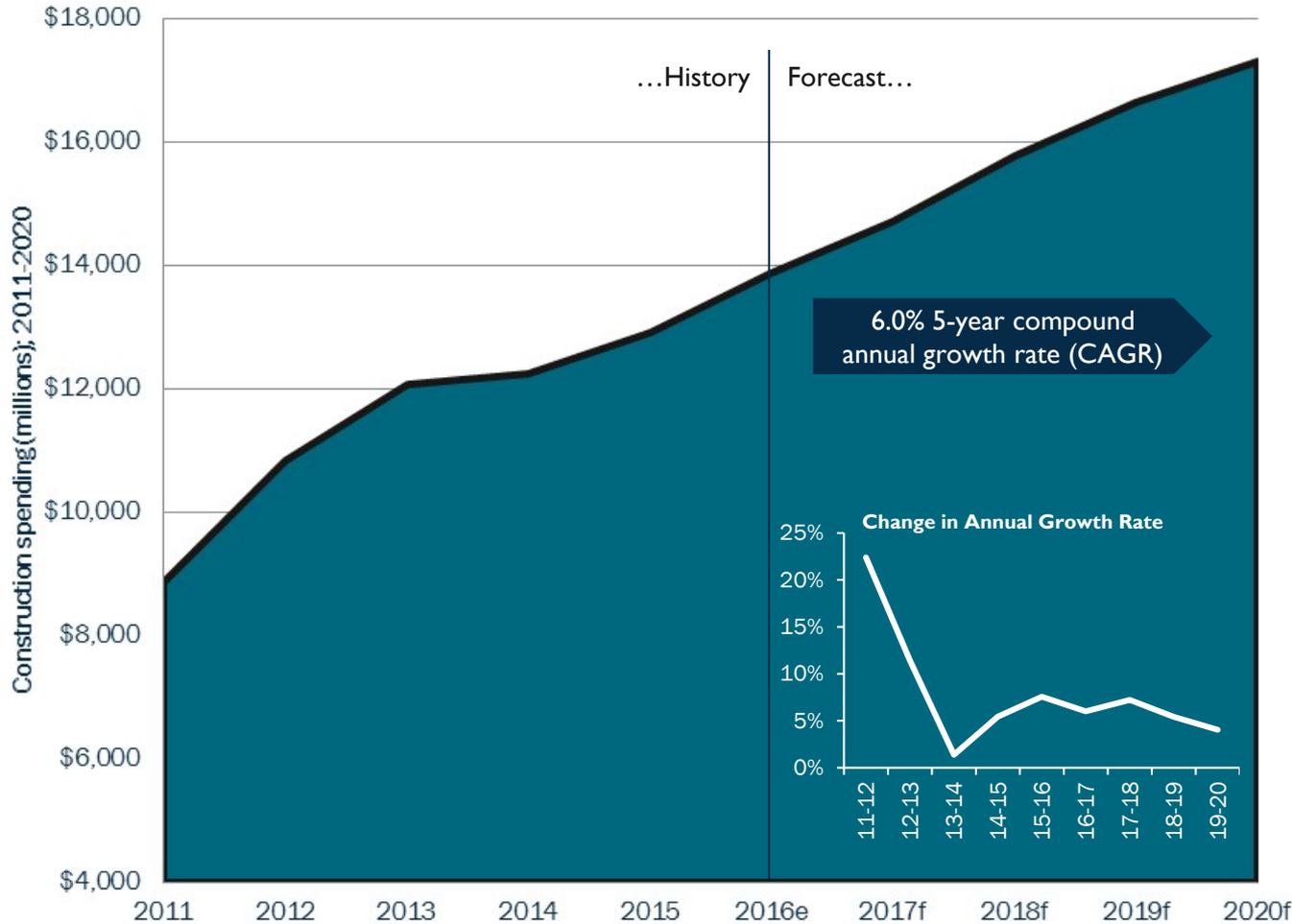
Fastest Growing Building Segments (CAGR 2016-2020)	
Education	9.30%
Healthcare	7.84%
Government	5.01%
Retail	4.32%
Power	3.13%

Source: Global Insights, FMI

Minneapolis-St. Paul-Bloomington, MN-WI MSA's forecasted construction spending is expected to grow at a 6.0% compound annual growth rate through 2020 to reach nearly \$17.5 billion.

