BUILDING
MORE THAN
BUILDINGS®

BUILDING FOR THE FUTURE

CELEBRATING GILBANE'S 10th EDITION

Construction Economics

Market Conditions in Construction

Winter
2015-2016

UW Cancer Center at ProHealth Care
Pewaukee, Wisconsin

Gilbane

BUILDING FOR THE FUTURE

Construction Economics
Market Conditions in Construction
Winter 2015 - 2016

CONTENTS

DATA INCLUDED IN THIS REPORT

Dodge Data & Analytics Construction Starts through November, released December 18, 2015

U.S. Census Construction Spending (Put-In-Place) through November, released January 4, 2016

Bureau of Labor Statistics Construction Jobs through mid-November, released December 4, 2015

Producer Price Index Materials through November, released December 12, 2015

Producer Price Index Markets through November, released December 12, 2015

Architectural Billings Index through November, released December 22, 2015

Dodge Momentum Index through November, released December 7, 2015

Consumer Inflation Index through November, released December 15, 2015

Gilbane

TABLES

FIGURES

Summary

CONSTRUCTION OUTLOOK

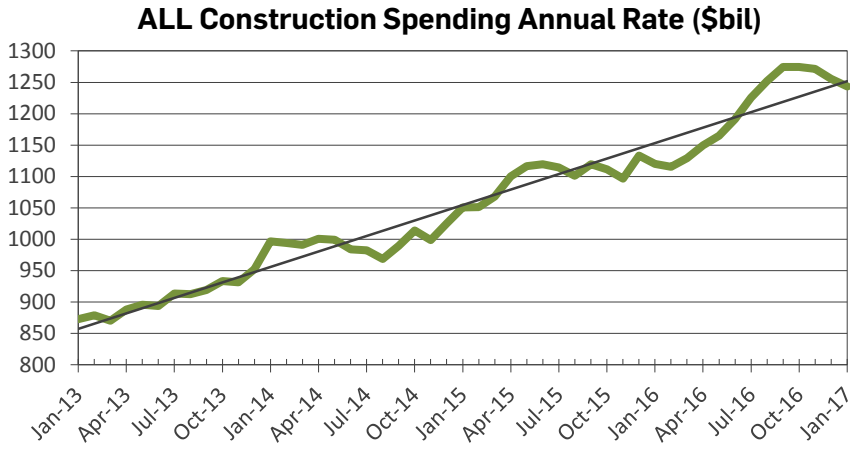
The Construction Spending BOOM in 2015 is being led by nonresidential building construction. Nonresidential buildings spending year-to-date (YTD) through November increased 17.6%, up $53 billion over the same period for 2014. Residential buildings spending YTD increased 13%, up $45 billion, and nonbuilding infrastructure projects YTD decreased 0.2%, down less than $1 billion. Nonresidential buildings will repeat this elevated activity with 13.7% growth in 2016.

- Construction spending will grow 10.7% for 2015 and 9.7% in 2016. Total spending in 2015 will be $1.1 trillion.
- Three-year growth from 2014 to 2016 for total construction spending may reach 30%, setting an all-time high. Growth from 2013 to 2015 will reach 27%, already the second highest growth period ever recorded.
- In the first quarter of 2015, the seasonally adjusted annual rate for all spending averaged near $1.05 trillion. In the last quarter of 2015, spending will average greater than $1.1 trillion.
- 2015 and 2016 spending advances will be supported by the strongest gains in nonresidential buildings in eight years.
- Construction starts for new nonresidential buildings for five of the last six quarters were the highest since Q3 2008.
- Residential spending has averaged 15% annual growth since 2012.
- Construction added 1 million jobs in five years. 800,000 jobs were added in the last three years.
- Spending for residential and nonresidential buildings will increase at an average annual rate of growth near 1.0% per month for the next 12 months.
- Nonbuilding infrastructure spending will remain near flat in 2016. There will be gains in spending midyear before we experience another mild slowdown later in 2016.

$1.115 Trillion

Average seasonally adjusted annual rate for all spending in Q3 and Q4 2015.

FIGURE A:
All Construction Spending Rate of Growth 2013-2016

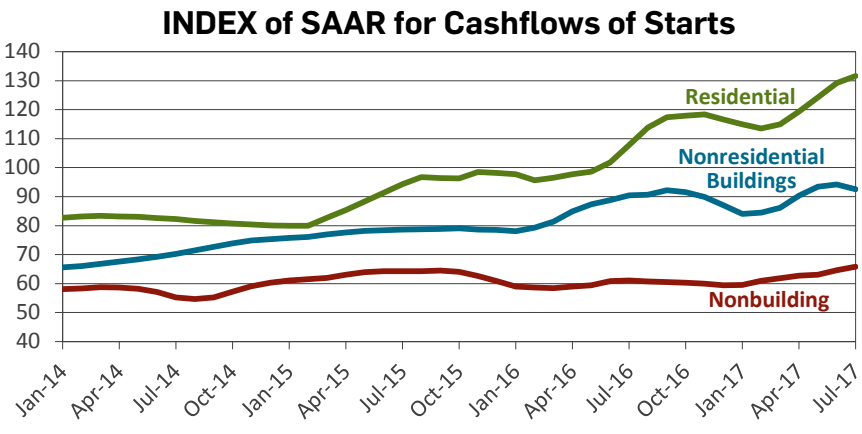


RESTRAINTS TO GROWTH

- The BLS Job Openings and Labor Turnover Survey (JOLTS) for the construction industry for October is at 139,000 unfilled positions. Although down slightly this month and down from the summer peak, the openings rate has been trending upward since 2012. A relatively high rate of openings generally indicates high demand for labor and could lead to higher wage rates.
- In a 2015 Associated General Contractors (AGC) survey, 80% of contractors indicated some difficulty in acquiring trained workers.
- According to a June 2015 survey by the National Association of Home Builders (NAHB), 61% of homebuilders during the previous 12 months had raised home prices due to labor shortages across construction trades.
- New nonbuilding infrastructure project starts have been mixed over the last two years, with both new highs and new lows. Even with five months of new highs in 2015, the up and down spending pattern we've been seeing will continue at least until the end of 2016.
- Housing starts were off to a slow start. In February and March, new starts dropped well below expectations, holding down total starts for 2015. The consensus forecast was 1,134,000 and the final total will be closer to 1,110,000, an increase of only 110,000 new starts in 2015.

Hiring workers with the right skills will continue to be a key constraint to economic growth through 2016.

FIGURE B:
Construction Starts – Aggregate Cash Flow of Starts 2014-2017

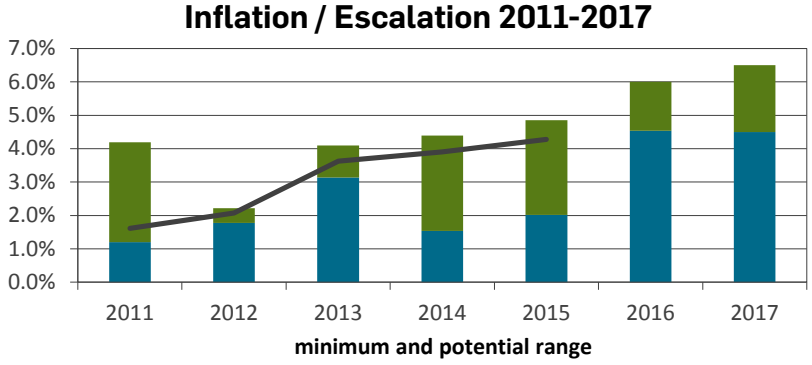


THE EFFECTS OF RAPID GROWTH

- From 2012 through 2014, the most current completed period, construction spending grew 24%. Inflation was 13%, so volume increased only 11%. However, work output increased by 13%. In this current growth cycle, productivity loss is at 2%.
- 2015 predicted spending growth is near 11%. The 2012-2015 four-year period of spending growth (35%) will be greater than the 2003-2006 rate (33%) and 1996-1999 rate (32%), which were the two fastest growth periods on record with two of the highest rates inflation and productivity loss.
- As work volume continues to increase over the next few years, expect productivity to decline. There are many reasons why this will occur, among them: working longer hours until new workers are brought on; working more days; hiring less qualified workers; and acclimating new workers to the crew.
- Growth in nonresidential buildings and residential construction in 2014 and 2015 has led to more significant labor demand. This may lead to labor shortages in some trades. This will drive up labor cost.
- Construction inflation is very likely to advance more rapidly than some owners have planned for, potentially requiring that some project budgets be revisited before projects can begin.
- Construction inflation in rapid growth years is much higher than average long-term inflation.
- Long-term inflation is 3.3% for nonresidential buildings and 3.5% for residential buildings.
- During rapid growth periods, inflation is 8% for nonresidential buildings and 9% for residential buildings.

2015 is a breakout year for nonresidential buildings construction spending, expected to finish at 17% growth. With expected growth of more than 13% in 2016, the three-year period of 2014-2016 could reach historic growth. Escalation will climb to levels typical of rapidly growing markets.

FIGURE C:
Inflation/Escalation 2011-2017



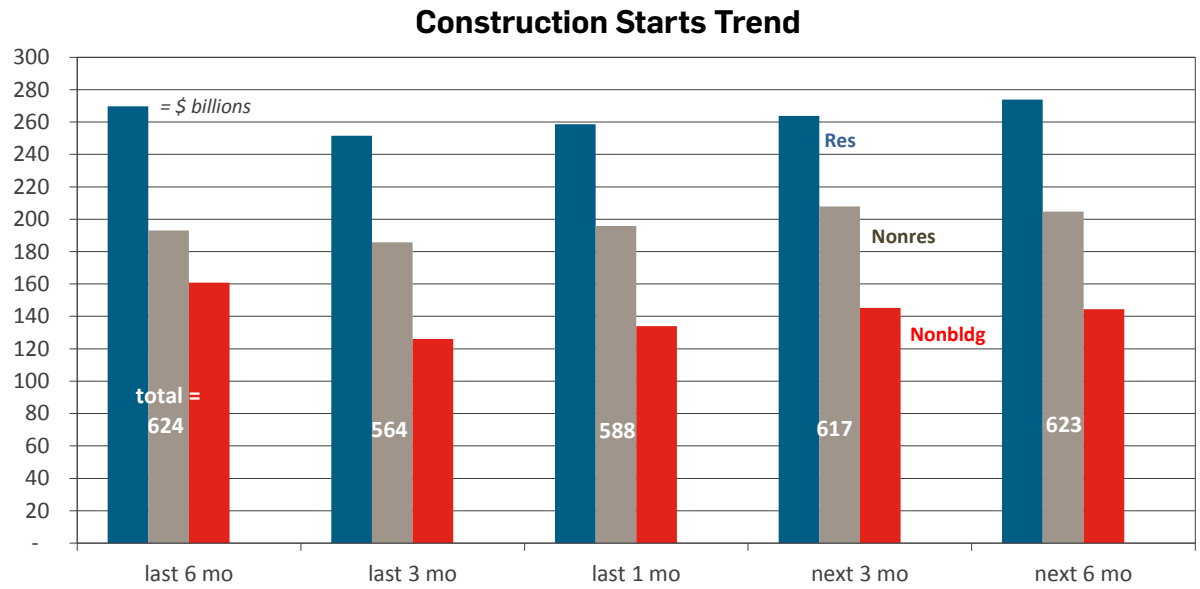

Construction
Starts

Construction Starts

Construction Starts data is published monthly by Dodge Data & Analytics (DDA). Each month, they update the data for the previous month and for the 12 months prior. The previous month and year prior updates are incorporated into the charts and tables included here. Although DDA may publish further updates to its data, this report does not track any data beyond the 12-month update. This may result in values here that differ slightly from other published DDA data.

Construction Starts data is volatile from month to month, and this may cause unusual peaks and valleys in the data. For that reason, a three-month moving average (3mma) of starts data is used. Also, to observe trends in the data, the latest month is compared to the last three months and the last six months of the Seasonally Adjusted Annual Rate (SAAR) data.

FIGURE 1:
Construction Starts Trends 2015-2016



SAAR based on data through November released Dec 18, 2015

EXPECTATIONS FOR 2015-2016 NEW CONSTRUCTION STARTS

- Total construction starts will slow to only 6% growth in 2016 but have averaged greater than 10% growth per year for the last four years. Nonresidential and residential buildings will record substantial growth in 2016. Nonbuilding infrastructure starts will decline from the high reached in 2015, and this will hold down 2016 totals.
- Nonresidential buildings starts will post a 7% drop for 2015, but primarily because the second half of 2015 slowed from the rapid pace of growth in the previous 15 months. 2015 is being compared to the resurgence in growth that started in early 2014, a year that posted 25% growth in new starts and the beginning of a period during which new starts posted the best five quarters since 2008. A 30% decline from the all-time high recorded in 2014 for new manufacturing building starts accounts for more than half of the full decline in this sector. Nonresidential buildings starts will increase 8.5% in 2016. The volume and evenness of the cash flows from 2014 and 2015 is supporting spending growth of 17% in 2015 and 14% in 2016.
- Residential starts growth for 2015 was consistently 15% above the same period in 2014. Residential starts are at a nine-year high. Starts averaged 20% per year growth for the last four years with 2014 held to only 10%. Growth in 2015 and 2016 is expected at 15% and 16%. This level of new starts activity will help keep spending growing at 12% to 15% per year.
- Nonbuilding infrastructure starts in the first half of 2015 reached the highest on record. Driven mostly by large power projects, cash flows are spread over longer durations than normal so they do not add significantly to monthly spending in 2015 or 2016. However, they will extend the period of spending. Current spending is being influenced by the completion of cash flows from starts in 2014 which were the lowest on record going back to January 2008. Starts in 2015 were expected to drop by 33% from first half to second half 2015, and they did drop by 36%. Starts in 2016 are projected to decline 14%, but this may change once we begin to see the impact of highway/bridge and transportation new starts as a result of the Fixing America's Surface Transportation (FAST) Act.

TABLE 1:
U.S. Construction Market Outlook New Starts 2009-2016

Total Construction Starts							GILBANE Forecast	GILBANE Forecast
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
NONRESIDENTIAL BUILDINGS	167,955	161,194 -4.0%	165,048 2.4%	155,222 -4.1%	177,362 12.1%	221,998 25.2%	205,397 -7.5%	222,764 8.5%
RESIDENTIAL BUILDINGS	111,851	121,155 8.3%	126,299 4.2%	166,159 31.6%	210,325 26.6%	231,000 9.8%	264,787 14.6%	307,416 16.1%
NONBUILDING CONSTRUCTION	141,899	148,088 4.4%	147,851 -0.2%	162,823 10.1%	148,755 -8.6%	145,125 -2.4%	176,745 21.8%	152,405 -13.8%
TOTAL CONSTRUCTION	421,705	430,437	439,198	487,204	536,442	598,123	646,929	682,585
PERCENT CHANGE YOY		2.1%	2.0%	10.9%	10.1%	11.5%	8.2%	5.5%

dollars in millions
includes Dodge Data & Analytics (DDA) data for November 2015 released 12-18-15
DDA data includes updates to 12 months ago data through November 2014
all data after November 2015 is predicted

FIGURE 2A:
Construction Starts Nonresidential Buildings 2012-2016

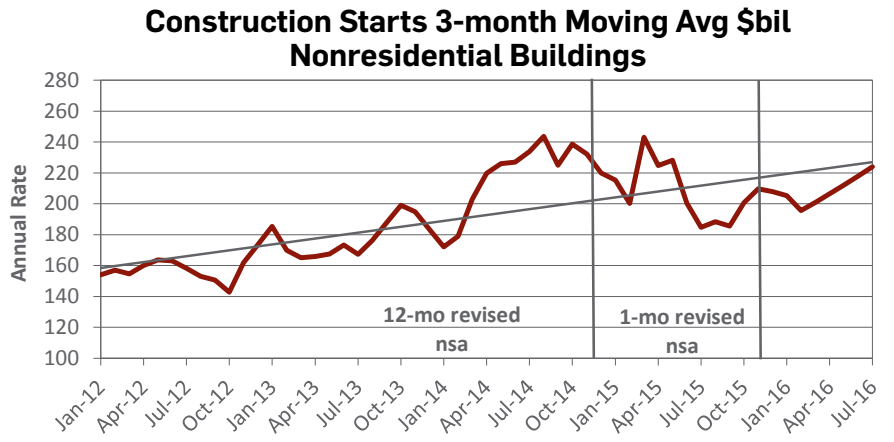


FIGURE 2B:
Construction Starts Nonbuilding Infrastructure 2012-2016

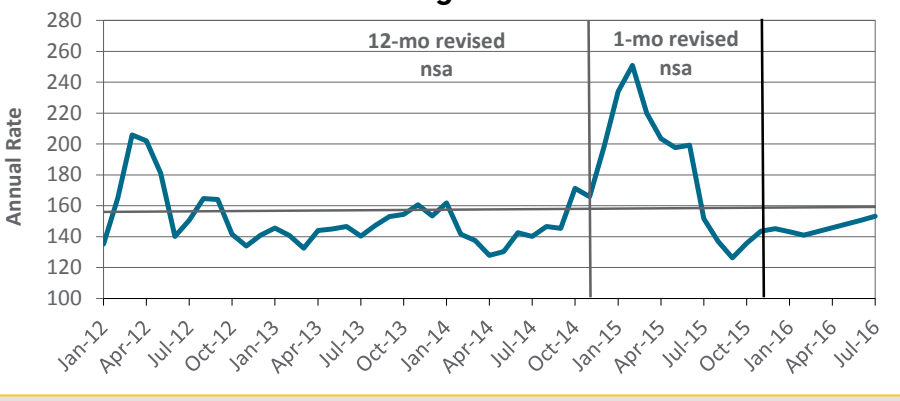
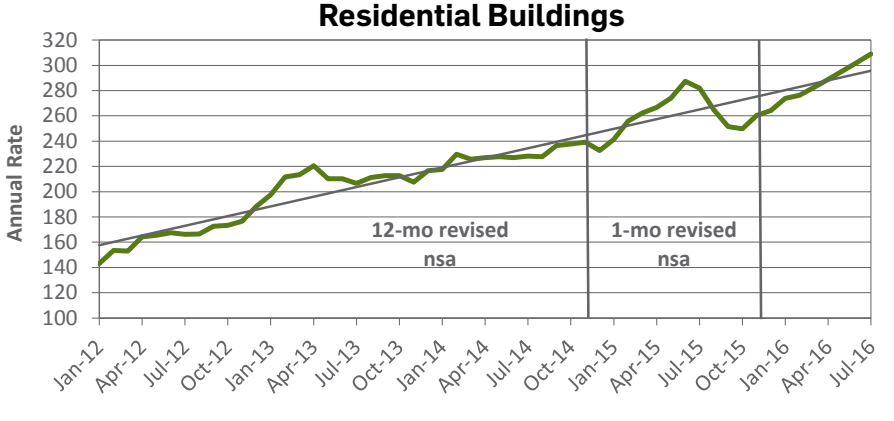


FIGURE 2C:
Construction Starts Residential Buildings 2012-2016



FIGURES 2A, B, C

Note: All DDA Starts seasonally adjusted (SAAR) data is revised one month later, and not seasonally adjusted (NSA) data is revised 12 months later. These plots include both 12-month and one-month adjustments. The vertical lines reflect the revision month.


Leading
Indicators

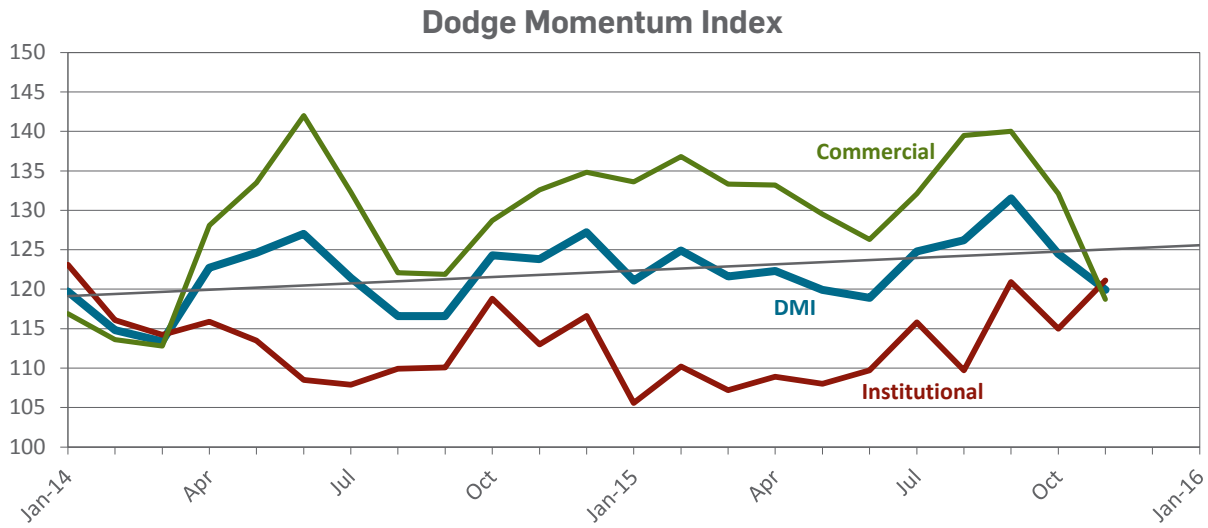
Leading Indicators

Leading indicators give the first indications of the expected direction for future starts and spending. The Dodge Momentum Index (DMI) and the American Institute of Architects (AIA) Inquiries Index are similar in that they both lead the AIA Architectural Billings Index (ABI). The ABI leads new construction starts. Dodge Data & Analytics (DDA) new construction starts is the record of new building contracts. Cash flows that show expected spending from all new starts over the life of the projects give an indication of the direction in future spending.

DODGE MOMENTUM INDEX

Dodge Momentum Index (DMI) is a monthly measure of nonresidential projects in planning, excluding manufacturing and infrastructure. It gives an indication of projects that may soon begin the design phase. It is a leading indicator of specific nonresidential construction spending by approximately 12 to 15 months. In recent months, the commercial index has been declining while the institutional index has been climbing.