Construction Put in Place (CPIP) Spending, 5-year history; 5-year forecast

Minneapolis-St. Paul-Bloomington, MN-WI 2011-2020



Largest Building Segments (2016-2020)	
Power	\$8.66 Billion
Education	\$6.77 Billion
Manufacturing	\$6.06 Billion
Office	\$3.89 Billion
Healthcare	\$3.75 Billion

Fastest Growing Building Segments (CAGR 2016-2020)	
Education	8.07%
Manufacturing	7.79%
Healthcare	7.72%
Power	7.06%
Government	6.61%

Source: Global Insights, FMI

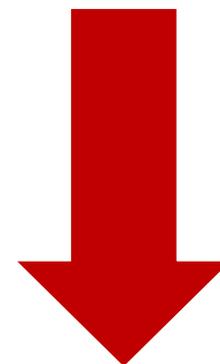
Looking Ahead



Anticipating the Next E&C Downturn

Perhaps some combination of the following

- Presidential and congressional elections
- Major domestic or European terror event
- Rising energy prices and core inflation
- Premature/over action by the Fed on interest rates
- Commercial real estate bubble / Debt
- Another European debt crisis
- Failure to pass TPP



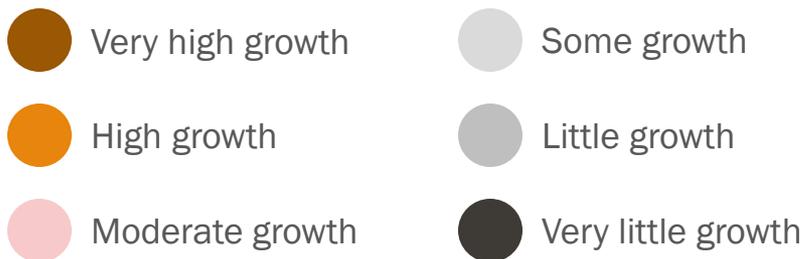
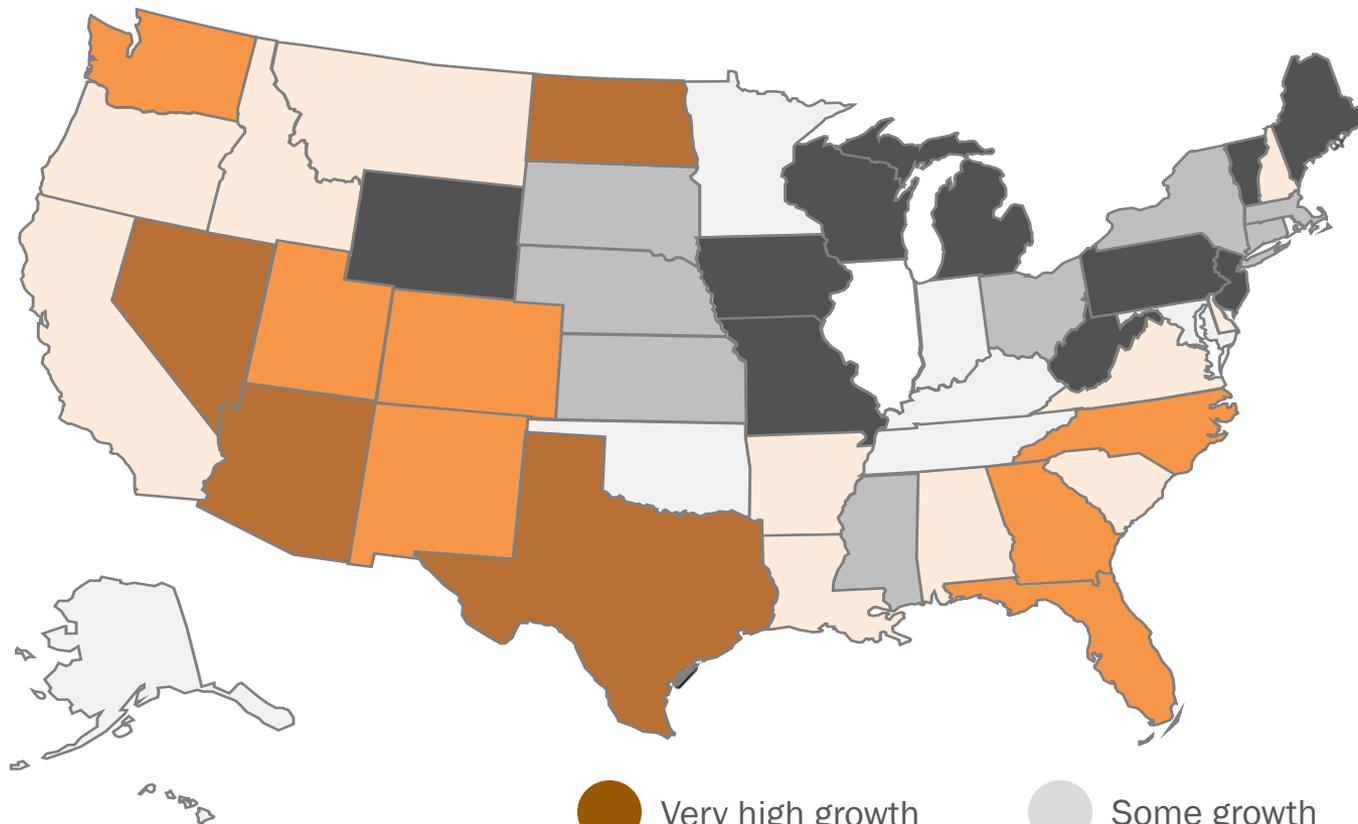
FMI best 'guess' is barring an unpredictable event, a general recession followed by a relatively mild E&C industry downturn more than likely within the next two years and most likely in second half of 2017 or first half of 2018