FIGURE 3:
Dodge Momentum Index 2014-2015

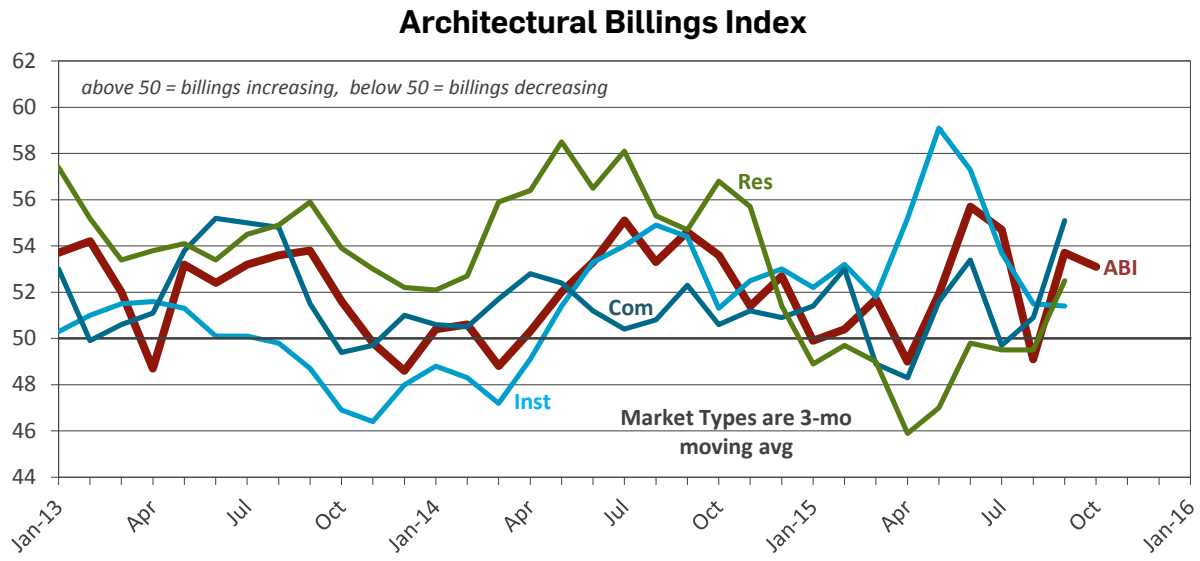


From July 2013 to July 2014, the DMI commercial index increased 40% and the institutional index dropped nearly 20%. For all of 2015, commercial slipped 12% while institutional advanced 15%. The DMI shows strongest correlations in the commercial sector at a nine-month lag and the institutional sector at a 15-month lag.

ARCHITECTURAL BILLINGS INDEX

Architectural Billings Index (ABI) measures monthly design work on the boards in architectural firms. It is a nine- to 12-month leading indicator to new construction starts. Index values above 50 indicate increasing billing revenues. Values below 50 indicate declining revenues.

FIGURE 4:
Architectural Billings Index 2013-2015

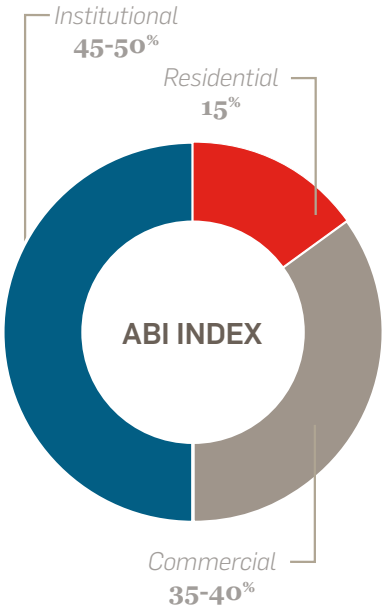


The slight dips in the ABI in 2015 may be indicating only a slowing of growth, not a decline.

The ABI is primarily a nonresidential indicator. Residential design projects account for only about 15% of the total index. Office buildings, hotels, shopping centers, banks, warehouses, manufacturing plants, and other commercial properties represent 35-40% of the index. Institutional buildings account for 45-50% of the index.

The ABI residential index may not necessarily track with residential spending. The residential ABI has very little input from single-family buildings that mostly do not require architectural design work. Therefore, a shift from multi-family to single-family residential construction could still result in active residential markets while the residential ABI may decrease.

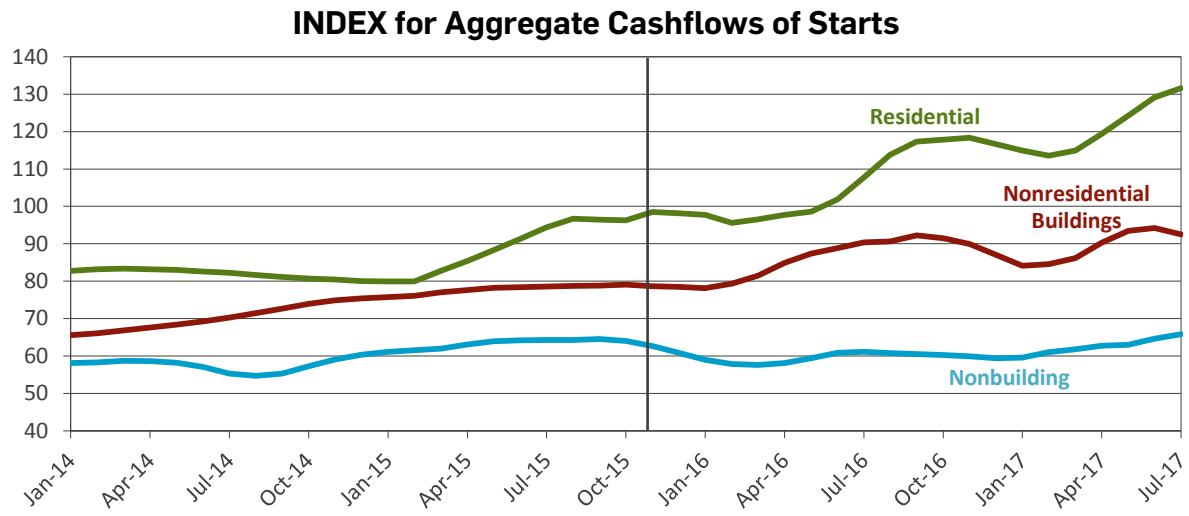
The ABI Institutional Index posted strong upward movement from May to July 2015. This should lead to strength in new institutional starts in early 2016. The Commercial Index dipped into negative territory three times in 2015, a sign of weakening from the strength in the previous two years. Typically, institutional facilities are the last nonresidential building sector to recover from a downturn.



NEW CONSTRUCTION STARTS AGGREGATE CASH FLOW

DDA construction starts act as a leading indicator to spending. To see the effect all starts have on future spending, monthly cash flow values are spread out over the expected project duration from start to finish. Generally, project durations can range from six to twelve months for small projects and, on average, 24 to 36 months for large projects. Unique large projects can last several years. Project duration and cash flow begins in the month the data is posted. Monthly cash flow can be quite uneven due to the variation in the volume and duration of starts. The cumulative cash flow every month from all starts over the previous months or years shows the relative change in spending caused by change in starts.

FIGURE 5:
Construction Starts – Aggregate Cash Flow of Starts 2014-2017



Cash flow shows both residential and nonresidential buildings should experience strong growth in 2016 before both dip in late 2016 or early 2017. Nonbuilding infrastructure shows flat throughout 2016 and a slight rise in 2017. This could change once the impact of the FAST Act is assessed.

CORRELATION OF LEADING INDICATORS

The following index chart (see Figure 6) shows the correlation among the DMI, the ABI, nonresidential building starts cash flows and actual nonresidential buildings spending. Starts data shows the aggregate cash flow. ABI and DMI data are moved out to their respective lead times; actual and predicted spending is real-time. Although there may be a one-month to three-month differential, there appears to be a correlation between the ABI and DMI and Starts, and they provide an indication of the strength and the direction that spending will move. Actual spending is through November 2015, and some correlation between spending and the other indicators can be seen throughout 2015. Starts are used to develop the spending forecast.

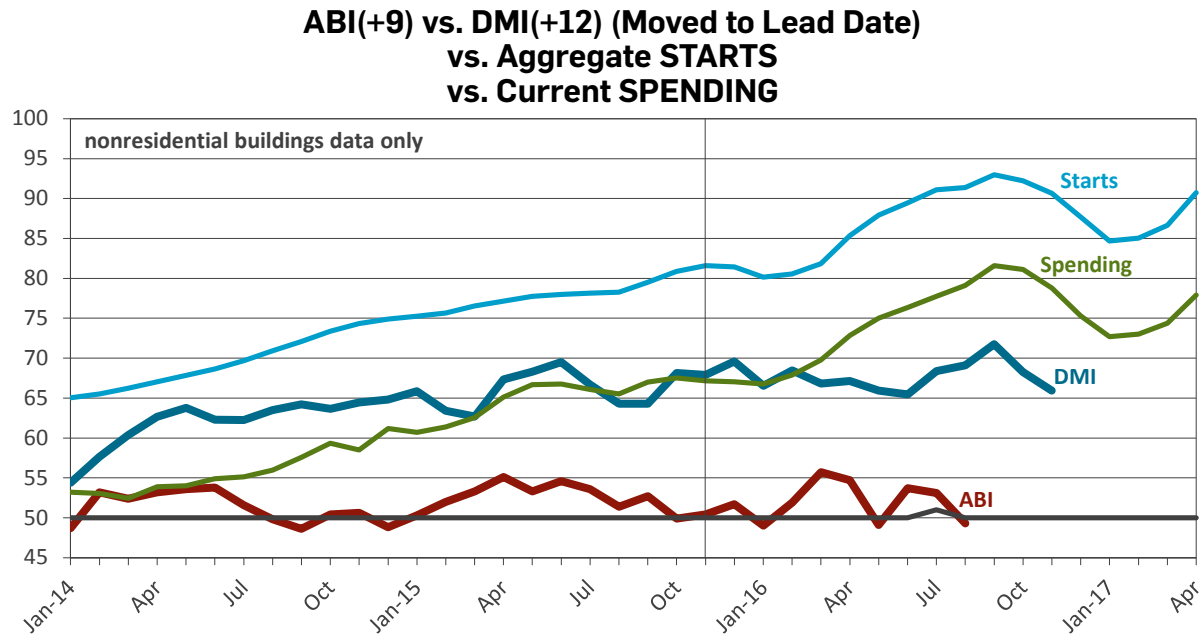
ANALYZING THE ARCHITECTURAL BILLINGS INDEX

Above indicates growth

50

Below indicates decline

FIGURE 6:
ABI – DMI – Starts by Lead Times vs. Spending



Based on leading indicators, spending for nonresidential buildings in 2016 is projected to increase 13% over 2015. With 17% growth projected for 2015, this will be the best two-year growth since 2006-2007.

Construction Spending

Gilbane

Construction Spending

Total spending for all types of construction in 2015 will reach $1.1 trillion, up 10.7% year-over-year from 2014 spending.

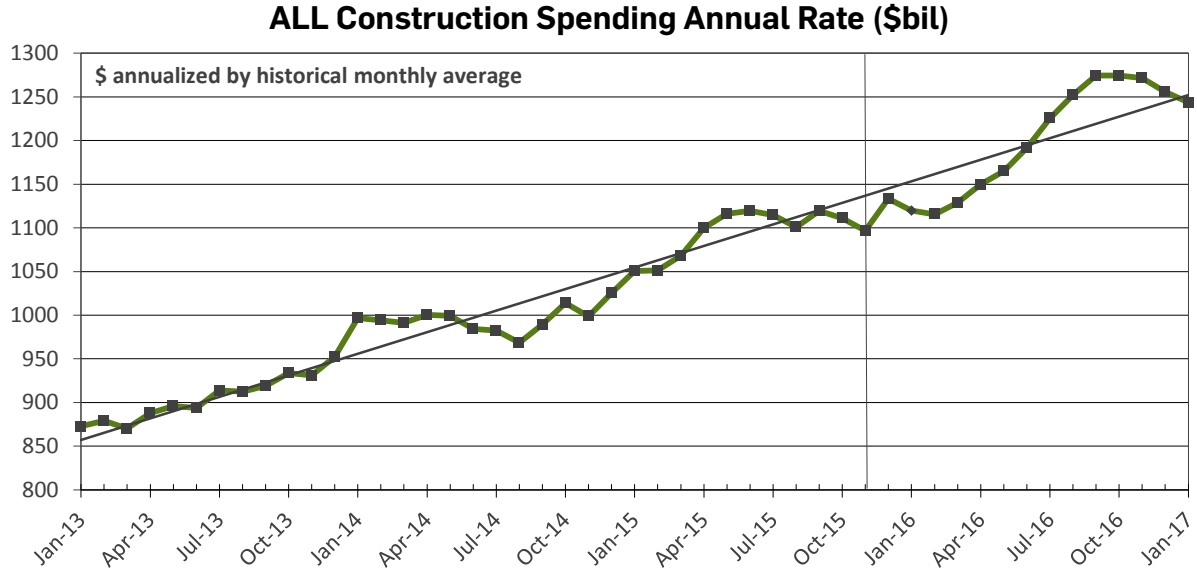
- 2015 spending will record the highest dollar amount year-over-year growth in 10 years.
- In Q1 2014, the monthly rate of spending was $994 billion.
- In Q1 2015, the monthly rate of spending was $1.056 trillion.
- In Q4 2015, the monthly rate of spending will average over $1.1 trillion.

For 2015, spending gains will be supported by the strongest gains in nonresidential buildings in eight years. Residential spending will also help total spending to advance. Nonbuilding infrastructure spending, after a brief gain, will go flat or decline until growth returns in the fourth quarter.

From the middle of Q1 2016 to the end of Q3 2016, construction spending will register an annual growth rate of 20%, but due to the dips at the beginning and the end of the year 2016, total construction spending growth will come in at 10%. Construction spending momentum is not losing steam. We are seeing the effect of a few years of erratic growth patterns and a shift from commercial to institutional work.

Expect a winter slowdown. It's not because of the weather. There may be additional repercussions if we experience severe weather, but the slowdown is predetermined because very large starts that got booked from one to two years ago are now reaching completion and dropping out of the monthly spending. Starts can be erratic. This causes periodic, but normal, fluctuations in monthly spending.

FIGURE 7:
All Construction Spending Rate of Growth 2013-2016



The November monthly construction spending report posted a slight loss month-over-month from October, but the data still shows rather exceptional trends. May plus June spending is the highest two-month total in seven years. Q2 2015 is the highest quarter since Q1 2008. At this rate, 2015 is on track to experience the second-highest ever dollar growth in spending, more than $100 billion. Only 2005 growth was greater.

- From August 2014 to May 2015, construction spending registered the fastest growth rate in more than nine years. 15% growth in nine months = 20% per year annualized. The growth rate is flat since.
- Manufacturing spending year-to-date versus same months in 2014 increased 47%.
- Nonresidential buildings spending year-to-date versus same months in 2014 increased 18%.
- Nonbuilding Infrastructure spending year-to-date versus same months in 2014 decreased 0.2%.
- Public spending is up 8% in a year and reached the highest level of spending in 12 quarters.

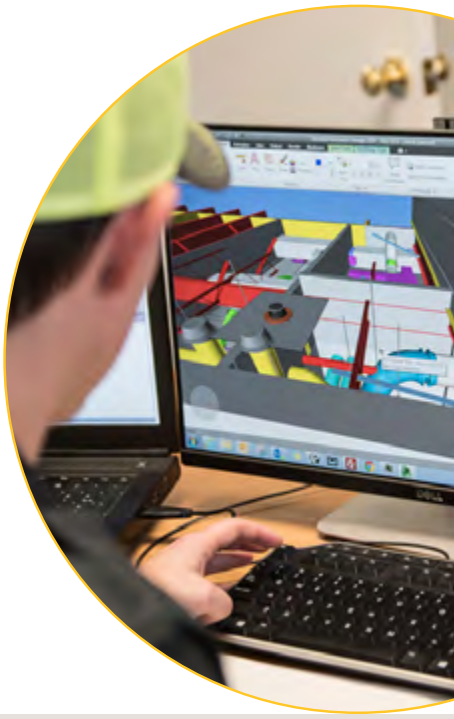


TABLE 2:
Total Construction Spending Summary 2007-2016

U.S. Total Construction Spending Summary

	TOTALS IN BILLIONS CURRENT U.S. DOLLARS									
	Actual								GILBANE FORECAST	GILBANE FORECAST
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
NONRESIDENTIAL BLDGS	403.9	438.6	377.5	291.9	284.3	300.7	303.2	330.0	**386.4**	**439.2**
% CHANGE YEAR OVER YEAR	18.9%	8.6%	-13.9%	-22.7%	-2.6%	5.7%	0.8%	8.8%	**17.1%**	**13.7%**
NONBUILDING HVY ENGR	248.1	272.1	273.5	265.0	251.3	273.7	273.9	288.3	**289.7**	**293.2**
	19.4%	9.7%	0.5%	-3.1%	-5.2%	8.9%	0.1%	5.2%	**0.5%**	**1.2%**
RESIDENTIAL	496.1	366.7	255.5	252.3	252.6	276.1	329.2	375.1	**423.8**	**473.8**
	-19.2%	-26.1%	-30.3%	-1.3%	0.1%	9.3%	19.3%	13.9%	**13.0%**	**11.8%**
TOTAL	1148.1	1077.4	906.5	809.3	788.3	850.5	906.4	993.4	**1099.8**	**1206.2**
	-1.1%	-6.2%	-15.9%	-10.7%	-2.6%	7.9%	6.6%	9.6%	**10.7%**	**9.7%**

Source $ Data: U.S. Census Bureau, Department of Commerce.
See Nonbuilding Infrastructure section for list of markets in Nonbuilding Hvy Engr
Actual spending data includes 2013 & 2014 revisions 7-1-15 and 2005-2015 revisions 1-4-16
Forecast Gilbane Building Company includes U.S. Census November year-to-date spending

Anticipate that construction spending for 2015 will total $1.1 trillion supported by a 17% increase in nonresidential buildings spending and a 13% increase in residential spending.

Once actual spending data through September is available, a select set of monthly data supports a statistical prediction of the yearly outcome for total spending within +/- 1%. It indicates 2015 should finish with total spending between $1.099 trillion and $1.119 trillion and nonresidential buildings spending between $386 billion and $395 billion. The actual final spending totals have not fallen outside the statistical range since 2001, as far back as Gilbane tracks the data. Gilbane's 2015 forecasts of $1.068 trillion for total spending and $387 billion for nonresidential buildings fall within the expected ranges.

TOTAL AND NONRESIDENTIAL BUILDINGS CONSTRUCTION SPENDING 2015-2016 - HOW DO WE COMPARE?

A comparison of most recent 2015 spending projections is shown in Table 3 and early 2016 projections are given in Table 4. Gilbane's projections are compared to CMD Group (CMD), Markstein Advisors (Mrkst) and FMI. Other forecasts are now more in line with Gilbane's forecast than earlier in the year. The FMI Fourth Quarter Outlook report's final forecast for 2015 and forecast for 2016 is usually released in January but was not available at the time of this report.

On January 4, 2016, the U.S. Census released revisions to residential spending covering 2005 through 2015. Table 3 shows the last Gilbane projection of 2015 costs JUST PRIOR TO THE CENSUS UPDATE. Other firms that released cost projections prior to January 4, 2016 have not yet had the opportunity to incorporate this revised data. This table captures the equivalent 2015 comparison before the updated numbers change.

TABLE 3:
Total Spending Predictions Comparisons 2015 Midyear vs. Year End

2015 Construction Spending Forecast

	VALUES ARE $ BILLIONS							
VALUES ARE $ BILLIONS	2014	Midyear Estm 2015			Q3-Q4 Estm 2015			
2014 DATA UPDATED 7-1-15	ACTUAL	Gilbane	CMD	FMI	Gilbane	CMD	Mrkst	FMI
RESIDENTIAL	344	388	384	382	390	395	384	376
NONRESIDENTIAL BUILDINGS	330	397	354	346	387	378	390	361
NONBUILDING	288	282	293	284	291	284	290	290
TOTAL NONRES	618	679	646	630	678	662	680	650
TOTAL ALL	962	1067	1031	1012	1068	1057	1064	1026
Change from 2014		10.9%	7.1%	5.2%	11.0%	9.9%	10.6%	6.6%

Values are billions of dollars
Gilbane data midyear 2015 = July 2015, Q3-Q4 12-21-15 includes October spending
CMD data midyear 2015 = 6-3-2015 report, Q3-Q4 12-23-15
Markstein Advisors (Mrkst) data Q3Q4 webcast 11-3-15
FMI data midyear 2015 = Outlook 2015 Q2, Q3-Q4 Outlook 9-28-15
FMI Transportation and Communication moved from Buildings to Nonbuilding to conform

Gilbane's forecast has not changed much since July when it predicted $1,067 billion for total construction spending, $388 billion for residential and $397 billion for nonresidential buildings spending in 2015. Last December, Gilbane forecast 8.5% growth in spending for 2015 and by April, raised that forecast to 9.5%. Since August, Gilbane has been predicting 11% growth in 2015 when most other forecasts were in the 5% to 7% range. It now appears we will finish the year very close to 11% growth.

For 2016, expect spending to total $1.206 trillion with increases of 13% and 14% in nonresidential and residential buildings. For the 2016 forecast, new starts booked through December 2015 will contribute 75% to nonresidential buildings spending, 55% to residential spending and 80% to spending on nonbuilding infrastructure.

TABLE 4:
Total Spending Predictions Comparisons 2015-2016

2015 -2016 Construction Spending Forecast									
VALUES ARE $ BILLIONS	**2014**	Q3-Q4 Estm 2015				Early Estm 2016			
2014 DATA UPDATED 1-4-16	**ACTUAL**	Gilbane	CMD	Mrkst	FMI	Gilbane	CMD	Mrkst	FMI
RESIDENTIAL	**375**	424	395	384	376	474	436	430	409
NONRESIDENTIAL BUILDINGS	**330**	386	378	390	361	439	417	426	384
NONBUILDING	**288**	290	284	290	290	293	294	313	301
TOTAL NONRES	**618**	676	662	680	650	732	711	739	685
TOTAL ALL	**993**	1100	1057	1064	1026	1206	1147	1169	1093
Change from previous year		10.7%				9.6%	8.6%	9.9%	6.6%

Includes U.S. Census November spending and 1-4-16 residential revisions
Gilbane Building Company all data from update 1-4-16, includes census revisions released 1-4-16
CMD Construction Market Data all data from article 12-23-15
Markstein Advisors (Mrkst) all data from webcast 11-3-15
FMI data all data from Outlook 9-28-15
FMI Transportation and Communication moved from Buildings to Nonbuilding to conform

On January 4, 2016, the U.S. Census released revisions to residential spending covering 2005 through 2015. Table 4 INCLUDES those revisions in the Gilbane projection of 2015 costs and 2016 costs. Other firms that released cost projections prior to January 4, 2016 have not yet had the opportunity to incorporate this revised data.

Census added about $33 billion to residential spending in 2015. For sake of fair comparison, add that amount to other 2015 projections and add that to other estimates for 2016.

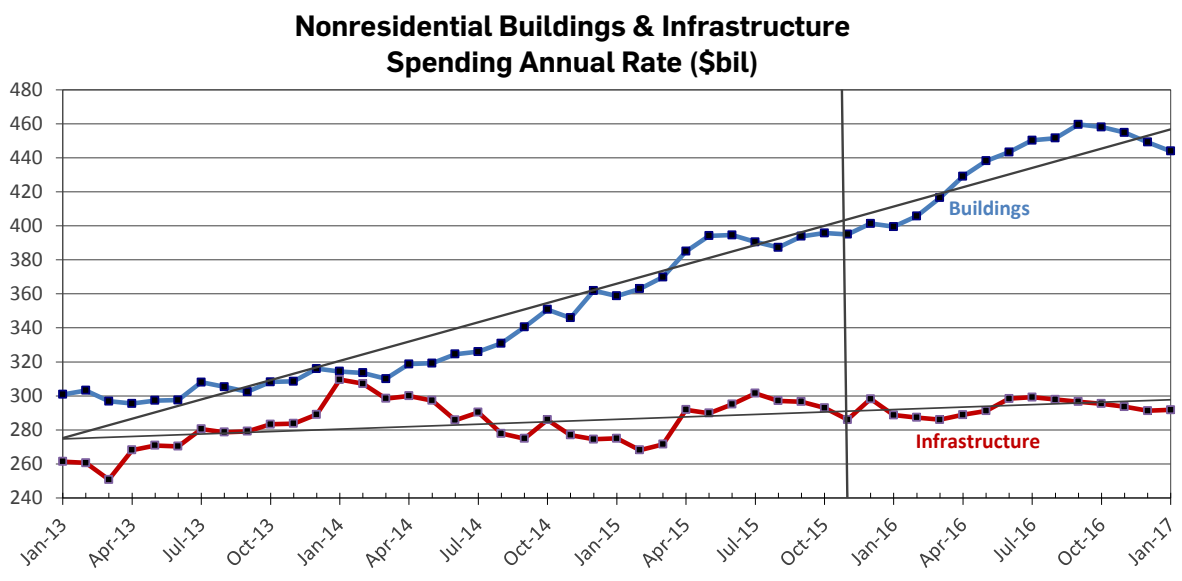
Nonresidential Construction Spending

Nonresidential Construction Spending

Nonresidential construction consists of two main categories, nonbuilding infrastructure projects and nonresidential buildings.

Total spending for all nonresidential construction in 2015 will reach $678 billion, up 9.7% from 2014. Growth is entirely due to nonresidential buildings spending, up 18% year-to-date. Nonbuilding infrastructure spending increased less than 1% in 2015.

FIGURE 8:
Spending Growth Nonresidential Buildings and Infrastructure 2013-2016



Nonresidential buildings spending will slow moderately in the next few months before we enter a period of 15% annual growth rate for the period Q2-Q3 2016. Spending will slow down late in 2016, leading into a considerably slower 2017.

Manufacturing starts are down 30% in 2015 and are still at the second highest rate ever recorded. Manufacturing will still provide very strong support to spending at 13% growth in 2016. The institutional sector will be the strongest sector in 2016 with work in educational and healthcare market sectors both climbing 13% to 14% and amusement/recreation adding 22%. Since 2013, major nonresidential buildings new starts increased an average 33% with healthcare coming up last. Total nonresidential buildings spending in 2016 will reach 14% growth.

Infrastructure projects spending will decline for the next six months due to the ending of massive projects that started 24 to 42 months ago. There will be big advances in spending midyear before we experience another mild slowdown later in 2016.

Infrastructure spending will grow less than 1% in 2016, held down by a 9% drop in the power sector, the second largest component of infrastructure work. Although power had very strong starts in 2015, spending in 2016 will be held down by the cash flows from a lower volume of project starts in 2013 and 2014. The strong starts in 2015 will boost 2017 spending. Highway/bridge and surface transportation spending will both benefit from the passage of the FAST Act with greater benefit occurring in 2017.

NONBUILDING INFRASTRUCTURE SPENDING

Nonbuilding projects are composed of heavy engineering, heavy industrial and infrastructure projects. They include transportation, communication, power, highway and street, sewage and waste disposal, water supply, and conservation and development. Almost 60% of nonbuilding work is public work.

After holding at $290 billion for less than 1% growth in 2015, spending for nonbuilding infrastructure in 2016 will reach only $293 billion, again less than a 1% increase over 2015.

- In Q1 2015, the monthly rate of spending slipped to only $272 billion, down from all of 2014.
- For the entire second half of 2015, the monthly rate of spending has been averaging $297 billion.
- Most of 2016 will not reach the current level of spending, finishing the year at $293 billion.

TABLE 5:
Construction Spending Major Nonbuilding Infrastructure Markets 2007-2016

U.S. Infrastructure Construction Spending

	TOTALS IN BILLIONS CURRENT U.S. DOLLARS Actual									
	2007	2008	2009	2010	2011	2012	2013	2014	GILBANE FORECAST 2015	GILBANE FORECAST 2016
POWER / ELECTRIC / GAS	66.1	81.1	88.9	77.9	75.2	97.4	93.3	101.2	87.4	78.9
% CHANGE YEAR OVER YEAR	56.4%	22.7%	9.6%	-12.3%	-3.5%	29.6%	-4.2%	8.5%	-13.7%	-9.6%
HIGHWAY / BRIDGE / STREET	76.7	81.4	82.2	82.5	79.3	80.5	81.4	84.2	90.4	94.6
	6.4%	6.1%	1.0%	0.4%	-3.9%	1.5%	1.0%	3.5%	7.3%	4.7%
TRANSPORTATION / AIR / RAIL	31.9	35.5	36.7	38.3	34.7	37.9	39.5	41.8	45.5	48.7
	14.0%	11.3%	3.5%	4.5%	-9.4%	9.0%	4.2%	5.9%	8.8%	7.0%
SUBTOTAL NONBUILDING	174.6	197.9	207.7	198.8	189.2	215.8	214.1	227.2	223.2	222.2
	22.8%	13.3%	5.0%	-4.3%	-4.8%	14.1%	-0.8%	6.1%	-1.8%	-0.4%
SUBTOTAL SHARE % TOTAL NONBUILDING INFRASTRCTR	*70.4%*	*72.7%*	*75.9%*	*75.0%*	*75.3%*	*78.9%*	*78.2%*	*78.8%*	*77.1%*	*75.8%*

Source $ Data: U.S. Census Bureau, Department of Commerce.
Transportation includes terminal buildings
Actual Spending data includes 2013 and 2014 revisions 7-1-15 and 2005-2015 revisions 1-4-16
Forecast Gilbane Building Company includes U.S. Census November year-to-date spending

The largest components of nonbuilding infrastructure work are power and highway/street. The power sector represents approximately 25% to 30% of all nonbuilding spending and highway/street represents about 30%. Power is more than 85% private while highway/street is almost 100% public. Erratic movement in new starts in the power industry causes unusual fluctuations in nonbuilding infrastructure spending. The period from July 2012 through June 2014 had the lowest average new starts for infrastructure work of any period in the last seven years. The effect of all of those low starts will result in constrained spending continuing through 2016.

Power

After reaching a peak of $101 billion in 2014, total spending for power projects in 2015 is expected to reach only $87.4 billion, a 13.7% decrease from 2014.

Power spending only dropped 15% during the recession. It is the most volatile market of all with dramatically erratic spending patterns.

Spending for power projects in 2016 is forecast to decline 9.6% from 2015. Other industry projections for power spending in 2016 range from -5% to +10% growth over 2015, averaging 3% growth in 2016.

As of November 2015, project starts that will generate 80% of all power projects spending in 2016 are already booked. Although power starts more than doubled in 2015, these projects are of such long duration that they will not have the same effect on 2016 spending. Long-duration, lower-volume projects from 2013 and 2014 will drive 2016 spending down. Strong starts in 2015 will boost 2017 spending.

Highway/Bridge/Street

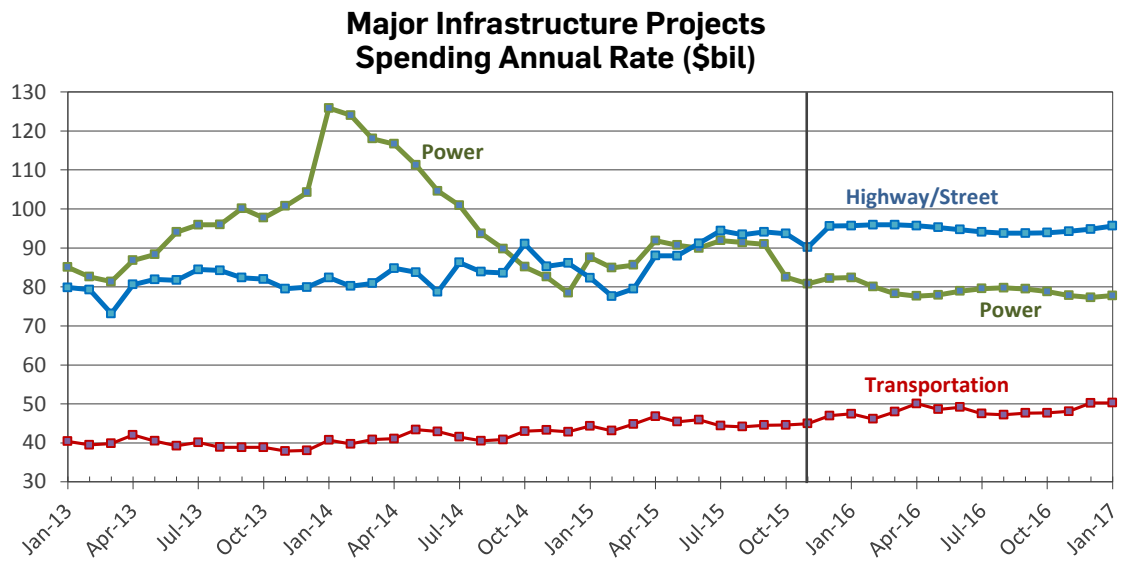
Total spending for highway/bridge/street projects in 2015 is expected to reach $90.4 billion, a 7.3% increase from 2014.

Spending in the highway/bridge/street market dropped only one year during the recession, 2011. It was supported in large part by government spending during the early stages of the recession.

In 2016, spending for highway projects is expected to increase 4.7% from 2015. Other industry projections for highway spending in 2016 range from -1% to +6% growth over 2015, averaging 3% growth in 2016. Once we begin to see the effects of the FAST Act projects, we may begin to see modifications to these projections.

As of November 2015, project starts that will generate 80% of all highway projects spending in 2016 are already booked. Highway/bridge spending will benefit from the passage of the FAST Act with potentially the most benefit occurring in 2017.

FIGURE 9:
Spending Growth Major Nonbuilding Infrastructure Markets 2013-2016



After two years of very low new starts, January through May 2015 posted the highest nonbuilding starts on record. Even though new starts slowed in the second half of 2015 by 35%, six months of an elevated level of nonbuilding starts will result in several months of increased spending over the next few quarters. Nonbuilding infrastructure will realize only modest spending gains in 2016 due to large projects ending and dropping out of spending.

NONRESIDENTIAL BUILDINGS SPENDING

Nonresidential buildings spending remained relatively flat from August 2011 to March 2014. Both the ABI and cash flow of new starts correlated with that spending pattern, and both also indicated the growth that we have seen occur since then. Nonresidential buildings spending year-to-date versus same months 2014 is up 21%. After a brief slowdown, nonresidential buildings spending will resume rapid growth through Q3 2015.

After reaching $386 billion for 17% growth in 2015, spending for nonresidential buildings in 2016 will climb to $439 billion, a 14% increase over 2015, a two-year growth total exceeded only once before in 2006-2007.

- 2015 spending will record the second highest dollar amount annual growth ever recorded, exceeded only by 2007.
- In the second half of 2015, the monthly rate of spending averaged just under $400 billion, a rate not seen since 2009 just before the beginning of the nonresidential building downturn.
- In 2016, the monthly rate of spending will climb from $400 billion to $450 billion.

NONRESIDENTIAL BUILDINGS

Total spending in 2015 and 2016 will be highest two-year total since 2006-2007.

This is clearly going to measure up as the breakout year for spending on nonresidential buildings. Growth year-to-date (YTD) is up 18%. We will finish the year with total growth up 17%. The last time we saw growth like this was 2007, the only time % growth (and $ volume growth) was ever larger than this year.

By far the largest spending contribution comes from the growth in manufacturing buildings, up 50% and up $23 billion YTD. Next closest is office buildings, up 22% and $8.3 billion YTD. Lodging, commercial-retail, educational, and amusement-recreation are each up approximately $4 billion YTD, impressive for lodging and amusement-recreation since they total only $17 billion each YTD.

Nonresidential buildings spending will maintain a second year of 10% growth in 2016 – something achieved only five times in 25 years. In 2016, educational and healthcare buildings will both contribute strongly to the total annual growth. Manufacturing, office and lodging will all settle back but still maintain 10% or greater growth. Commercial-retail, which had three years of substantial growth from 2012 to 2014, adding nearly 50% spending growth during that time, will add only 6% next year.

Nonresidential buildings spending in 2014, 2015 and 2016 may reach or exceed growth of 40% in three years, a growth rate reached only once in history, during the last construction boom, from 2006 to 2008. Along with that boom in spending came the highest nonresidential buildings construction inflation ever recorded, an average inflation of more than 8% per year for the four years from 2005 to 2008. It looks like we are headed toward persistent high construction inflation. However, the last three years so far seem more like the period from 1995 to 2000 when nonresidential buildings inflation averaged 4.0%. Then we had 40% spending growth in four years, a lesser growth rate than now.

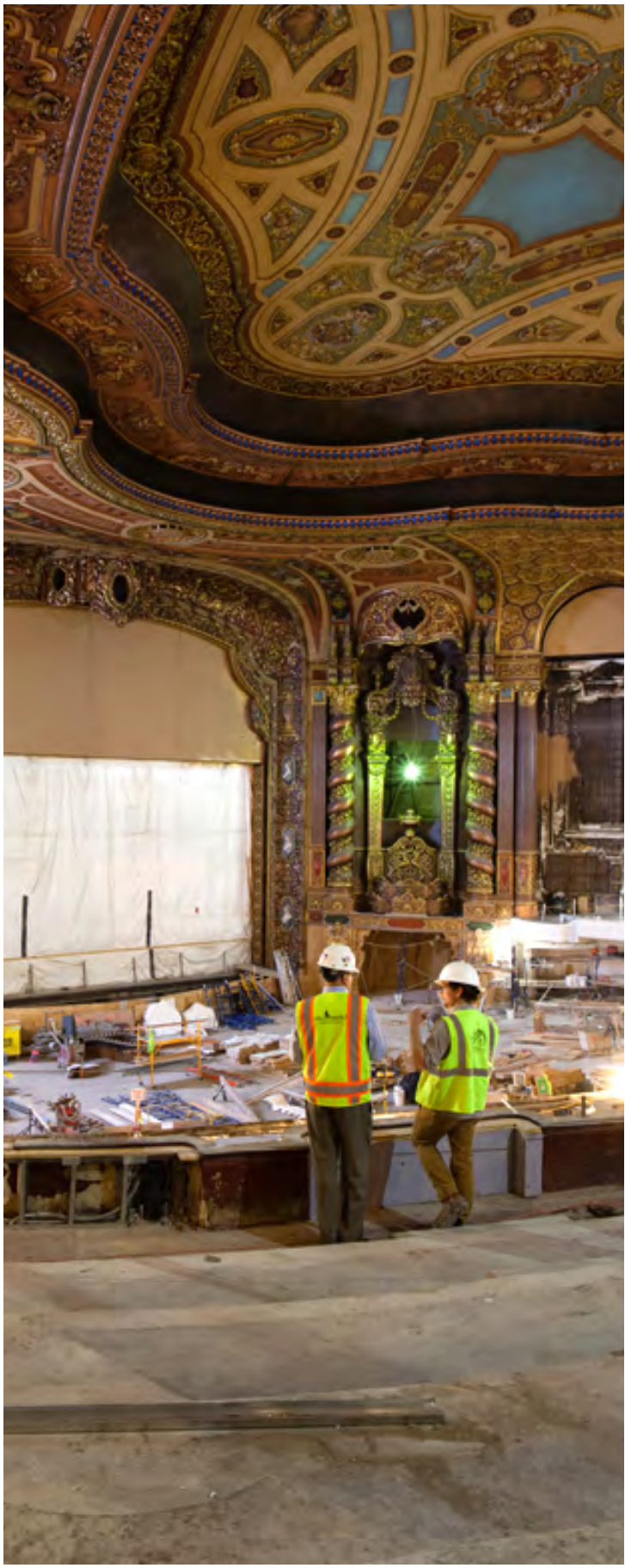


TABLE 6:
Construction Spending Major Nonresidential Buildings Markets 2007-2016

U.S. Nonresidential Buildings Construction Spending

TOTALS IN BILLIONS CURRENT U.S. DOLLARS

	Actual								GILBANE FORECAST	GILBANE FORECAST
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
EDUCATIONAL	96.8	104.9	103.2	88.4	85.0	84.7	79.1	79.7	85.6	97.2
% CHANGE YEAR OVER YEAR	13.9%	8.4%	-1.6%	-14.3%	-3.9%	-0.4%	-6.6%	0.8%	7.4%	13.6%
HEALTHCARE	43.8	46.9	44.8	39.3	39.7	42.5	40.7	38.4	40.5	46.1
	13.7%	7.2%	-4.4%	-12.3%	0.9%	7.2%	-4.4%	-5.6%	5.4%	13.8%
AMUSEMENT/RECREATION	21.2	21.8	19.4	16.9	16.0	15.5	15.2	16.6	20.9	25.6
	11.5%	2.9%	-11.1%	-12.7%	-5.6%	-3.2%	-1.8%	9.4%	25.7%	22.5%
COMMERCIAL/RETAIL	89.7	86.2	54.7	40.1	42.8	47.3	53.2	62.7	67.5	71.6
	16.9%	-3.9%	-36.5%	-26.7%	6.8%	10.6%	12.3%	18.0%	7.7%	6.0%
LODGING	28.7	35.8	25.5	11.6	9.1	10.8	13.5	16.1	21.1	23.4
	58.3%	24.7%	-28.8%	-54.4%	-21.5%	18.7%	24.5%	19.6%	31.0%	10.8%
OFFICE	65.3	68.6	51.9	37.8	36.0	37.8	38.0	46.1	55.9	58.5
	20.4%	5.1%	-24.3%	-27.1%	-4.9%	5.0%	0.5%	21.3%	21.4%	4.7%
MANUFACTURING	40.6	54.1	57.9	41.2	40.6	47.7	50.5	57.8	83.7	94.7
	24.4%	33.2%	7.0%	-28.9%	-1.5%	17.7%	5.9%	14.3%	44.8%	13.2%
SUBTOTAL NONRES BLDGS	386.0	418.3	357.5	275.5	269.2	286.4	290.1	317.4	375.2	417.2
	19.1%	8.4%	-14.5%	-22.9%	-2.3%	6.4%	1.3%	9.4%	18.2%	11.2%
SUBTOTAL SHARE % OF TOTAL NONRESIDENTIAL BLDGS	*95.6%*	*95.4%*	*94.7%*	*94.4%*	*94.7%*	*95.3%*	*95.7%*	*96.2%*	*97.1%*	*95.0%*

Source $ Data: U.S. Census Bureau, Department of Commerce.
Commercial retail includes stores & warehouses, Recreation includes Stadiums, Office includes Data Centers
Actual Spending data includes 2013 & 2014 revisions 7-1-15 and 2005-2015 revisions 1-4-16
Forecast Gilbane Building Company includes U.S. Census November year-to-date spending

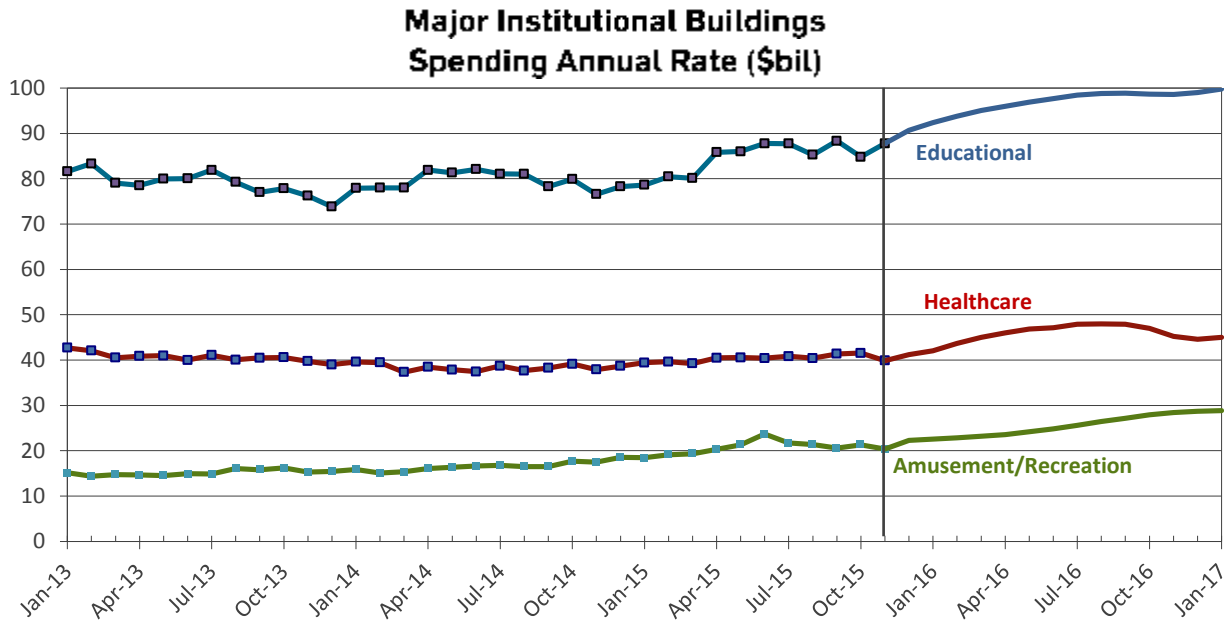
Five market sectors represent over 80% of all nonresidential buildings spending: educational; healthcare; commercial/retail; office and manufacturing. Lodging and amusement/recreation are the next two largest markets, and those seven markets account for 95% of all nonresidential buildings spending.

TABLE 7:
Spending Predictions Comparisons – Nonresidential Buildings Total 2015

2015 Construction Spending Forecast - Nonresidential Buildings						
$ IN BILLIONS	Q2 Estimate		Q3-Q4 Estimate		Early Estimate	
% GROWTH COMPARED TO PREVIOUS YEAR	2015		2015		2016	
NONRES BLDGS FINAL ACTUAL 2014	**330**		**330**			
GILBANE BUILDING COMPANY 1-4-16	397	20%	386	17%	439	14%
CONSTRUCTION MARKET DATA (CMD) 12-23-15	354	7%	373	13%	416	12%
FMI Q3 OUTLOOK 9-28-15	346	5%	361	9%	384	6%
MARKSTEIN ADVISORS WEBCAST 11-3-15			390	18%	426	9%
dates show latest forecast						

These are current comparisons of forecast totals for nonresidential buildings from midyear to year end for 2015 and early estimates for 2016. There are several other firms' forecasts that estimate between $380 to $400 billion for 2015 and $415 to $450 for 2016, but all are based only on about 80% to 90% of markets, and Gilbane has extrapolated to get an estimated total. So while this produces expected ranges reported here, those individual values are not included here.