Is There a Bubble?

- Multi-Family in certain markets
- Commercial office building



Demographic Forecast Growth—2017



Source: Moody's Analytics

Productivity Gains from Technology

Technological advances in pre-con and construction ops pivotal to maintaining competitive position

- Building Information and Modeling (BIM) is key to construction scheduling optimization
- Job-site technologies to work faster, smarter and safer are expanding at an accelerated pace

Implications

- Tech-savvy firms becoming more essential and less elective
- Talent selection and development needs to factor willingness to embrace and capacity to apply new practices
- Without clarity of long-term direction, every innovation looks important and represents a potential distraction vs. benefit

Adoption of these tools does not necessarily translate to productivity gains or margin expansion



Disruption through technology accelerating

Computing power gains are accelerating the creation of disruptive technologies

- BIM and 3D laser scanning
- Empowering the way we find and do work
- Industries will emerge FAST, others will be rendered obsolete

Implications

- Finding work, assessing project viability improving, driving smarter decisions
- Disruptive technologies represent opportunity to gain competitive advantage
- The disruptors represent future growth and new market opportunities
- Organizations will need talent that can think strategically to see and apply these disruptors effectively

Technologies' impact on the E&C industry appears to finally making inroads....but, to what end?

	Mobile Internet	Increasingly inexpensive and capable mobile computing devices and Internet connectivity
	Automation of knowledge work	Intelligent software systems that can perform knowledge work tasks involving unstructured commands and subtle judgments
	The Internet of Things	Networks of low-cost sensors and actuators for data collection, monitoring, decision making, and process optimization
	Cloud technology	Use of computer hardware and software resources delivered over a network or the Internet, often as a service
	Advanced robotics	Increasingly capable robots with enhanced senses, dexterity, and intelligence used to automate tasks or augment humans
	Autonomous and near-autonomous vehicles	Vehicles that can navigate and operate with reduced or no human intervention

SOURCE: McKinsey Global Institute analysis

Productivity and Safety from Jobsite Transparency

Embedded GPS and real-time information improves production

- Merging of GPS and virtual imaging
- Mobility devices streamlining jobsite decision making
- Drones and robots in use to avoid costly mistakes in high-risk areas

Implications

- Greater daily production expected
- Job-site communication skills need to improve
- Staging of work is becoming key to profitable outcomes
- The more time sensitive your part of the project the greater the need for adoption



Augmented Reality: GPS Positioning & Model



“Building Manufacturing” through Prefabrication

Use of prefabricated building components on the rise

- Higher quality
- Improved job-site performance
- Ideal for repetitive sections
- Architectural style NOT compromised

Implications

- Less skilled labor on jobsites
- Changing playing field - who will be contracting the work?
- Competencies in manufacturing process required
- Heightened ability to collaborate across trades



Growth impediments due to talent shortages

Availability has become a top impediment to performance

- Recession created industry exodus
- Baby boomers retiring
- Slowdown in U.S. immigration

Implications

- Top strategic leader focus – how do we attract and retain an “unfair” advantage of a limited talent pool
- Understand what’s required to attract and effectively leverage Millennials
- Internal development of talent
- Can applied technology produce more with fewer people

The E&C industry downturn occurred when Millennials were coming of age

If you cannot reasonably meet the need for skilled labor and tradespeople in the next few years, what do you think will be the impact for your business?