FIGURE 10:
Spending Growth Major Institutional Building Markets 2013-2016



The major markets in the institutional sector are educational, healthcare and amusement/recreation. The largest markets, healthcare and hducational, both peaked in late 2008 and early 2009.

Educational

Spending for educational buildings in 2015 will total $85.6 billion, a 7.4% increase from 2014, the first substantial increase since 2008.

Since Q1 2009, public educational spending declined 30%, from a SAAR of $90 billion to $62 billion, but private educational spending declined only 11%, from $19 billion to $17 billion. Educational spending hit a low in Q4 2013 not seen since 2004. Since Q4 2013, low monthly spending has increased 15% and is projected to reach a rate of $90 billion by December 2015, an 8% gain for 2015 and a 13% gain for 2016.

Spending in 2016 for educational buildings is projected to grow 13.6% over 2015. Other industry projections for educational spending in 2016 range from -1% to +7% growth over 2015, with the average projected at 4.5%.

As of November 2015, project starts that will generate 70% of all educational spending in 2016 are already booked.

Educational spending through November increased only 6.7% YTD 2015 from the same period in 2014. However, the current annual rate of growth is 10%. Monthly spending is increasing and should continue to do so at least until mid-2016 before turning flat into year end.

Healthcare

Total spending for healthcare buildings in 2015 is expected to reach $41.1 billion, a 7.0% increase from 2014.

Healthcare spending hit an eight-year low in Q2 2014 at $38 billion. It is now up to $41 billion. Healthcare spending will reach an annual rate of $48 billion by Q3 2016.

2016 spending for healthcare buildings is expected to grow 13.8% over 2015. Other industry projections for healthcare spending in 2016 range from +3% to +8% growth over 2015, averaging 6% growth in 2016.

As of November 2015, project starts that will generate 70% of all healthcare spending in 2016 are already booked. Although healthcare starts have not increased much over 2014, there are several months of very large starts from 2014 and early 2015 that will generate added spending above normal in 2016.

Healthcare spending through November increased only 4.6% YTD 2015 from the same period 2014. However, expect the annual growth rate to reach 15% in the first half of 2016, caused in part by long-duration, large-volume starts that are still ongoing from early 2014. Monthly spending is increasing and should continue to do so at least until the third quarter before turning flat into year end.

Amusement/Recreation

Amusement/recreation is the smallest of the major nonresidential building types. It posted the strongest percent growth of the institutional buildings in 2015. 2015 spending will reach $20.9 billion, a 26% increase from 2014.

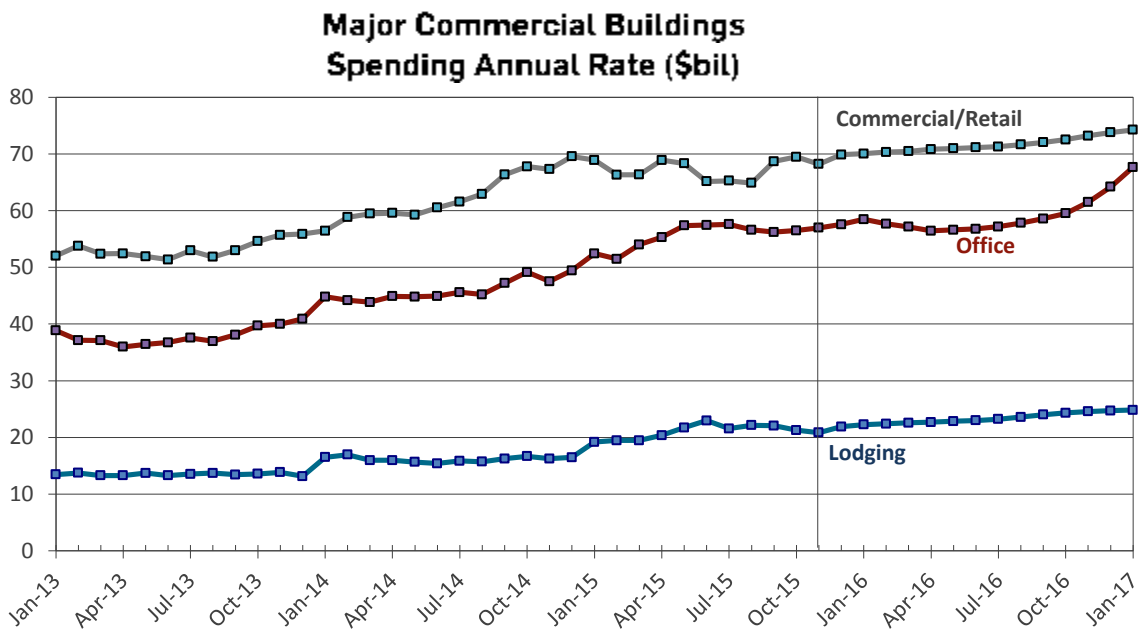
Amusement/recreation building spending hit its post-recession low in 2011, dropping from $21.8 billion in total spending in 2008 to $15.2 billion 2011. From 2010 through 2014, amusement/recreation spending averaged $16 billion per year. In 2015, spending is back to the pre-recession high, and in 2016 spending will reach a new high.

Spending in 2016 for amusement/recreation buildings is projected to grow 22.5% over 2015. Other industry projections for spending in 2016 range from +6% to +13% growth over 2015, with the average projected at 9%.

As of November 2015, project starts that will generate 70% of all amusement/recreation spending in 2016 are already booked. New starts are up 10% in 2015 and are expected to grow at least the same in 2016.

This category includes theme/amusement parks, stadiums, field houses, athletic clubs, performance centers, convention centers, community centers and similar type buildings.

FIGURE 11:
Spending Growth Major Commercial Building Markets 2013-2016



The major commercial markets are commercial/retail, office and lodging. Lodging has less than 15% market share.

Commercial/Retail

Total spending for commercial/retail buildings in 2015 should reach $67.5 billion, up 7.7% from 2014. In July, U.S. Census revised 2014 spending upward from $57.1 billion to $62.7 billion, reflecting an 18% increase above 2013, the largest increase since 2007.

Commercial/retail experienced the most drastic decrease in spending of all nonresidential market types. From Q1 2008 to Q4 2010, it dropped 60% to $37 billion from a peak of $99 billion. In inflation adjusted constant dollars, this is the lowest spending on record for commercial/retail buildings. Spending rebounded very nicely in the three years from 2012 to 2014 as the strongest growth market sector during that period. Spending is now up to a rate of $69 billion, but growth will slow from here on forward.

Spending in 2016 for commercial/retail buildings is projected to grow 6% over 2015. Other industry projections for commercial/retail spending in 2016 range from -2% to 11% growth over 2015, with the average projected at 6.5%.

As of November 2015, project starts that will generate 70% of all commercial/retail spending in 2016 are already booked. Fairly consistent growth in starts will produce a slow but consistent spending growth pattern through 2016.

Commercial/retail spending through November increased 8.4% YTD 2015 from the same period 2014. However, the current annual rate of growth will very quickly fall to 6%. Monthly spending will grow very slowly in 2016 and slow even more into 2017.

Office

Total spending for office buildings in 2015 is expected to reach $55.9 billion, a 21.4% increase from 2014, on top of a 21.3% increase in 2014. Office spending experienced surges in both early 2014 and early 2015. It will maintain upward momentum in 2016 but at a slower pace.

Office building spending hit its post-recession low in Q2 2013 but very quickly turned up in 2014. Year-over-year growth in 2014, and now in 2015, is over 20%. However, a slowdown in new starts over the last three quarters will slow growth over the next 12 months.

Spending in 2016 for office buildings is projected to grow only 4.7% over 2015. Other industry projections for office spending in 2016 range from +7% to +15% growth over 2015, with the average projected at 10%.

As of November 2015, project starts that will generate 65% of all office spending in 2016 are already booked. Although down 15% in 2015, starts have been strong and multiple months of large volume starts will help keep 2016 spending positive.

Office spending is projected to grow again in 2017. Office vacancy rates are low and rents are high supporting developers in their decision to build new projects. Dodge Data & Analytics (DDA) predicts office as the strongest nonresidential market for new starts in 2016.

Lodging

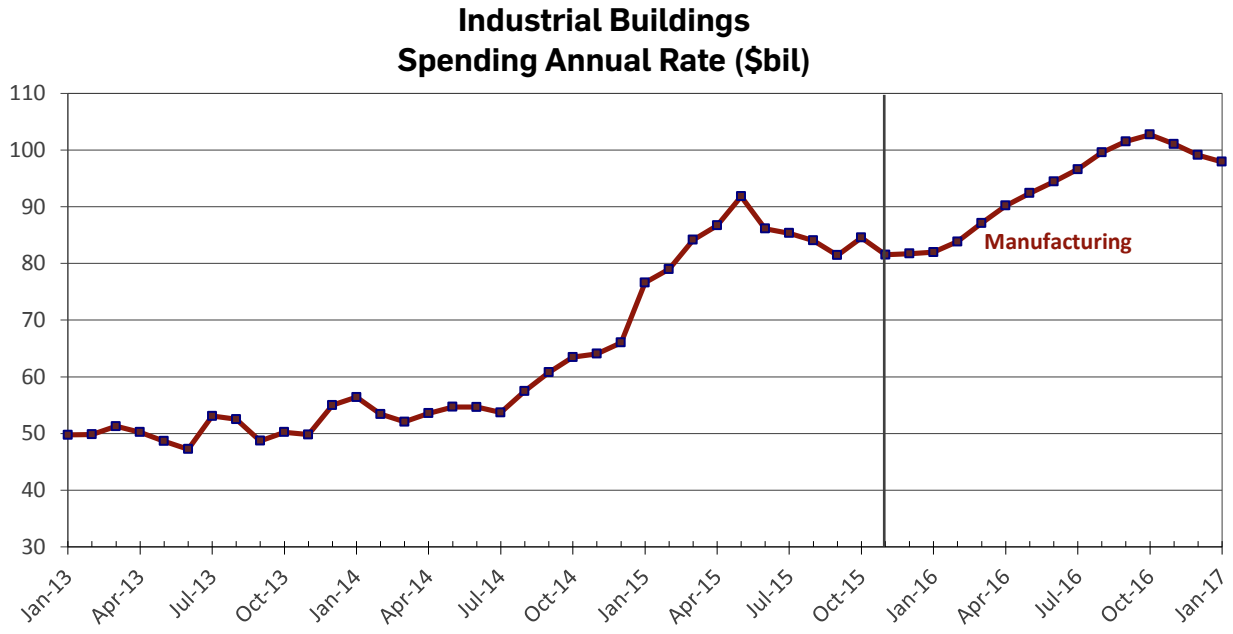
Lodging is the second smallest of the major commercial building types, but it is by far the strongest commercial percent growth market. 2015 spending is expected to reach $21.1 billion, a 31% increase from 2014, following three previous years that averaged 21% growth. The 2012-2015 four-year total growth will exceed 90%.

Lodging building spending hit its post-recession low in 2011, dropping from $90 billion in total spending in the three years from 2007 to 2009 to only $30 billion in the three years from 2010 to 2012. From 2005 through 2009, lodging spending averaged $24 billion per year. There may be currently a $60 billion deficit that needs to be filled, and this may keep the lodging market active for several more years.

Spending in 2016 for lodging buildings is projected to grow 10.8% over 2015. Other industry projections for lodging spending in 2016 range from +7% to +15% growth over 2015, with the average projected at 9.5%.

As of November 2015, project starts that will generate 65% of all lodging spending in 2016 are already booked. Lodging new starts slowed in 2015, but still posted 12% growth. Starts in 2016 are projected to grow 16% leading to continued spending growth in 2017.

FIGURE 12:
Spending Growth Major Industrial Building Market 2013-2016



Manufacturing buildings are the only building type classified in the industrial buildings sector. Spending peaked in early 2009 at a rate of $70 billion but then dropped 50% to hit a five-year low in January 2011. It quickly climbed from that bottom but remained between $40 and $50 billion until March 2014. Manufacturing is 100% private.

Manufacturing

Total spending for manufacturing buildings in 2015 will reach $83.7 billion, up 44.8% from 2014. It is rare that any market grows close to 50% in a year.

Manufacturing buildings spending rose from a SAAR rate of $50 billion in Q1 2014 to its 2015 peak of $92 billion in May. From July 2014 through May 2015, manufacturing spending grew at an annual rate of 80%. Since then, spending has declined at an annual rate of 25%.

Spending in 2016 is projected to grow 13.2% over 2015. Other industry projections range from -10% to +15% growth over 2015, with the average of those projections at 6.5%.

As of November 2015, project starts that will generate 75% of all manufacturing spending in 2016 are already booked. Total starts for 2015 are projected to finish almost 30% lower than 2014. That will still result in the second highest year of starts on record and will result in spending growth in 2016.

INDUSTRY FORECASTS COMPARED – MAJOR NONRESIDENTIAL BUILDINGS

Table 8 shows forecast percent growth over the previous year for nonresidential buildings. Midyear forecast and most recent forecast for year-end 2015 are also given. Some firms provided midyear forecasts, while others provided only year-end forecast.

TABLE 8:
Spending Predictions Comparisons – Major Nonresidential Buildings Markets 2015

2015 Construction Spending Forecast Comparison
Selected Nonresidential Buildings

MIDYEAR DATA JUN-AUG UPDATED 8-3-15 % = GROWTH CHANGE 2015 VERSUS 2014	EDUCATIONAL 2015	HEALTHCARE 2015	AMUSE/REC 2015	COMMERC/RTL 2015	LODGING 2015	OFFICE 2015	MANUFACTURING 2015
ACTUAL 2014 TOTAL $ (RVSD 7-1-15) $BILLIONS	**79.7**	**38.4**	**16.6**	**62.7**	**16.1**	**46.1**	**57.8**
Gilbane Building Company 8-3-15	7.1%	6.0%	na	5.5%	24.0%	21.1%	49.6%
Construction Market Data (CMD) 6-3-15	3.5%	5.5%	18.0%	12.0%	16.0%	14.0%	18.0%
FMI Q2 Outlook Jun 2015	-0.2%	1.5%	9.0%	13.5%	12.1%	11.3%	16.9%
Assoc. Builders & Contractors - AIA 06-15	-1.6%	-0.3%	5.7%	8.4%	12.3%	9.8%	19.6%
Dodge Data & Analytics - AIA 06-15	2.9%	0.4%	15.1%	13.7%	17.1%	19.2%	24.6%
IHS Global Insight - AIA06-15	12.4%	12.5%	8.4%	11.4%	16.8%	14.3%	5.6%
Moody's Economy.com - AIA 06-15	5.6%	4.0%	38.0%	12.1%	7.9%	12.2%	10.7%
Q3-Q4 DATA SEP-DEC UPDATED 1-4-16 YEAR-TO-DATE GROWTH AS OF 11-30-15	**EDUCATIONAL 6.7%**	**HEALTHCARE 4.6%**	**AMUSE/REC 26.2%**	**COMMERC/RTL 8.4%**	**LODGING 30.8%**	**OFFICE 21.9%**	**MANUFACTURING 47.3%**
Gilbane Building Company 1-4-16	7.4%	5.4%	25.7%	7.7%	31.0%	21.4%	44.8%
Construction Market Data (CMD) 12-23-15	5.9%	5.7%	29.0%	9.0%	28.5%	22.0%	48.0%
FMI Q3 Outlook 9-28-15	3.0%	5.0%	11.0%	8.0%	15.0%	14.0%	18.0%
Assoc. Builders & Contractors - 12-7-15	8.1%	5.1%	na	5.0%	27.4%	18.7%	46.1%
Wells Fargo 9-30-15 in NABE webcast 10-1-15	2.5%	4.0%	12.5%	3.0%	20.0%	18.5%	45.0%
Portland Cement Assoc in ENR 11-16-15	-2.1%	12.2%	na	10.4%	23.8%	15.8%	7.1%
American Institute Arch - CMD web 11-19-15	5.8%	5.5%	28.9%	9.3%	31.1%	22.9%	53.0%
Assoc General Contractors - NABE web 10-1-15	0 to 5%	3 to 6%	25 to 35%	9 to 14%	20 to 30%	15 to 20%	40 to 50%

Comparisons in Table 9 show forecasts for nonresidential buildings in 2016. How will markets perform in 2016? Here's a few examples from a variety of sources; educational, healthcare, lodging and manufacturing all have more than one estimate for 2016 growth in the range of 0% to 4%, values that would not keep spending growth up with inflation, meaning volume would actually decline. Gilbane's forecasts for those markets are all 10% or higher. Variations of 10% to 15% in predicted growth are common in the data.

TABLE 9:
Spending Predictions Comparisons – Major Nonresidential Buildings Markets 2016

2016 Construction Spending Forecast Comparison
Selected Nonresidential Buildings

% = GROWTH CHANGE 2016 VERSUS 2015 EARLY 2016 DATA POSTED Q4 2015	EDUCATIONAL 2016	HEALTHCARE 2016	AMUSE/REC 2016	COMMERC/RTL 2016	LODGING 2016	OFFICE 2016	MANUFACTURING 2016
FORECAST 2015 $BILLIONS >>>	**85.6**	**40.5**	**20.9**	**67.5**	**21.1**	**55.9**	**83.7**
Gilbane Building Company 12-21-15	13.6%	13.8%	22.5%	6.0%	10.8%	4.7%	13.2%
Construction Market Data (CMD) 12-23-15	6.0%	8.5%	13.0%	10.5%	18.0%	15.0%	10.5%
FMI Q3 Outlook 9-28-15	4.0%	4.0%	8.0%	10.1%	12.4%	7.0%	5.0%
Assoc. Builders & Contractors - 12-7-15	6.9%	8.0%	na	3.7%	11.4%	8.1%	14.9%
Wells Fargo 9-30-15 in NABE webcast 10-1-15	5.3%	6.2%	5.6%	5.5%	11.1%	9.7%	10.6%
PCA in ENR 11-16-15	-0.6%	2.6%	na	8.1%	3.8%	8.0%	4.2%
AGC in CMD webcast 11-19-15	3 to 5%	3 to 8%	na	-2 to +11%	-10 to +15%	5 to 15%	-10 to +10%
Actual 2015 Total $billions will be revised 3-1-16							

Residential Construction Spending

Gilbane

Residential Construction Spending

On January 4, 2016, the U.S. Census released revisions to residential spending covering 2005 through 2015. Most years during that period were revised upwards. By far the largest adjustments were for 2014 and 2015 year-to-date, which were revised upward by $31 to $33 billion, 9% of total residential spending in the year. This modified our total growth reported for 2014 from less than 1% to +14%. While it modifies our total dollars for 2015, it does not have a large effect on our percent growth for 2015.

Total spending for residential construction in 2015 will reach $424 billion, a 13.0% increase from 2014. Single-family housing represents approximately 52% of spending. Multi-family housing represents 12% of spending. The remaining 36% of spending is renovation work.

- 2015 spending will grow 13% over 2014. Spending has averaged 14% per year growth for the last four years.
- Spending will post modest dips from Q4 2015 through Q1 2016.
- In 2016, the monthly rate of spending will grow more than 20% from Q1 to Q4.
- By the end of 2016 spending will be at an annual rate over $500 billion.

Spending in 2016 for residential buildings is projected to grow 11.8% over 2015. Other industry projections for residential spending in 2016 range from 5% to 10% growth over 2015, with the average projected at 7.5% growth.

As of November 2015, residential project starts that are booked will generate 55% of residential spending in 2016. Residential construction has the shortest durations so previously booked starts provide the lowest forecast certainty and new starts booked within the year contribute a lot to spending within the year. More than any other sector or market, residential construction is more dependent on future starts for total spending within the year.

RESIDENTIAL BUILDINGS

2015 spending will record the second highest dollar amount annual growth ever recorded, exceeded only by 2007.

TABLE 10:
Construction Spending Summary Residential 2007-2016

U.S. Total Construction Spending Summary

	TOTALS IN BILLIONS CURRENT U.S. DOLLARS Actual								GILBANE FORECAST	GILBANE FORECAST
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
RESIDENTIAL	496.1	366.7	255.5	252.3	252.6	276.1	329.2	375.1	423.8	473.8
% CHANGE YEAR OVER YEAR	-19.2%	-26.1%	-30.3%	-1.3%	0.1%	9.3%	19.3%	13.9%	13.0%	11.8%

Source $ Data: U.S. Census Bureau, Department of Commerce.

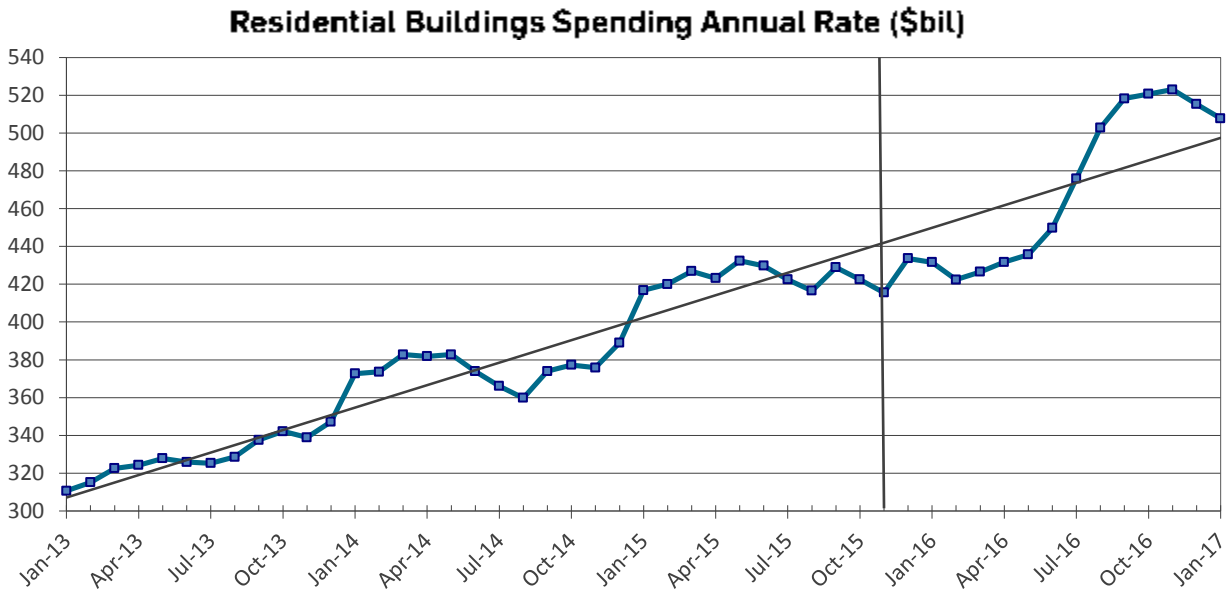
See Nonbuilding Infrastructure section for list of markets in Nonbuilding Hvy Engr

Actual spending data includes 2013 & 2014 revisions 7-1-15 and 2005-2015 revisions 1-4-16

Forecast Gilbane Building Company includes U.S. Census November year-to-date spending

Residential spending peaked in Q1 2006 at an annual rate over $700 billion. It then dropped to a low point in Q4 2010 at an annual rate of less than $250 billion, a decline of 65%. Spending rebounded very nicely in the three years of 2012 to 2014 as the strongest growth market sector during that period. Spending is now averaging an annual rate of $430 billion, but growth will slow for the next few months. Residential spending will slow several percent to a low point in February before resuming upward momentum to finish 2016 stronger than 2015. Periods of low start volumes need to work their way through the system, and this produces growth patterns with periodic dips.

FIGURE 13:
Spending Growth Residential Building Market 2013-2016



HOUSING STARTS

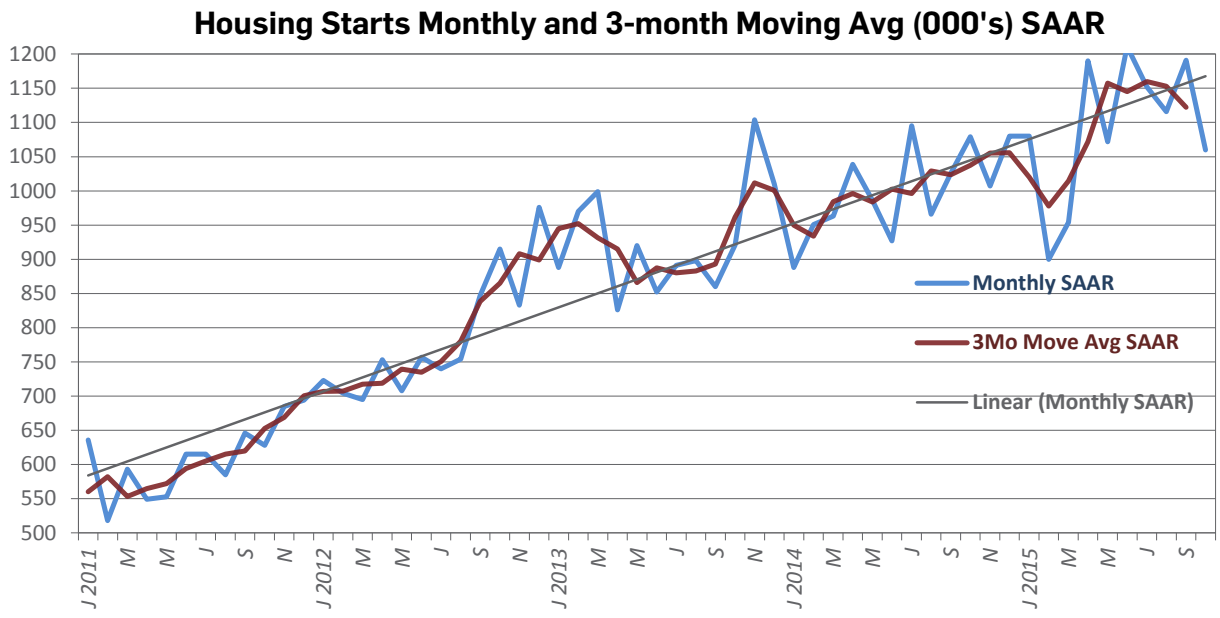
Housing starts highest growth rates per year in the last 30 years were 186,000 in 1992; 169,000 in 1994; and 172,000 in 2012. Early estimates for new housing starts in 2015 included three estimates that were 1.3 million to 1.5 million, which would imply a growth rate of about two to nearly three times the 30-year historical maximum growth rate. The remaining early estimates range from 1.1 million to 1.17 million with an average of 1.143 million and are well within the achievable range. Seven midyear estimates range from 1.1 million to 1.2 million with an average of 1.134 million.

New Housing Starts (# new units started) from U.S. Census:

- 2012 and 2013 increased 28% and 18%.
  - – 2012 added 172,000 new units to total 781,000 for the year.
  - – 2013 added 144,000 new units to total 925,000.
- 2014 increased 8.4%. 2015 expected to increase 11%.
  - – 2014 added 78,000 new units to total 1,003,000.
  - – 2015 expect 110,000 new units to total 1,113,000.
- 2016 predicted increase of 12%.
  - – 2016 forecast is for 135,000 new units to total 1,248,000.

Since 1992, there is no other year in which the number of new units started in the year exceeded 170,000 units. In the 1970s and early 1980s, when total housing units started were near two million units per year, we see growth years of 400,000 to 600,000 new units from year to year. After 1984, only three times have new starts reached over 170,000 units in a year, 2012 being one of those years.

FIGURE 14:
New Housing Starts Seasonally Adjusted Rate 2011-2016



Gilbane's midyear estimate of new housing starts in 2015 (based on starts in place, volume of permits and steady growth until year end) was an increase of 130,000 new units above 2014, for a total of 1,133,000. It now appears the year will end closer to 110,000 new units at a total new housing starts of 1,113,000 units.

For 2016, Gilbane's early estimate of new housing starts is an increase of 135,000 new units for a total of 1,248,000. Several other industry experts posted 2016 estimates ranging from 1.2 million to 1.3 million with the average at 1,254,000.

Monthly starts periodically peak and dip erratically. Consider February 2015, the biggest dip in five years. But then notice that it took less than four months for starts to come right back to the trend line and the trend remained intact. This is how the monthly housing starts data goes. So don't be too alarmed when one month of data doesn't measure up to expectations. It appears that the trend for the last several years is well established and growth is currently following the trend, whether up or down in a given month.

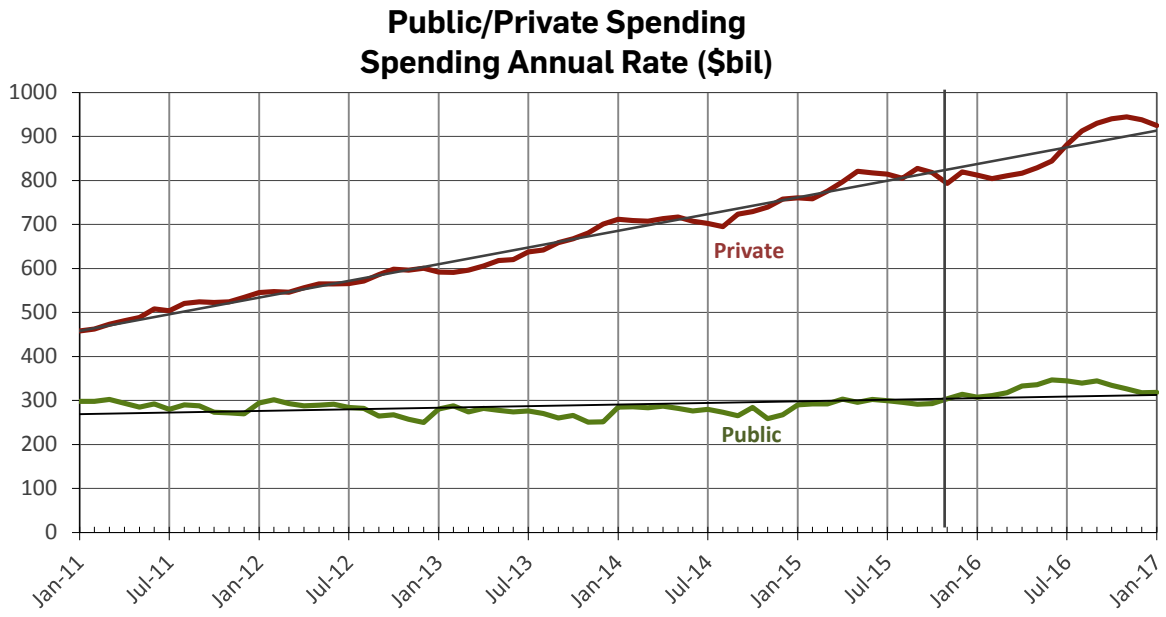

Public / Private
Spending
Gilbane
Gilbane Cares
Because we're all one family.
Gilbane

Public/Private Spending

Total spending for public construction in 2015 will reach $298 billion, an increase of 7.9% from 2014. 2014 ended a four-year decline in public spending.

Total spending for private construction in 2015 will reach $802 billion, an increase of 11.8% from 2014, although still 14.5% below the peak of $912 billion in 2006.

FIGURE 15:
Spending Growth Public – Private Building Markets 2011-2016



Mixed within three sectors – residential, nonresidential buildings and nonbuilding infrastructure - are private and public spending.

Private work is comprised primarily of residential, which is about 98% private and makes up about 50% of all private work. Along with manufacturing, and large portions of power, commercial/retail, office and healthcare, these markets comprise nearly 90% of all private work. Private growth then, predicted to increase 9.1% for 2016, is the sum of these parts from residential, nonresidential buildings and nonbuilding infrastructure. Private spending volume is almost two and one-half times that of public spending. However, if residential construction were excluded, private spending would be only 25% greater than public spending.

Private spending in 2015 is being driven up by manufacturing, which represents 50% of the gains in year-to-date private spending.

Public work is all or a large portion of highway/street, educational, transportation and sewage/waste. The largest public construction markets are highway and education. These two markets alone represent more than half of all public construction. Along with small contributions from water and a portion of power, these markets comprise 80% of all public work. Again, the sum of parts shows growth at 11.3% in 2016.

TABLE 11:
Construction Spending Summary Public vs. Private 2007-2016

U.S. Total Construction Spending

TOTALS IN BILLIONS CURRENT U.S. DOLLARS

	Actual								GILBANE FORECAST	GILBANE FORECAST
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
PRIVATE	858.9	768.6	591.7	505.3	501.9	571.1	635.7	717.7	802.3	874.9
% CHANGE YEAR OVER YEAR	-5.2%	-10.5%	-23.0%	-14.6%	-0.7%	13.8%	11.3%	12.9%	11.8%	9.1%
Private Residential	488.8	359.2	247.5	242.0	244.1	269.8	323.4	370.0	417.2	465.3
Private Nonresidential	370.0	409.4	344.1	263.3	257.8	301.1	312.3	347.7	385.1	409.6
PUBLIC	289.2	308.7	314.9	304.0	286.4	279.3	270.7	275.7	297.5	331.3
	13.2%	6.8%	2.0%	-3.5%	-5.8%	-2.5%	-3.1%	1.9%	7.9%	11.3%
TOTAL	1148.1	1077.4	906.5	809.3	788.3	850.5	906.4	993.4	1099.8	1206.2
	-1.1%	-6.2%	-15.9%	-10.7%	-2.6%	7.9%	6.6%	9.6%	10.7%	9.7%
PRIVATE % OF TOTAL	74.8%	71.3%	65.3%	62.4%	63.7%	67.2%	70.1%	72.2%	72.9%	72.5%
PUBLIC % OF TOTAL	25.2%	28.7%	34.7%	37.6%	36.3%	32.8%	29.9%	27.8%	27.1%	27.5%

Source $ Data: U.S. Census Bureau, Department of Commerce.
Public is 55% Nonbuilding Infrastructure 25% Educational
Actual Spending data includes 2013 and 2014 revisions 7-1-15 and 2005-2015 revisions 1-4-16
Forecast Gilbane Building Company includes U.S. Census November year-to-date spending

TABLE 12:
ALL Construction Spending 2007-2016

U.S. Total Construction Spending Summary

	TOTALS IN BILLIONS CURRENT U.S. DOLLARS								GILBANE FORECAST	GILBANE FORECAST
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
NONRESIDENTIAL BLDGS	403.9	438.6	377.5	291.9	284.3	300.7	303.2	330.0	386.4	439.2
% GROWTH VS. PRIOR YEAR	18.9%	8.6%	-13.9%	-22.7%	-2.6%	5.7%	0.8%	8.8%	17.1%	13.7%
NONBUILDING HVY ENGR	248.1	272.1	273.5	265.0	251.3	273.7	273.9	288.3	289.7	293.2
	19.4%	9.7%	0.5%	-3.1%	-5.2%	8.9%	0.1%	5.2%	0.5%	1.2%
RESIDENTIAL	496.1	366.7	255.5	252.3	252.6	276.1	329.2	375.1	423.8	473.8
	-19.2%	-26.1%	-30.3%	-1.3%	0.1%	9.3%	19.3%	13.9%	13.0%	11.8%
TOTAL	1148.1	1077.4	906.5	809.3	788.3	850.5	906.4	993.4	1099.8	1206.2
% GROWTH VS. PRIOR YEAR	-1.1%	-6.2%	-15.9%	-10.7%	-2.6%	7.9%	6.6%	9.6%	10.7%	9.7%
PRIVATE	858.9	768.6	591.7	505.3	501.9	571.1	635.7	717.7	802.3	874.9
	-5.2%	-10.5%	-23.0%	-14.6%	-0.7%	13.8%	11.3%	12.9%	11.8%	9.1%
PRIVATE Residential	488.8	359.2	247.5	242.0	244.1	269.8	323.4	370.0	417.2	465.3
PRIVATE Non-Residential	370.0	409.4	344.1	263.3	257.8	301.4	312.3	347.7	385.1	409.6
PUBLIC	289.2	308.7	314.9	304.0	286.4	279.3	270.7	275.7	297.5	331.3
	13.2%	6.8%	2.0%	-3.5%	-5.8%	-2.5%	-3.1%	1.9%	7.9%	11.3%
TOTAL	1148.1	1077.4	906.5	809.3	788.3	850.5	906.4	993.4	1099.8	1206.2
% GROWTH VS. PRIOR YEAR	-1.1%	-6.2%	-15.9%	-10.7%	-2.6%	7.9%	6.6%	9.6%	10.7%	9.7%
Share Private % of Total	*74.8%*	*71.3%*	*65.3%*	*62.4%*	*63.7%*	*62.7%*	*70.1%*	*72.2%*	*72.9%*	*72.5%*
Share Public % of Total	*25.2%*	*28.7%*	*34.7%*	*37.6%*	*36.3%*	*32.8%*	*29.9%*	*27.8%*	*27.1%*	*27.5%*
EDUCATIONAL	96.8	104.9	103.2	88.4	85.0	84.7	79.1	79.7	85.6	97.2
% GROWTH VS. PRIOR YEAR	13.9%	8.4%	-1.6%	-14.3%	-3.9%	-0.4%	-6.6%	0.8%	7.4%	13.6%
HEALTHCARE	43.8	46.9	44.8	39.3	39.7	42.5	40.7	38.4	40.5	46.1
	13.7%	7.2%	-4.4%	-12.3%	0.9%	7.2%	-4.4%	-5.6%	5.4%	13.8%
AMUSEMENT/RECREATION	21.2	21.8	19.4	16.9	16.0	15.5	15.2	16.6	20.9	25.6
	11.5%	2.9%	-11.1%	-12.7%	-5.6%	-3.2%	-1.8%	9.4%	25.7%	22.5%
COMMERCIAL/RETAIL	89.7	86.2	54.7	40.1	42.8	47.3	53.2	62.7	67.5	71.6
	16.9%	-3.9%	-36.5%	-26.7%	6.8%	10.6%	12.3%	18.0%	7.7%	6.0%
LODGING	28.7	35.8	25.5	11.6	9.1	10.8	13.5	16.1	21.1	23.4
	58.3%	24.7%	-28.8%	-54.4%	-21.5%	18.7%	24.5%	19.6%	31.0%	10.8%
OFFICE	65.3	68.6	51.9	37.8	36.0	37.8	38.0	46.1	55.9	58.5
	20.4%	5.1%	-24.3%	-27.1%	-4.9%	5.0%	0.5%	21.3%	21.4%	4.7%
MANUFACTURING	40.6	54.1	57.9	41.2	40.6	47.7	50.5	57.8	83.7	94.7
	24.4%	33.2%	7.0%	-28.9%	-1.5%	17.7%	5.9%	14.3%	44.8%	13.2%
OTHER NONRES BUILDINGS	17.9	20.3	20.0	16.4	15.2	14.3	13.1	12.6	11.2	22.0
	15.2%	13.7%	-1.6%	-17.7%	-7.8%	-5.8%	-8.2%	-3.5%	-11.4%	
SUBTOTAL NONRES BUILDINGS	403.9	438.6	377.5	291.9	284.3	300.7	303.2	330.0	386.4	439.2
% GROWTH VS. PRIOR YEAR	18.9%	8.6%	-13.9%	-22.7%	-2.6%	5.7%	0.8%	8.8%	17.1%	13.7%
POWER/ELECTRIC/GAS	66.1	81.1	88.9	77.9	75.2	97.4	93.3	101.2	87.4	78.9
	56.4%	22.7%	9.6%	-12.3%	-3.5%	29.6%	-4.2%	8.5%	-13.7%	-9.6%
HIGHWAY/BRIDGE/STREET	76.7	81.4	82.2	82.5	79.3	80.5	81.4	84.2	90.4	94.6
	6.4%	6.1%	1.0%	0.4%	-3.9%	1.5%	1.0%	3.5%	7.3%	4.7%
TRANSPORTATION/AIR/RAIL	31.9	35.5	36.7	38.3	34.7	37.9	39.5	41.8	45.5	48.7
	14.0%	11.3%	3.5%	4.5%	-9.4%	9.0%	4.2%	5.9%	8.8%	7.0%
OTHER INFRASTRUCTURE	73.5	74.2	65.8	66.2	62.1	57.9	59.8	61.1	66.5	71.0
	12.2%	0.9%	-11.3%	0.6%	-6.2%	-6.8%	3.3%	2.2%	8.9%	6.8%
SUBTOTAL INFRASTRUCTURE	248.1	272.1	273.5	265.0	251.3	273.7	273.9	288.3	289.7	293.2
% GROWTH VS. PRIOR YEAR	19.4%	9.7%	0.5%	-3.1%	-5.2%	8.9%	0.1%	5.2%	0.5%	1.2%

Source $ Data: U.S. Census Bureau, Department of Commerce.
See Nonbuilding Infrastructure section for list of markets in Nonbuilding Hvy Engr
Actual Spending data includes 2013 and 2014 revisions 7-1-15 and 2005-2015 revisions 1-4-16
% is percent growth vs. prior year, except Share %, then it's percent Share of Total
Forecast Gilbane Building Company includes U.S. Census November year-to-date spending


Inflation
Adjusted
Volume
Gilbane

Inflation Adjusted Volume

Real construction volume can only be found by analyzing spending after inflation.

Spending, or total revenue, is typically reported in unadjusted dollars, or current dollars (for current dollars, see Table 2). Current dollars is a true indication of dollars spent within any given year, but does not give a true comparison of constant dollar volume from year to year. Current dollars are dollars within any given year. Constant dollar is defined as all dollars adjusted for inflation to represent dollars in the year to which they are adjusted, as in this report to 2015.

TABLE 13:
Construction Spending Summary Adjusted 2007-2016 (Constant 2015$)

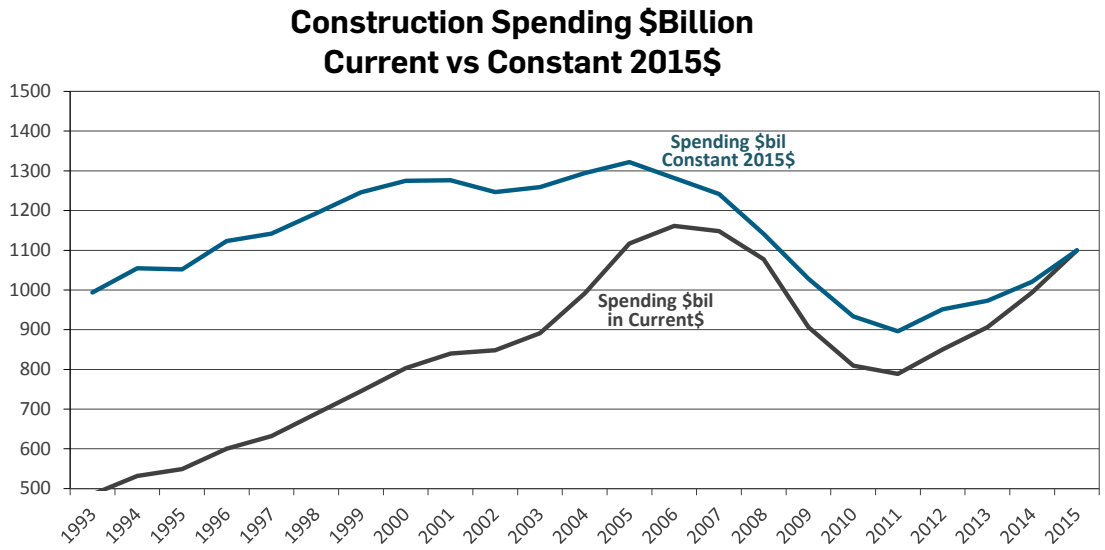
U.S. Total Construction Spending - Volume

	TOTALS IN BILLIONS U.S. DOLLARS (CONSTANT) ADJUSTED TO DECEMBER 2015 $								GILBANE FORECAST	GILBANE FORECAST
	Actual									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
NONRESIDENTIAL BLDGS	461.0	468.0	428.5	340.7	325.8	337.9	328.8	344.1	386.4	416.3
% CHANGE YEAR OVER YEAR	10.3%	1.5%	-8.4%	-20.5%	-4.4%	3.7%	-2.7%	4.7%	12.3%	7.7%
NONBUILDING HVY ENGR	277.5	276.5	301.6	291.8	265.1	283.4	279.6	287.1	289.7	283.3
	13.1%	-0.4%	9.1%	-3.3%	-9.2%	6.9%	-1.4%	2.7%	0.9%	-2.2%
RESIDENTIAL	503.0	396.7	298.2	301.1	305.5	330.0	364.4	389.3	423.8	444.9
	-18.7%	-21.1%	-24.8%	1.0%	1.5%	8.0%	10.4%	6.8%	8.9%	5.0%
TOTAL	1241.4	1141.2	1028.3	933.5	896.4	951.3	972.7	1020.5	1099.8	1144.5
	-3.2%	-8.1%	-9.9%	-9.2%	-4.0%	6.1%	2.2%	4.9%	7.8%	4.1%

Source $ Data: U.S. Census Bureau, Department of Commerce.
Cost adjusted to 12-2015 by Gilbane Building Cost Index
Actual Spending data includes 2013 and 2014 revisions 7-1-15 and 2005-2015 revisions 1-4-16
Forecast Gilbane Building Company includes U.S. Census November year-to-date spending

Table 13 shows inflation-adjusted dollars, constant dollars, as an equalized comparison from year to year. Table 13 adjusts total construction spending for construction labor and materials inflation in addition to changes in productivity and margin costs. All dollars in Table 13 analysis are adjusted to 2015 constant dollars. The rate of inflation each year is determined individually for nonresidential buildings, nonbuilding heavy engineering and residential.