61% believe the lack of skilled labor will impact competitiveness and / or slow ability to grow



Bifurcation and Business Reinvention Continues

Large firms are becoming larger and more diversified, smaller firms are becoming more specialized

- Mid-tier firms are struggling to find a path of sustainable growth
- Engineering firms are moving into construction
- Contractors are pursuing opportunities across the facility life-cycle

Implications

- Vision and aligned strategic priorities never more critical
- Leaders of mid-tier firms are under pressure to understand marketplace and where and how they will compete and grow in the future
- Strategic thinking organizations becoming imperative

Diseconomies of scale persist for large firms, leadership issues are magnified....Design firms assuming contract risk with mixed results

Bifurcation:

Convergence underway in design and construction

- Seventeen (17) of the top twenty-five (25) engineering firms are in the contracting business
 - This number will only increase in the coming years
- Growth of design-build and construction management
- Battle for dominance – designers versus contractors
- Designing for productivity and efficiency



Green Building 2.0 - Sustainability Isn't Going Away

Green building aka Smart Buildings demand remains

- \$3 billion by 2020
- Consumption of renewable energy growing faster than conventional energy
- New generation expect energy efficient, high performance facilities

Implications

- Demand will grow for those who are expert in:
 - Energy-efficient designs
 - Low-impact building materials
 - Updated sustainable building standards



Global Interconnectedness Expanding

A/E/C outlook increasingly tied to global conditions and market dynamics

- As goes China, so goes... really?
- Terrorism and cyber-risk are new norm *wild-cards*

Implications

- Embedding organizational agility and performance discipline are becoming cultural requirements
- Knowing what to preserve and what to change in organizational behaviors to adapt and deliver consistent quality critical to long-term strategic direction

Re-thinking traditional strategic planning in favor of creating agile organizations

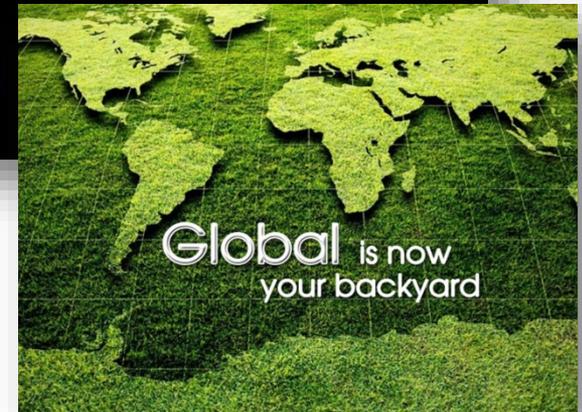
And, if the pace of change wasn't enough, we're now operating in a **VUCA** world

Volatile

Uncertain

Complex

Ambiguous





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Greg Powell is a director with FMI Capital Advisors, Inc., FMI Corporation's investment banking subsidiary. He specializes in mergers & acquisitions and business continuity transactions for engineering, architecture and environmental services firms. Greg also focuses on service and technology providers in the municipal and industrial water and wastewater industry.

Greg has 17 years of experience providing investment banking and corporate finance services. Prior to joining FMI, he spent several years as a principal with the boutique investment banking firm Wiley Capital Advisors and on Wall Street with Deutsche Bank's securitized products group. Greg also has extensive business and investment valuation experience, having worked with a wide range of companies and alternative investment funds. He began his career as a portfolio manager at The CIT Group where he structured and managed corporate credit facilities.

Greg earned a bachelor of arts in economics from the University of California at Los Angeles and a master of business administration from New York University's Stern School of Business. Greg also holds an Investment Banking Representative license (Series 79) and Uniform Securities Agent license (Series 63) from the SEC and FINRA.