FIGURE 16:
Construction Spending vs. Volume 1993-2015 (constant 2015$)



Peak volume was fairly constant from 2004 through 2006. In today's constant dollars, peak volume reached $1.30 trillion. 2015 predicted 2015 volume will be about equal with 1995 and 2009 volume

On average, volume grows less than 3.5% per year historically. At that rate, it will not return to peak volume before 2020. However, in the last four years, volume grew at about 5% per year. At that rate we could recover peak volume in 2019.

NOT ALL OF REVENUE GROWTH IS REAL VOLUME GROWTH

During the period from 1999 to 2006, total spending increased 55%, but real volume increased only 9%. Inflation accounted for the remainder of the cost growth in that eight-year period.

In the five boom years of constructing nonresidential buildings including 2004 through 2008, spending (on nonresidential buildings only) increased by 53%. However, real inflation adjusted volume increased by only 14%. Total inflation for nonresidential buildings in the five-year period 2004 through 2008 was 39%, an average of near 8% per year.

In eight boom years of residential construction including 1998 through 2005, spending (for residential buildings only) increased by 88%. However, real inflation adjusted volume increased by only 32%. Total inflation for residential buildings in the eight-year period 1998 through 2005 was 56%, an average of 7% per year.

When we look at just the four highest spending growth years for residential construction (2003, 2004, 2005 and 2013) we see inflation for residential buildings in those rapid growth years increased at a rate over 9% per year.

WHY IS IT SIGNIFICANT TO ANALYZE BOTH REVENUE AND VOLUME?

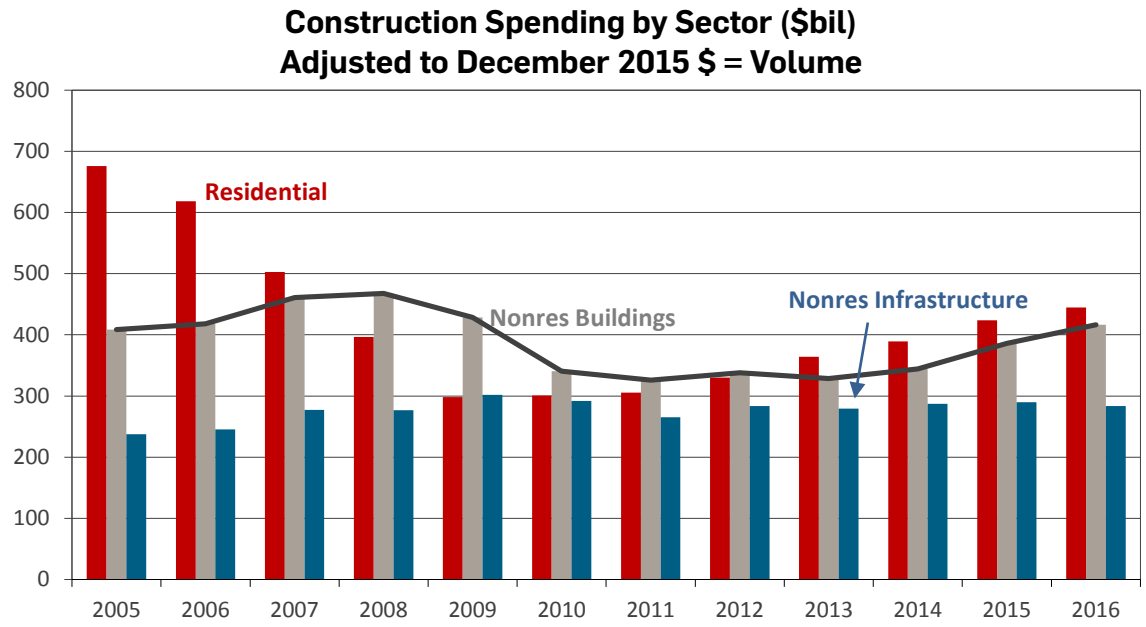
Contractor fees are generally determined as a percentage of revenue. However, workload volume determines the size of the workforce needed to accommodate the annual workload. It is valuable to know how many employees were required to accomplish the workload volume based on the past several years of data. From the standpoint of workforce planning, there is not so much concern with the value of the revenue as the volume of the work.

For 2015, 10.7% revenue growth is predicted, but due to rapidly increasing escalation, 2015 volume growth will be only about 7% to 8%.

INFLATION IS SIGNIFICANTLY AFFECTED BY RAPID GROWTH?

- Construction inflation in rapid growth years is much higher than average long-term inflation.
- Long-term 20-year inflation for nonresidential buildings is 3.3%
- Long-term 20-year inflation for residential buildings is 3.5%.
- In rapid growth years, inflation for nonresidential buildings is 8%.
- In rapid growth years, inflation for residential buildings is above 9%.

FIGURE 17:
Construction Spending by Sector 2005-2016 (constant 2015$)



Jobs and Unemployment

Gilbane

Jobs and Unemployment

The number of jobs is tracked as the measure of how many people are currently working to put in place the construction spending. The unemployment rate shows how many more people are available to go to work. Both added together shows the size of the workforce. The size of the workforce is important because it tells how many workers are available to draw from for future volume growth.

Table 9 includes both residential and nonresidential construction employment, as well as all trades and management personnel. The BLS suggests not using any single month but instead looking at long-term trends in the data.

2014 had near-record growth of 338,000 jobs, exceeded only by 1998 and 2005, both during the fastest spending growth periods within the past 30 years. In 2015 263,000 jobs were added. Since the bottom between Q4 2010 to Q1 2011, more than 1 million jobs have been added for total jobs growth of 18%.

TABLE 14:
Construction - All Employees 2004-2015

Industry:	Construction												
Data Type:	ALL EMPLOYEES, THOUSANDS												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr Avg
2004	6848	6838	6887	6901	6948	6962	6977	7003	7029	7077	7091	7117	6973
2005	7095	7153	7181	7266	7294	7333	7353	7394	7415	7460	7524	7533	7333
2006	7601	7664	7689	7726	7713	7699	7712	7720	7718	7682	7666	7685	7690
2007	7725	7626	7706	7686	7673	7687	7660	7610	7577	7565	7523	7490	7627
2008	7476	7453	7406	7327	7274	7213	7160	7114	7044	6967	6813	6701	7162
2009	6567	6446	6291	6154	6100	6010	5932	5855	5787	5716	5696	5654	6017
2010	5580	5500	5537	5553	5520	5516	5508	5524	5501	5508	5506	5467	5518
2011	5432	5458	5476	5492	5516	5527	5547	5552	5588	5585	5588	5612	5531
2012	5629	5629	5628	5627	5608	5623	5632	5641	5649	5668	5684	5724	5645
2013	5746	5798	5815	5813	5833	5856	5854	5866	5893	5918	5953	5937	5857
2014	6006	6032	6062	6103	6114	6121	6152	6169	6191	6201	6231	6275	6138
2015	6316	6347	6368	6365	6377	6378	6383	6391	6410	6444	6490	6538	6401

The unemployment rate in construction averaged 6.0% for the last six months. For December it is 7.5%. This is not an unusual jump in unemployment, since it is not seasonally adjusted. It is typical for December through March to reach unemployment 4% to 5% higher than June through October. Comparisons can be made to the same months in previous years. This is the lowest December unemployment since 2006. Average unemployment for the last six months, 6.2%, is at an eight-year low.

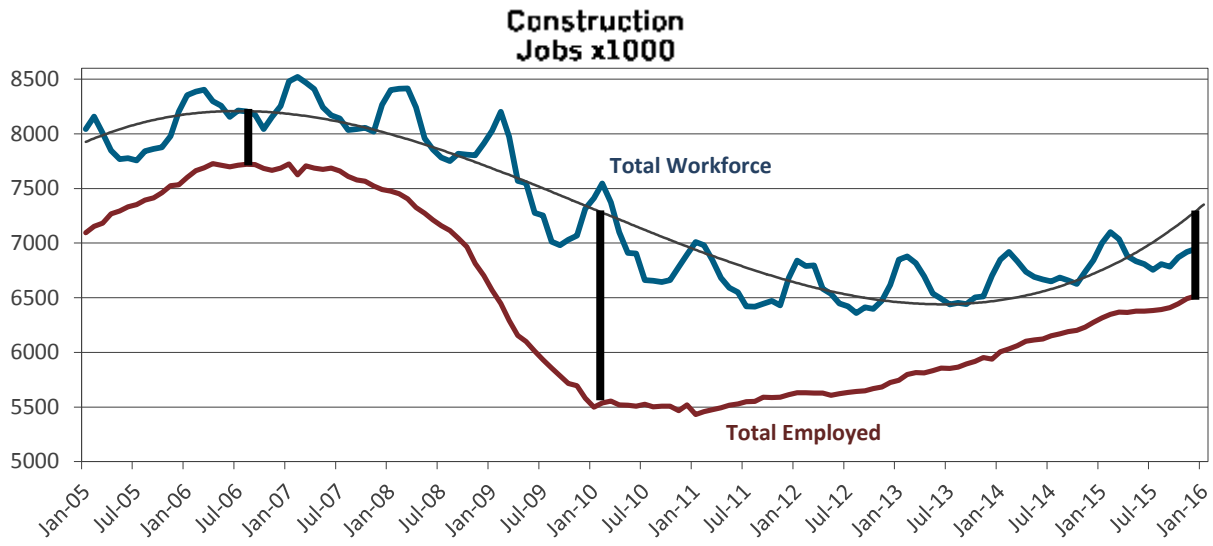
The historical long-term average seasonally adjusted unemployment rate is between 6% and 8%. This means, regardless whether markets are very active or slow, there is historically at least 6% of the construction workforce not working. Average unemployment for the last 12 months is 7.3%.

The reduction in available workers in the workforce will continue to have a detrimental effect on cost and schedule. Without a large volume of available and trained workers in the unemployment pool to draw from, the rate of expansion may be constrained.

The total construction workforce hit a 15-year low in 2013 at about 6.4 million. Currently the workforce is growing and is near 7.3 million, still near a 15-year low, about 1.0 million (~17%) lower than the 2006-2007 peak.

The unemployment rate is not seasonally adjusted. This adds to the short-term fluctuation. The seasonal fluctuation can be seen in Figure 18 where the upper (blue) line shows a repeated annual rise and fall in the unemployment rate. This analysis counts the available workforce or the nonworking pool using the statistical trend line of the unemployment rate.

FIGURE 18:
Construction Jobs vs. Construction Workforce 2005-2015



WORKFORCE SHORTAGES

Some of the workers that were let go, moved on, or dropped out of the workforce had many years of experience and were highly trained. Unfortunately, some will never return. As a result, over the next few years the construction industry is going to be faced with a shortage of skilled, experienced workers. This will have the tendency to **DRIVE COSTS UP** and **QUALITY DOWN** due to the need to pay a premium for skilled workers and the necessity of training new workers in their job and company procedures.

- During periods of high volume and workforce expansion, productivity declines.
- Workforce shortages may force extended work schedules.

The BLS Job Openings and Labor Turnover Survey (JOLTS) for the construction industry for October is at 139,000 unfilled positions. Although down slightly this month and down from the summer peak, the openings rate has been trending upward since 2012. A relatively high rate of openings, this generally indicates high demand for labor and could lead to higher wage rates.

The job openings rate has been elevated since January 2013. The last time it stayed this high was 2007, leading into the peak of the previous expansion. A big difference this time around is that we have 1.5 million (or 20%) fewer workers in the workforce. This is a good sign for future hiring, but highlights the importance of workers having the right skills. An increase in job openings generally signifies that employers cannot find people with the right skills to fill open positions.

The most common effects of skilled labor shortages have been the need to pay higher wages and difficulty completing projects on time.

A recent NAHB survey indicates labor shortages have become more widespread than reported in 2014. According to a June 2015 survey by the NAHB, 61% of homebuilders during the previous 12 months had raised home prices due to labor shortages across construction trades.

In a recent ENR survey, executives from design firms, general contractors, subcontractors and construction managers were asked about their hiring and compensation plans for 2016. Of the 253 executives responding to the survey, 223 provided estimates of planned raises for their employees in 2016. The average planned increase was 4.63%.

The most common effects of skilled labor shortages have been the need to pay higher wages and difficulty completing projects on time.

Over the next five years, expect shortages of skilled workers, declining productivity, and rapidly increasing labor cost. If you are in a location where a large volume of pent-up work starts all at once, you will experience these three issues.

A last note on jobs: although there are surveys to support widespread agreement at firms indicating most everyone is experiencing labor shortages and having a difficult time hiring qualified people, the three-year period 2013 to 2015 ended with just over 800,000 new construction jobs added, a three-year total exceeded only once before since 2000. However, what might support the workforce shortage issue is during that same period hours worked increased. All employees are working longer hours having the same effect as adding additional jobs helping offset the shortage of qualified workers.

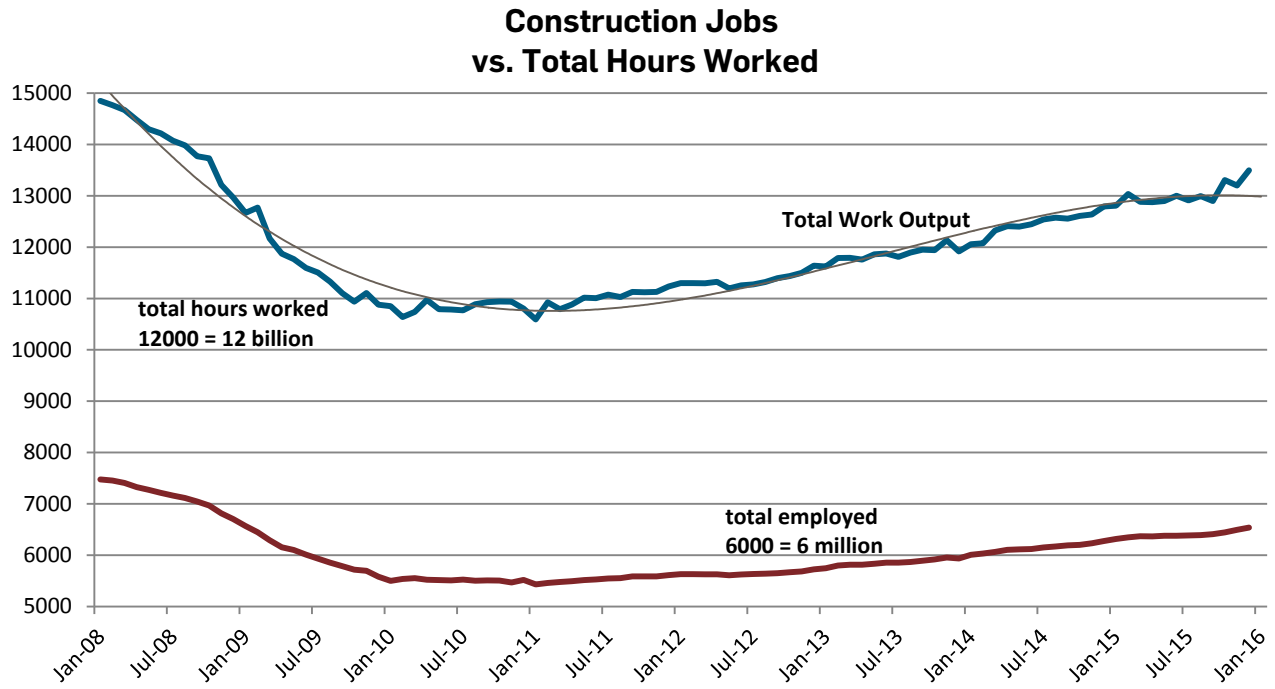

Jobs/
Productivity

Jobs/Productivity

Productivity is a measure of unit volume per worker output, not dollars put-in-place per worker.
To analyze productivity:

- Use annual inflation adjusted constant volume, not annual unadjusted current spending.
- Use total work output, which takes into account total employed multiplied by hours worked.

FIGURE 19:
Construction Jobs vs. Total Workforce Hours Worked 2008-2015



Often overlooked in the jobs data is the number of hours worked. In the last five years, the average hours worked has increased from 37.75 to 39.1 hours per week. That has the same effect as adding another 230,000 jobs.

The following productivity analysis is based on put-in-place revenues, inflation adjusted to constant 2015 dollars, and compared to actual manpower at average hours worked.

Figure 20 that follows shows a line plotted for the number of jobs per $1 billion spending unadjusted. That is a result obtained by using unadjusted spending current dollars without considering inflation and jobs without consideration of hours worked. The unadjusted analysis should not be used to track changes in productivity.

Figure 20 shows a line plotting the number of jobs per $billion in current 2015 dollars adjusted for inflation using jobs adjusted for hours worked. Use this line to track changes in productivity.

To explain how significant these differences might be, consider this example. Total construction spending reached a bottom in January 2011. For the four-year period from January 2011 to the end of 2014:

- Total construction spending (revenue) grew 23%;
- Composite total construction inflation was 12%;
- Real construction volume grew by only 11%;
- Jobs grew 840,000 from the low of 5,432,000, or 15.5%;
- Hours worked increased from 37.5 per week to a four-year average of 38.7, a 3.2% increase.

An unadjusted analysis would compare total construction spending growth of 23% to 15.5% jobs growth. That would indicate more spending got added than jobs, which would show an increase in productivity of 7.5%. But that is not correct.

The adjusted analysis shows that after 12% inflation is factored out, there was only an 11% increase in real construction volume. That volume should be compared to the work output (jobs plus hours on entire workforce) which is an increase of slightly more than 18.7%. In the correct analysis we see over the four-year period, we put in place 11% additional volume of work, but added almost 19% additional work output during the same period. Real productivity declined by 8% in four years.

FIGURE 20:
Jobs per $billion 2006-2015 in constant 2015$ All Construction

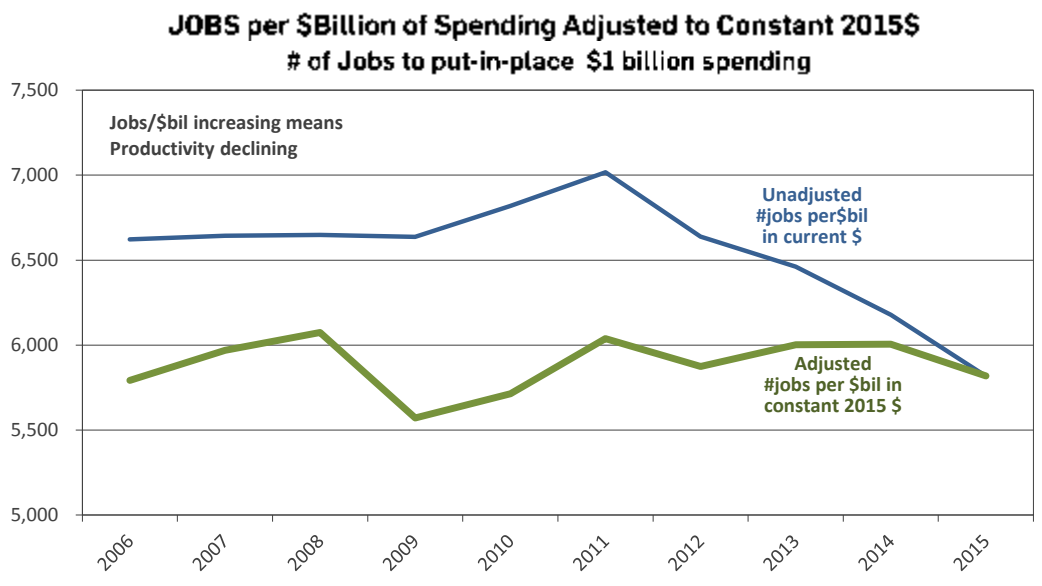
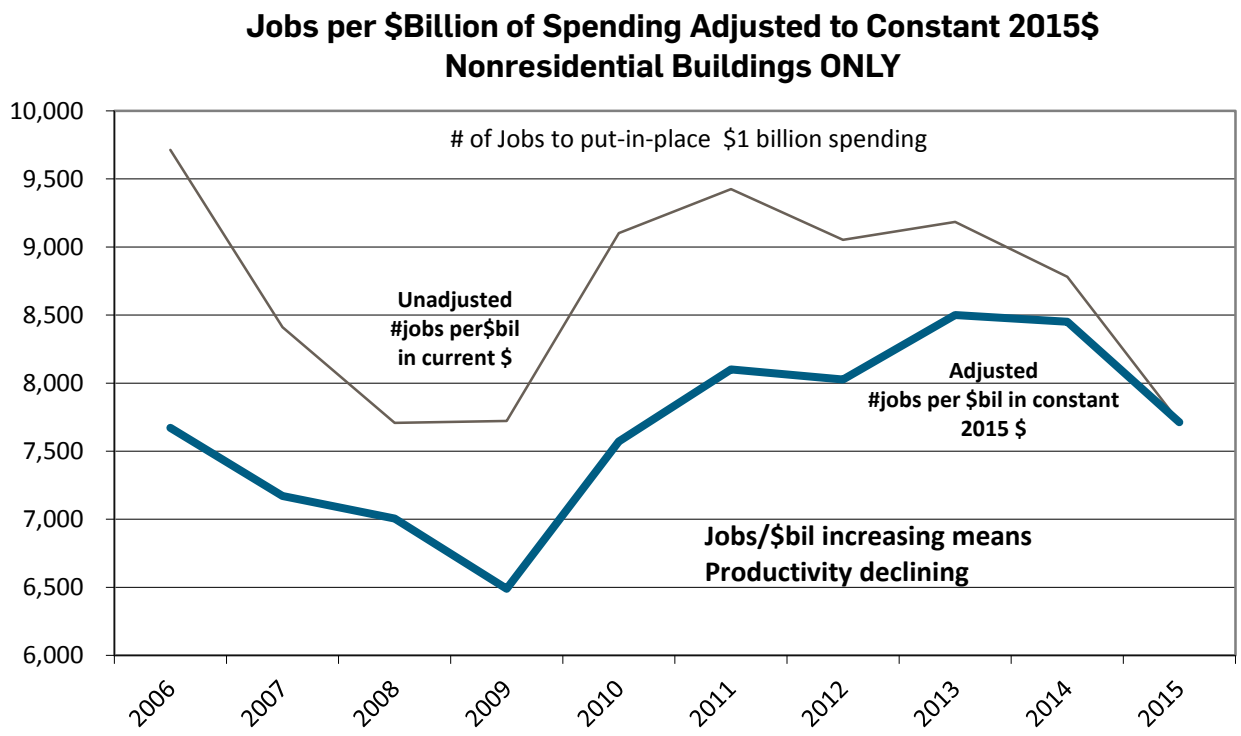


Figure 21 below plots the exact same type of unadjusted and adjusted data as Figure 20, but represents only nonresidential buildings.

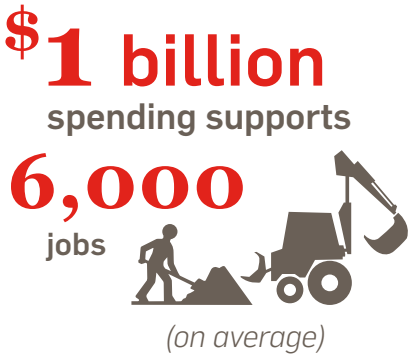
FIGURE 21:
Jobs per $billion 2006-2015 in constant 2015$ Nonresidential Buildings Only



All data in the previous charts show national averages. On average, $1 billion of spending supports approximately 6,000 construction jobs. In a location where the city cost index is 1.2, it would take $1.2 billion in spending to support 6,000 jobs and in a location where the city cost index is 0.85, only $850 million in spending would support 6,000 jobs.

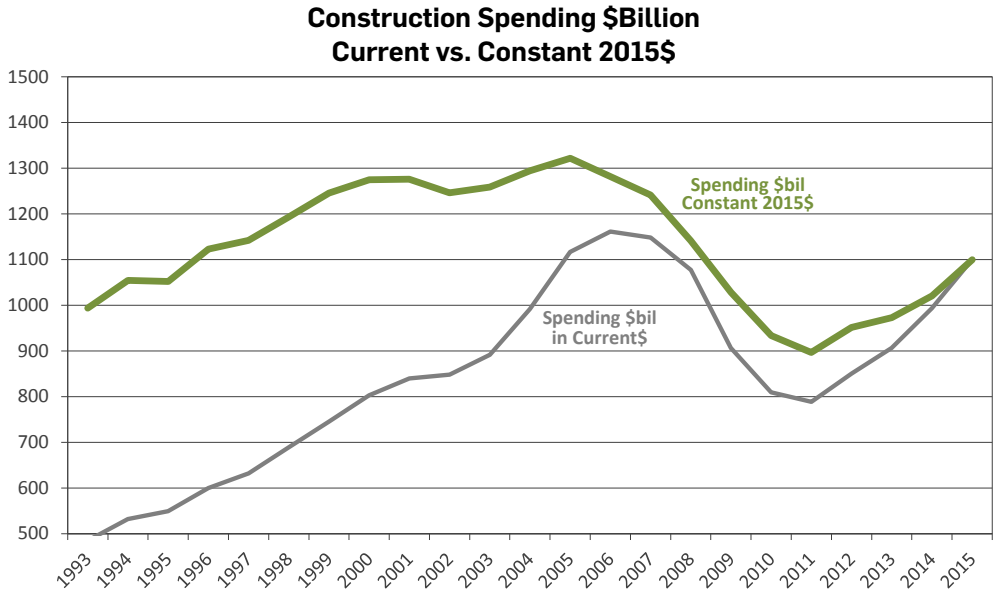
When spending and jobs are on the decline, and with diminished workload providing no other options, workers and management find ways to improve out of necessity. But at some point, longer hours and additional work burden causes productivity to decline. Also, a return to volume growth results in an easing of performance.

As workload begins to increase in coming years, net productivity gains will decline somewhat. This net effect cannot go unaddressed. The results of productivity declines are either decreased total output (if workforce remains constant) or increased workforce needed (if total workload remains constant).



(on average)

FIGURE 22:
Construction Spending vs. Volume in Constant 2015$ 1993-2015



Contractor fees are often determined as a percentage of revenue. However, workload volume should be used for planning the size of the workforce. It is valuable to know, from the past several years of data, how many employees were required to accomplish the workload volume.

Here is a simple example:

At the 2008 peak of construction cost, a building cost $12 million and took 100 men per year to build. In 2010, after two years of deflation, that same building potentially cost as little as $10 million to build, 20% less. Did it take 20% fewer men per year to build it? No, certainly not. That would be the fallacy of trying to determine jobs needed based on unadjusted revenue.

Rapid workforce expansion during a period of high spending growth leads to significantly lower productivity.

The building has not changed, only its cost has changed. It still has the same amount of steel and concrete, brick, windows, pipe and wire. Using revenue as a basis, we might be led to think we need 20% fewer workers. However, there is a need to base workers on inflation adjusted volume and productivity, not simply on direct annual revenue.

WORKFORCE EXPANSION

What happens in periods of rapid spending growth and workforce expansion?

From 1996 through 1998, during the most rapid sustained period of jobs expansion in the last 30 years, the workforce grew by 1 million jobs over 36 months, 19% over three years. Construction spending during that 36-month span increased 24%. However, inflation adjusted constant dollar volume increased by only 13%. Productivity declined by 6%.

From 2004 through 2006, construction spending increased by 28%, the most rapid pace on record. The workforce added 860,000 jobs, an increase of 15%. But inflation during that three-year period was 25%, the highest ever recorded. Real inflation adjusted volume increased by only 3%. Productivity declined by 12%, the most ever.

These spans were both periods when construction volume was rapidly expanding and approaching or at the all-time peak. Such a rapid workforce expansion during high spending growth led to measurably significant lost productivity. We are currently in a similar period.

From 2012 through 2014, the most current completed period, construction spending grew 21%, approaching the levels in the examples above. Inflation was 11%, so volume increased only 10%. Work output increased by 13%.

In this current growth cycle, we are currently at a productivity loss of 3%. With 2015 predicted spending near 11%, the current four-year period will be almost identical to 2003-2006 (33%) and 1996-1999 (32%), the two fastest growth periods on record with two of the highest rates inflation and productivity loss. 2015 may be similar to these previous periods.

If we continue to experience uninterrupted economic expansion at a rapid level, even for just the next few years, it will produce an extremely active extended duration market unlike anything ever measured. The workforce will expand, but there will be skilled worker shortages, and productivity will decline. When that occurs, it leads to rapidly increasing prices.

HOW MANY JOBS GET CREATED BY CONSTRUCTION?

Here are some details regarding how many jobs get created for every dollar spent on construction. For further reference, see "Jobs and Unemployment".

- Historical averages (adjusted for inflation) since year 2000 show the number of direct construction jobs supported by $1 billion in construction spending varies +/- from 6,000 jobs. That calculates to one job for every $170,000 (in 2015 dollars) spent on construction, or approximately six jobs per $1 million spent. Direct construction jobs include all Architecture/Engineering/Construction (AEC), but not, for instance, lumber or steel mill product manufacturing.

- In part, the wide variation in the number of jobs created is a result of productivity. In times of increasing work volume activity, productivity declines. In times of decreasing activity, productivity climbs. In 2009, construction activity declined drastically, but jobs declined even more, resulting in an 8% average increase of productivity. Because productivity increased, it took fewer workers to put in place the same volume of work. The net result is that $1 billion in spending supported far less jobs than previous years.

HISTORICAL AVERAGE

1 = $170,000

Job 2015 dollars

spent on $ construction

› As work volume starts to increase over the next few years, expect productivity to decline. There are many reasons why this will occur, among them: working longer hours until new workers are brought on; working more days; crowding the work area; hiring less qualified workers; and acclimating new workers to the crew.

There are several studies available, including one by the federal government and one by the Associated General Contractors of America (AGC), that state for every construction job, there are three additional jobs created in the economy. So while $1 billion of building construction may create 6,000 to 7000 direct construction jobs, overall it generates approximately as many as 28,000 jobs in the economy.

The data shown previously in this section on jobs, unemployment and productivity includes only jobs counted in the official U.S. Census Bureau of Labor Statistics (BLS) jobs report. There are two reports, one by Pew Research Center and one by National Association of Home Builders, that both document a large, unaccounted for shadow workforce in construction. By some accounts, 40% or more of the construction workforces in California and Texas are immigrant workers. Immigrants may comprise between 14% and 22% of the total construction workforce. It is not clear how many within that total may be included or not included in the U.S. Census BLS jobs report. However, the totals are significant enough that they may alter some of the results reported above. There is currently a level of uncertainty in this data.


Behind The
Headlines
FARO
Gilbane
Gilbane

Behind the Headlines

CONSTRUCTION SPENDING – IS A MONTHLY DECLINE AN INDICATION OF WEAKNESS?

Here's the headline – U.S. construction spending fell in November for the first time in 17 months, reflecting weakness in spending...

Almost all news releases concerning construction spending repeat the numbers published in the U.S. Census construction spending report. That headline is referring to month to month comparisons and states this is the first time in 17 months this measure has gone down. That comparison is being made using U.S. Census seasonally adjusted annual rates for spending.

The Gilbane report uses historical statistical averages for monthly spending, a different mathematical form of seasonally adjusting rates. The historical averages for each month give an indication of how much should be spent in any given month compared to every other month in the year. For instance, about 6% of annual spending occurs in January or February. About 10% of annual spending occurs in August or September. Therefore, January divided by 6% and August divided by 10% result in the same answer for a seasonally adjusted annual rate of spending.

When referring to the historical averages of expected spending rates, monthly construction has fallen eight times in the last 17 months, so this monthly decline is not unusual. Gilbane's data analysis predicted a slight decline in October and November, so in this report's analysis the decline was not unexpected, nor is it alarming.

Spending advances and declines are almost completely predetermined by the amounts of activity generated from the cash flow of all starts recorded in the previous two or three years. If two months of project starts that began three years ago come to an end this month, and these are offset only by one current month of new starts, we will see a decline this month in spending. This is a normal fluctuation in the amount of work starting, ongoing and completing. Spending patterns are affected mostly by the pattern of starts recorded over the previous 12 to 36 months.

Expect two more monthly declines in the next few months. In news articles, it may be attributed to winter weather or a drop in demand for new capital investment causing a slowdown, when in fact each of the three major sectors has some project completions dropping out of the monthly cash flows that will result in month to month declines.

CONSTRUCTION SPENDING OR CONSTRUCTION STARTS – MEDIA HEADLINES THAT GET IT CONFUSED

Here's a headline published recently. "Construction spending rose year-over-year during first 9 months of 2015."

What they really meant to say; "Construction *STARTS* rose year-over-year during first 9 months of 2015."

What's the big difference between these two statements? Well, here's an example:
The brief states "nonbuilding work climbed 35%" during the first nine months of 2015 compared to same months 2014. That is TRUE, if we are looking at new construction STARTS, but construction spending for nonbuilding work is down 2.5% during the first eight months of 2015 vs. 2014.

Construction starts help us understand where future spending is headed. Construction spending is based on how much is occurring this month from all the projects that started in the previous 12 to 36 months.

Current spending is based on the last one to three years of starts. New starts will generate the next one to three years of spending. Monthly increases or decreases in new starts is not telling us how much spending is going on right now, it gives us the data to determine how much spending to expect in the future. The only way to get the real picture of what to expect in the future is to look at the cumulative cash flows that occur in any given future month from all the previous starts that are still ongoing.

Furthermore, the construction starts values that are published every month represent a sampling of new construction activity, approximately 50% to 60% of total construction activity. While the total reported construction starts for a year might be $500 to $600 billion, the total spending in that year will be more like $1.0 to $1.1 trillion.

So, while a headline can certainly state correctly "Construction *STARTS* rose year-over-year during first 9 months of 2015", that doesn't tell us much about current spending.


Some Signs
Ahead
Gilbane

Some Signs Ahead

The following reports can be accessed by clicking on the hyperlinks provided.

American Institute of Architects (AIA) Architectural Billings Index (ABI) measures monthly design work on the boards in architectural firms. It is a nine- to 12-month leading indicator to new construction starts. Index values above 50 show increasing billing revenues, and below 50 indicates declining revenues. The ABI Institutional Index posted strong movement from May to July 2015. This should lead to strength in new institutional starts in early 2016. The Commercial Index dipped into negative territory three times in 2015, a sign of weakening from the strength in the previous two years. Typically, institutional facilities are the last nonresidential building sector to recover from a downturn.

The ABI Institutional Index, up 17 consecutive months, hit 59 in June, highest in a decade.

Associated Builders and Contractors (ABC) Spending Forecast predicts continued growth for the construction industry in 2016. ABC predicts nonresidential construction will increase 7.4% in 2016.

ABC Construction Backlog Indicator (CBI) third quarter 2015 report released December 16, 2015 is a quarterly forward-looking economic indicator reflecting the amount of work that will be performed by commercial and industrial contractors in the months ahead. The CBI is measured in months of backlog and reflects the amount of construction work under contract, but not yet completed.

ABC Charts and Graphs for Q3 2015 show strong advances peaking in Q3 2014. Indices are at post-recession highs. The current national index is at 8.5 months of backlog. The index was created in Q1 2009, so there is no comparison to pre-recession workload.

Associated General Contractors (AGC) in conjunction with Sage released a study in January. "The 2016 Construction Hiring and Business Outlook" survey conducted in November – December 2015 includes responses from more than 1500 firms. 71% of firms plan to add employees in 2016. 70% of firms report they are having a hard time finding qualified workers, including salaried and craft professionals.

AIA Consensus Second Half 2015 Construction Forecast is a semi-annual survey of construction economists' projections for future spending. Posted on the AIA economics page, the Second Half 2015 report of expectations for nonresidential construction shows predicted growth has been revised upward to 8.9% for 2015. It remains at 8.2% for 2016. All commercial sectors and the industrial (manufacturing) sector show expectations for double digit growth in 2015. The AIA consensus of spending growth for manufacturing buildings is 22% for 2015. Gilbane data predicts 45% growth in 2015 spending for manufacturing buildings. The AIA semi-annual Consensus report, forecasts of 2016 nonresidential buildings only, will be released in January.

Bloomberg News published this article in December 2015 that states "Labor shortages in the construction industry as a whole actually have a much greater impact on home prices than interest rates. According to a June survey by the NAHB, 61% of homebuilders during the previous 12 months had raised home prices due to labor shortages across construction trades."

CMD Construction Data Spending Forecast, in its December report, is currently predicting 10% spending growth in 2015 and 8.6% growth in 2016. CMD predicts residential construction will increase 11.5% in 2015 and 10.5% in 2016. CMD predicts infrastructure heavy engineering projects will drop 0.8% in 2015 but grow 3.5% in 2016. This CMD update was released prior to the U.S. Census revisions to residential spending.

CMD Construction Data New Construction Starts, released November 2, 2015, is predicting starts will increase 6.8% in 2015 and 8.4% in 2016 with strongest increases in residential and commercial construction.

Dodge Momentum Index (DMI) is a monthly measure of nonresidential projects in planning, excluding manufacturing and infrastructure. It gives an indication of projects that may soon begin the design phase. It is a leading indicator of specific nonresidential construction spending by approximately 12 to 15 months. In recent months the commercial index has been declining while the institutional index has been climbing.

Engineering News-Record (ENR) 2015 Fourth Quarterly Cost Report shows general purpose cost indices up on average about 2% year-over-year. However, selling price building indices for nonresidential buildings are up on average 6%. The difference between these indices is increased margins.

ENR Fourth Quarter Construction Industry Confidence Index Survey asked executives from design firms, general contractors, subcontractors and construction managers about their hiring and compensation plans for 2016. Of the 253 executives responding to the survey, 223 provided estimates of planned raises for their employees in 2016. The average planned increase was 4.63%.

FMI Fourth Quarter 2015 Nonresidential Construction Index (NRCI) is now 59.5, the lowest since Q4 2013. The NCRI is a report based on a survey of opinions submitted by nonresidential construction executives. The NCRI declined in Q3 and Q4 2014 from a very strong Q2 2014. It has since fallen to levels below all of 2014, primarily driven by a declining outlook for the overall economy.

FMI Construction Outlook Third Quarter 2015 Report predicts residential construction will increase 9% in 2015. At the time of this report, released September 24, 2015, FMI predicted 6% spending growth in 2015 and 7% growth in 2016. The FMI Fourth Quarter Outlook report, updated forecast for 2015 and 2016, is usually released in January.

Institute for Supply Management (ISM) Non-Manufacturing Index (NMI) Report for December 2015 is a better indicator of activity in the construction industry than the ISM manufacturing report. The NMI measures economic activity in 13 industries (including construction) not covered in the manufacturing sector. The December NMI is 55.3, well below the level of 60.3 in July but above 52 for 71 consecutive months, indicating continued economic growth.

Job Openings and Labor Turnover Survey JOLTS released in December for October, data shows the quits rate and the number of positions open that need to be filled. Values for construction have been elevated since January 2013.

Markstein Advisors Economic and Construction Outlook most closely agrees with the Gilbane forecast. Markstein predicts construction spending will increase 10.6% in 2015 and 9.9% in 2016.

Portland Cement Association, on December 15, 2015, released a report titled "What the FAST Act Means for Cement and Concrete." According to PCA, "the five-year transportation bill recently signed into law will add an average of 835 thousand tons of cement each year from 2016 through 2020."


Producer Price
Index
Gilbane

Producer Price Index

The U.S. Census Producer Price Index (PPI) data for November 2015 indicates the PPI for material inputs to all construction decreased 0.2% in the month and 1.8% over three months. The index baseline was recently revised so we have yet to gather a 12-month data point for comparison.

Producer Price Index (PPI) tracks cost to produce construction materials – providing a strong indicator for inflation trends.

TABLE 15:
BLS PPI Materials November 2015

U.S. Construction Producer Price Indexes - November 2015

MATERIALS PPI	PERCENT CHANGE VERSUS to November 2015 from Oct-15 1 month	Aug-15 3 months	Nov-14 12 month	ANNUAL FOR 12 months 2014 last yr	12 months 2013	12 months 2012
SUMMARY						
Inputs to ALL Construction	-0.2	-1.8		-0.9	1.3	1.4
Inputs to Nonresidential	-0.2	-1.9		-1.9	0.9	0.9
COMMODITIES						
Cement	-0.1	-0.5	6.2	6.1	4.7	2.9
Iron & Steel Scrap	-11.5	-31.7	-52.7	-17.1	7.5	-15.6
MANUFACTURED MATERIALS						
Diesel Fuel	-3.5	-11.6	-38.2	-26.1	-0.9	2.1
Asphalt Paving	-0.2	-1.5	-5.9	2.5	1.0	4.5
Asphalt Roofing/Coatings	-1.0	-2.0	-4.0	2.5	-0.8	-0.3
Ready Mix Concrete	0.7	1.1	3.5	5.5	2.9	2.6
Concrete Block & Brick	0.0	0.5	2.2	3.2	2.1	1.2
Precast Conc Products	0.5	0.8	1.6	6.5	1.6	2.4
Building Brick	-0.4	-0.4	1.5	1.4	1.4	-2.6
Copper & Brass Mill Shapes	-3.0	-4.6	-15.6	-4.5	-6.6	1.5
Aluminum Mill Shapes	-1.4	-2.5	-11.1	10.9	-4.6	-1.9
HR Structural Shapes				5.9	-5.3	-8.5
Steel Pipe and Tube	-0.4	-4.3	-14.9	0.0	-5.1	-6.1
Fab. Structural Steel	-0.6	-2.5	-1.2	1.4	-0.6	1.6
Fab. Bar Joists and Rebar	-0.1	-1.7	-0.1	2.5	0.4	2.6
Gypsum Products	-1.7	0.5	-1.1	5.1	16.2	14.1
Insulation Materials	2.5	2.1	3.9	2.5	6.7	5.4
Lumber and Plywood	1.0	-0.4	-7.4	3.3	10.0	11.1
Sheet Metal Products	-0.1	0.2	-0.9	2.5	-2.2	-1.3

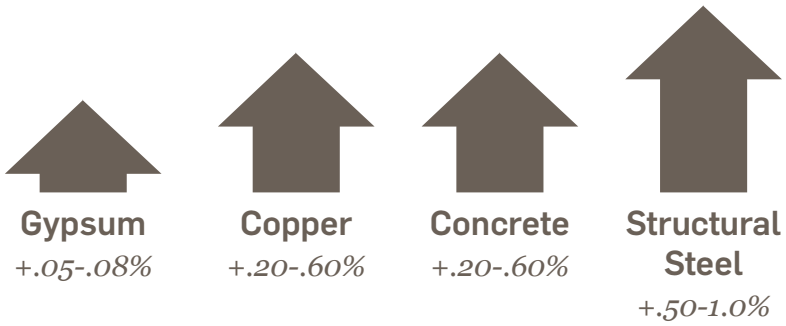
All data not seasonally adjusted
Source: Producer Price Index. Bureau of Labor Statistics

Cement, insulation materials, and ready-mix concrete increased the most in price year over year.

Diesel fuel, scrap steel, and copper and brass shapes decreased the most in price year over year.

The relative impact of cost changes for several materials is a function of how much the material is used within a typical building.

For a typical nonresidential building, a 10% increase in the cost of these materials has this impact on the overall cost of the building:



The PPI for construction materials gives us an indication whether costs for material inputs are going up or down. The PPI tracks producers' cost to supply finished products. This tells us if contractors are paying more or less for materials and generally indicates what to expect in the trend for inflation.

PPI TRENDS HELP TO INTERPRET THE DATA

- 60% of the time, the highest increase of the year in the PPI is in the first quarter.
- 90% of the time, the highest increase of the year is in the first six months.
- **In 20 years, the highest increase for the year has never been in Q4.**
- 60% of the time, the lowest increase of the year is in Q4.
- **50% of the time, Q4 is negative, yet in 22 years the PPI was negative only twice.**

So when you see monthly news reports from the industry exclaiming, "PPI is up strong for Q1" or "PPI dropped in the 4th Qtr." it helps to have an understanding that this may not be unusual at all and instead may be the norm.


Material
Price
Movement
Gilbane

Material Price Movement

When the cost to the supplier goes up, it almost always gets immediately passed along in full to the consumer. When the cost to the supplier goes down, the savings trickle down to the consumer very slowly.

Cost for material inputs:

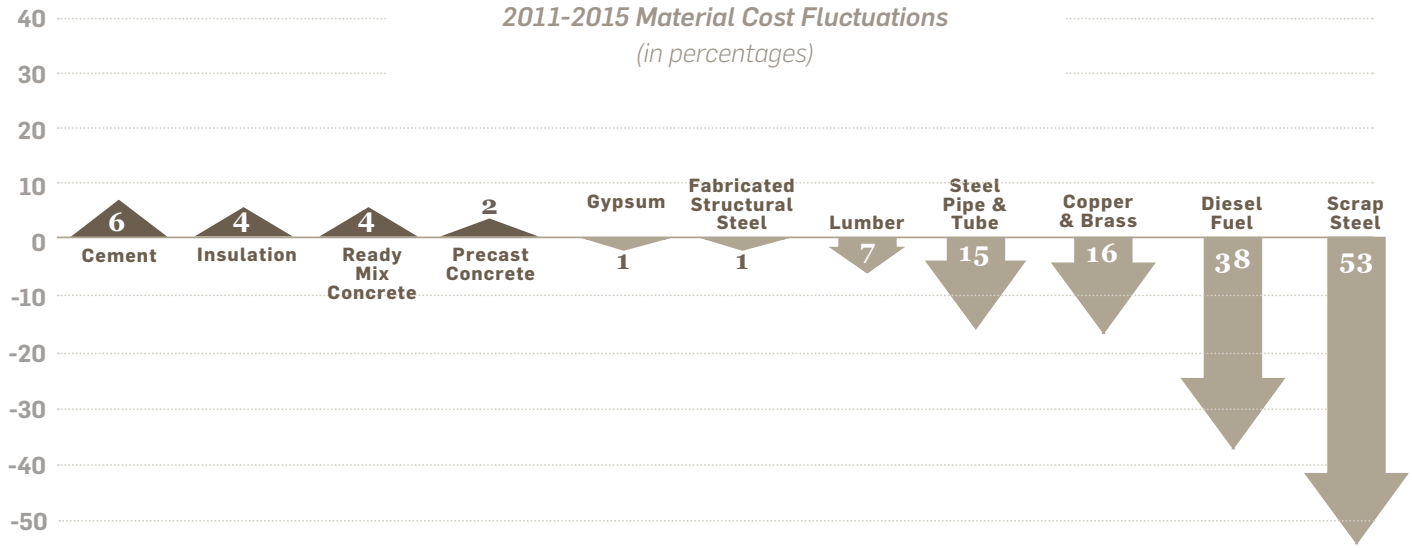
- to all construction decreased 0.9% last year and is on track to decrease even more in 2015.
- to nonresidential construction decreased 1.9% last year and will decrease again in 2015.

TABLE 16:
BLS PPI Markets 2012-2015

U.S. Construction Producer Price Indexes - November 2015

MARKETS Inputs PPI	PERCENT CHANGE VERSUS to November 2015 from Oct-15 1 month	Aug-15 3 months	Nov-14 12 month	ANNUAL FOR 12 months 2014 last yr	12 months 2013	12 months 2012
Inputs to ALL Construction	-0.2	-1.8	0.0	-0.9	1.3	1.4
Inputs to Nonresidential	-0.2	-1.9	0.0	-1.9	0.9	0.9
Inputs to Commercial	-0.2	-1.7		-0.3	0.9	1.2
Inputs to Industrial	-0.3	-1.3		-1.5	0.8	0.8
Inputs to Hghwy/Hvy Engr	-0.4	-2.6		-2.7	0.9	0.8
Inputs to Residential	0.0	-1.5		0.0	1.7	2.0

All data not seasonally adjusted
Data Source: Producer Price Index. Bureau of Labor Statistics

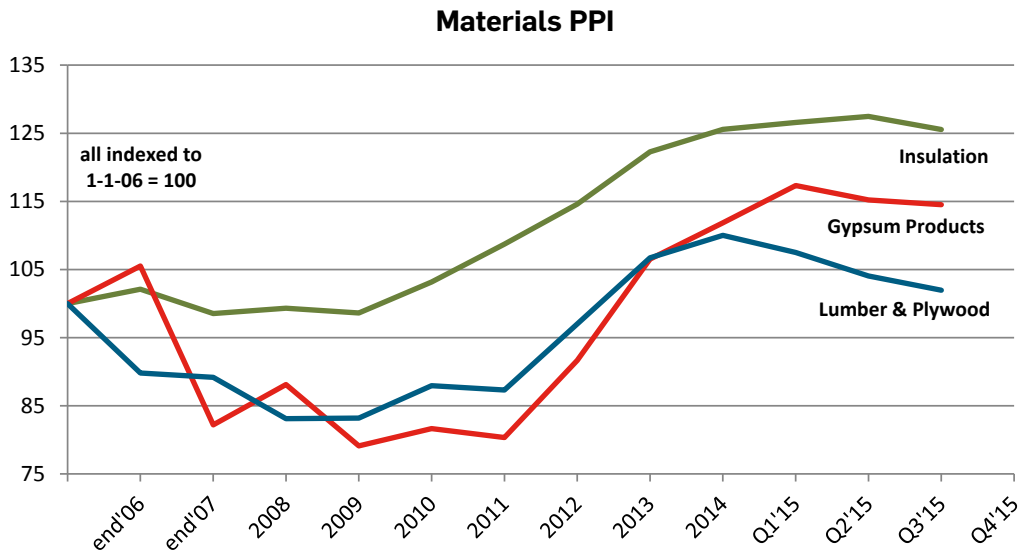


This extreme variability means individual trade assessments require individual material index data. Costs of gypsum, lumber and plywood, and insulation are driven primarily by residential markets. Structural steel products are driven more by nonresidential markets.

GYPSUM / LUMBER / INSULATION

Gypsum, lumber and insulation demand is primarily driven by residential construction.

FIGURE 23:
Materials PPI Index Gypsum Lumber Insulation 2006-2015



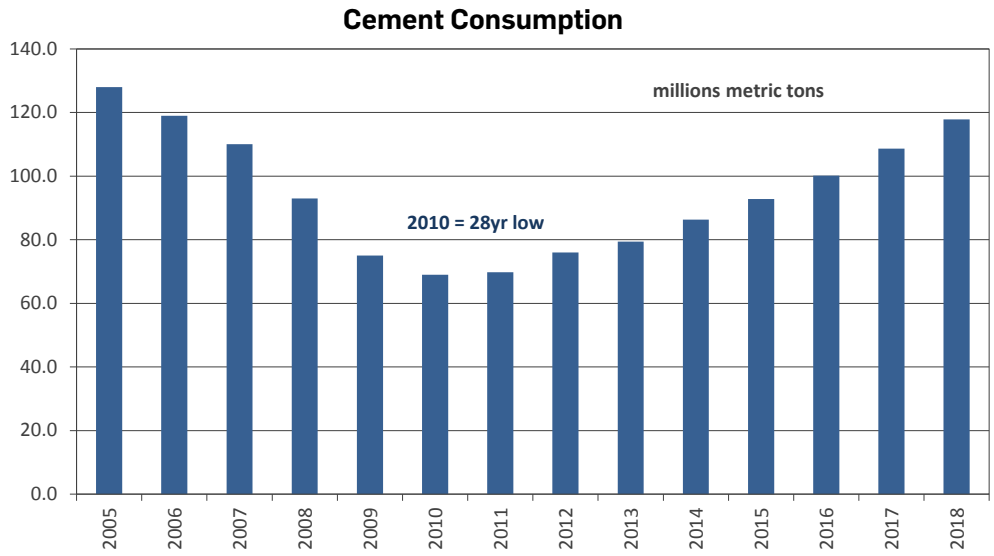
CEMENT / CONCRETE / ASPHALT / BRICK / BLOCK

Portland Cement Association (PCA) reports the volume of cement demand as an indicator of economic activity. It is a reliable coincident indicator. PCA reported an 8.9% rise in consumption in 2012, and consumption grew 4.5% in 2013. Consumption grew more than expected in 2014, up 8.7%. In 2015 consumption grew only 3.5%.

On December 15, 2015, PCA released a report titled "What the FAST Act Means for Cement and Concrete." According to PCA, "the five-year transportation bill recently signed into law will add an average of 835 thousand tons of cement each year from 2016 through 2020." That represents about a 1% increase in concrete demand.

Nearly two-thirds of U.S. cement consumption occurs in the six months between May and October. Rising consumption and prices leading into summer can lead to large shifts in demand and seasonal pricing and is not an indicator of long-term growth but only reflects periodic seasonal fluctuating consumption rates. Look at total annual volumes for trends.

FIGURE 24:
Cement Consumption 2005-2018



Cement prices increased 2.9% in 2012, after dropping four years in a row. Cement prices increased 4.7% in 2013 and 6.1% in 2014. IHS Global Insight predicted cement prices would rise 5.0% in 2015. Through November, prices are up 8.0%. IHS forecast cement price will increase 4.7% in 2016.

FIGURE 25:
Materials PPI Index Cement Concrete Asphalt 2006-2015

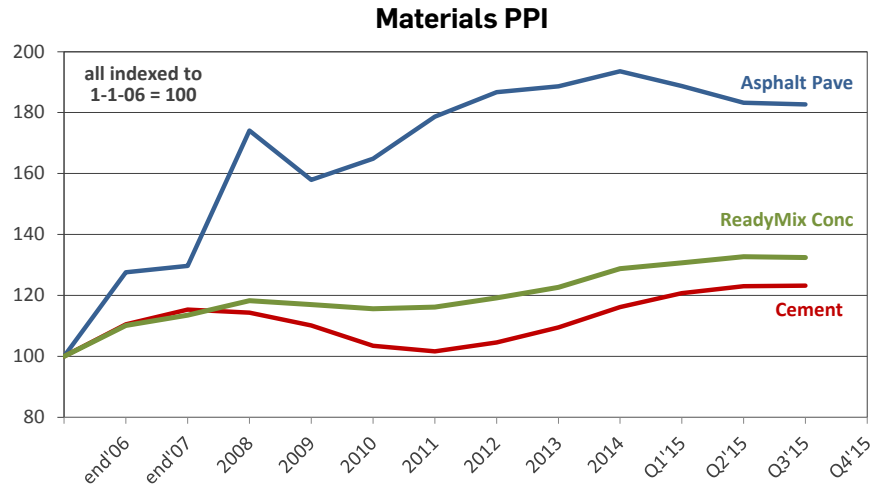
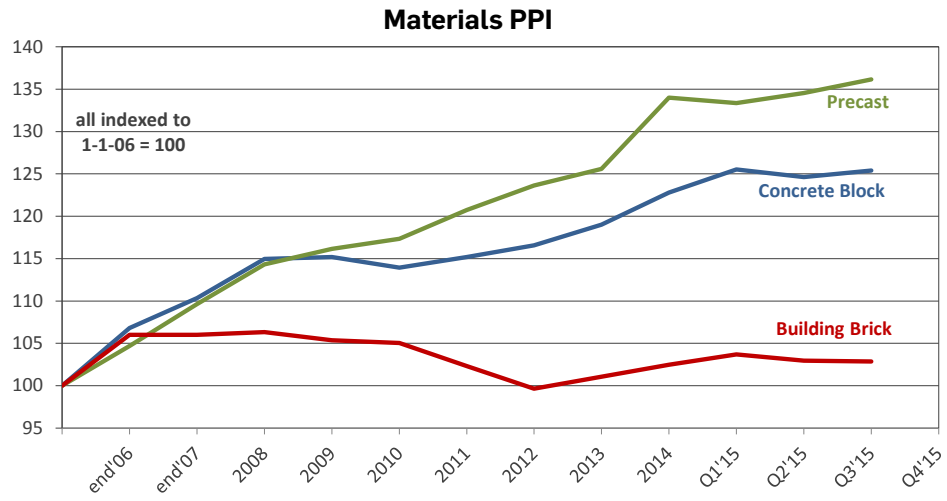


FIGURE 26:
Materials PPI Index Brick Block Precast 2006-2015

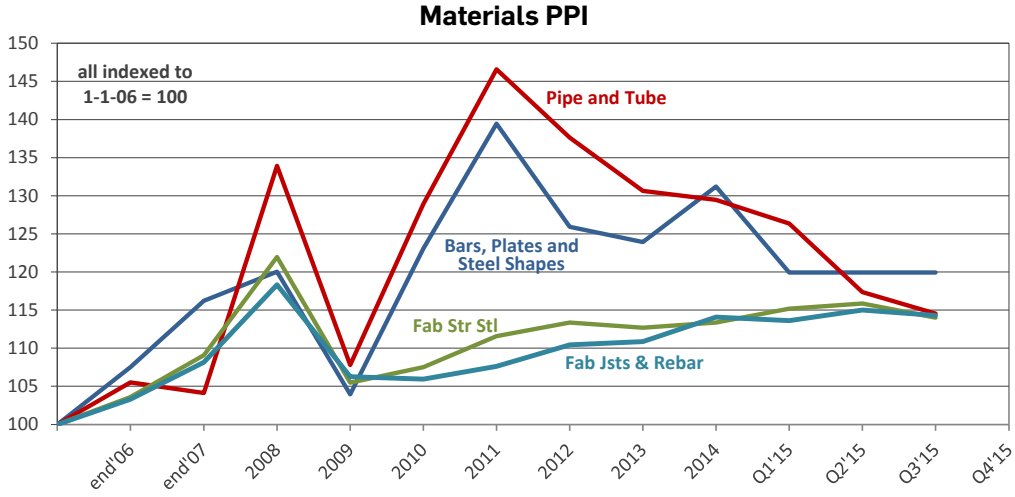


STRUCTURAL STEEL / REINFORCING BAR

The construction industry is the largest consumer of steel products worldwide. Approximately 100 million tons of steel is produced annually in the United States. More than 40 million tons of that is delivered to the construction industry. The next largest industries combined (automotive, equipment and machinery) do not consume as much steel as construction.

Structural steel is the most widely used structural framing material in the United States, with a 58% of market share for nonresidential and multi-story residential buildings, based on square footage built. The next closest framing material, concrete, holds only 21% market share.

FIGURE 27:
Materials PPI Index Iron and Steel Products 2006-2015



The rapid rise in 2008 mirrors the rapid acceleration in bid pricing to the peak in Q3-Q4 2008 and the precipitous fall from that peak. By mid-2009, the mill price of steel products had experienced a 40% decline, retreating to a 2004 low. Since the 2011 high, the price trend has been lower for pipe and tube and structural shapes.

The rapid rise in 2008 mirrors the rapid acceleration in bid pricing to the peak in Q3-Q4 2008 and the precipitous fall from that peak. By mid-2009, the mill price of steel products had experienced a 40% decline, retreating to a 2004 low. Since the 2011 high, the price trend has been lower for pipe and tube and structural shapes.

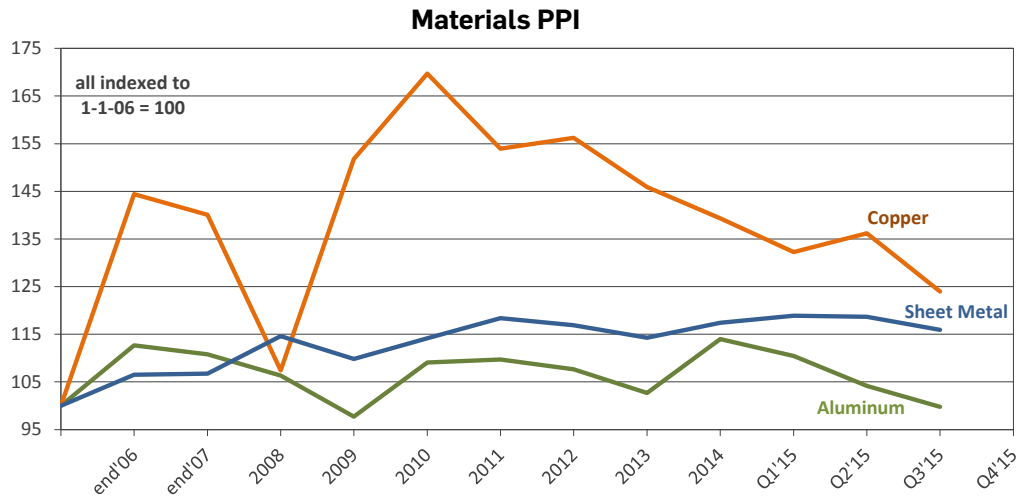
Steel.org reports steel mill capacity utilization is currently at 60% as of January 2, 2016. Capacity utilization a year ago was at 75%. This leaves considerable room for capacity expansion, and this will tend to hold down prices.

The November 2015 PPI shows fabricated structural steel cost is down 1.2% in the last 12 months.

Structural steel is very much dependent on recycled steel. Structural steel is made 90% from scrap steel. Scrap prices are down 53% in the last year and down 65% from a 10-year peak in 2011.

COPPER / ALUMINUM / SHEET METAL

FIGURE 28:
Materials PPI Index Aluminum Copper Sheet Metal 2006-2015



WHAT MAKES COPPER SO IMPORTANT TO WATCH?

Copper is a leading economic indicator that has rarely (if ever) failed to indicate the direction of world economies. When copper rises in price, world economies are leading into expansion. When copper drops in price, a decline in world economies very quickly follows. Copper prices and the U.S. workforce move almost perfectly together. Also, because copper is so widely used in buildings, and manufacturing facilities must be built to see a big increase in production, copper demand is an excellent predictor of industrial production 12 months out.

Click here to view copper price charts on metalprices.com

What drives copper prices up or down? Unlike some other metals, it is not speculation. Quite often it is demand. Increasing demand equals increasing prices. When demand wanes, prices drop.

What effects do copper price changes have on the cost of projects?

Roughly speaking, copper material is about:

- 10% electrical contract or 1% of cost of project
- 5% of an HVAC contract or 0.6% of cost of project
- 10% of a plumbing contract or 0.3% of cost of project

So, for an average project, copper material can represent approximately 2% of the total cost of the project. Therefore, a 10% increase in the cost of copper will increase the cost of a project by 0.2%.

There are exceptions. For example, if copper is 2% of the total cost of the typical project, it is probably 4% to 5% of total cost on a heavy mechanical/electrical project, such as a data center. So a 10% increase in the cost of copper increases the total cost of a data center by 0.4% to 0.5%. For a copper roof, material is 65% of total cost and can represent ~1% of typical project cost.

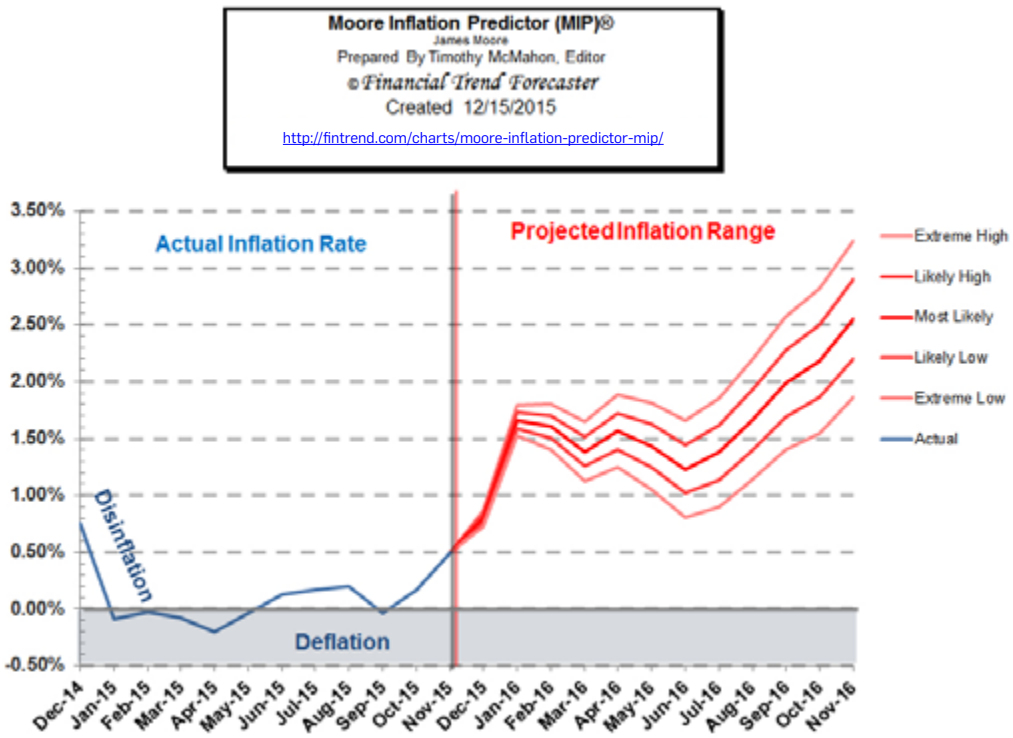

Consumer
Inflation/
Deflation
DELL
Gilbane

Consumer Inflation / Deflation

The Moore Inflation Predictor© (MIP) is a highly accurate graphical representation of the future direction of the inflation rate. It has a 97%+ accuracy rate forecasting inflation rate direction and turning points and over 90% of the time the inflation rate falls within the projected "likely" range.

A review of long-term inflation data shows there are seasonal aspects of inflation with some fairly consistent trends. It appears that the majority of inflation occurs in the first half of the year and then moderates for the second half. Since 2001, there have been eight deflationary fourth quarters and only three inflationary fourth quarters, even though the overall trend is inflationary.

FIGURE 29:
Moore Inflation Predictor Consumer Inflation 2015-2016



MIP 2013 and 2014 predicted inflation versus actual results that were only 0.1% and 0.2% off. MIP predicted a period of deflation from January 2015 through June 2015 with a rapid rise of 1.5% in the second half of 2015. Actual results show deflation from January through May and a very slight 0.12% inflation increase in June. MIP is now predicting a most likely rise to 0.75% inflation by year end 2015 and an increase up to 2.5% by the end of 2016.

Construction Inflation

Gilbane

Construction Inflation

Construction inflation, based on several decades of trends, is approximately double consumer inflation. From mid-2009 to late 2012, that long-term trend did not hold up. During that period, construction inflation/deflation was primarily influenced by depressed bid margins, which had been driven lower due to diminished work volume. Over the last 24 months, that has changed. Work volume has increased and short-term construction inflation has increased to more than double consumer inflation. It appears construction inflation is already advancing well ahead of consumer inflation, which supports that consumer inflation is not an indication of movements in construction inflation.

It is always important to carry the proper value for cost inflation. Whether adjusting the cost of a recently built project to predict what it might cost to build a similar project in the near future, or answering a client question, "What will it cost if I delay my project start?", the proper value for inflation (which differs by sector and differs every year) can make or break your estimate.

These points must be taken into consideration when addressing construction inflation:

- Long-term construction cost inflation is normally about double consumer price inflation (CPI).
- Average long-term (30 years) construction cost inflation is about 3.75%.
- In times of rapid construction spending growth, construction inflation averages about 8%.
- Although inflation is affected by labor and material costs, a large part of the change in inflation is due to change in contractors/suppliers' margins.
- When construction volume increases rapidly, margins increase rapidly.
- Construction inflation can be very different from one major sector to the other and can vary from one market to another. It can even vary considerably from one material to another.
- In the five years of rapid growth in spending for nonresidential buildings from 2004 through 2008, nonresidential buildings cost inflation totaled 39%, or averaged ~8% per year.
- In the six years of spending during the residential construction boom from 2000 through 2005, residential building cost inflation totaled 47%, or averaged ~8% per year.
- Neither the producer price index (PPI) for construction inputs nor the CPI is a good indicator of total construction cost inflation.
- Some construction cost indices include only the cost changes for a market basket of labor and materials and do not include any change for margins. Those indices are not a complete analysis of construction cost inflation.

Construction cost inflation must include all changes related to labor wages, productivity, materials cost, materials availability, equipment and finally contractors margins. Margins are affected by the volume growth of new work and demand for new buildings. Be sure to verify what is included in any cost index you reference for real construction cost inflation.

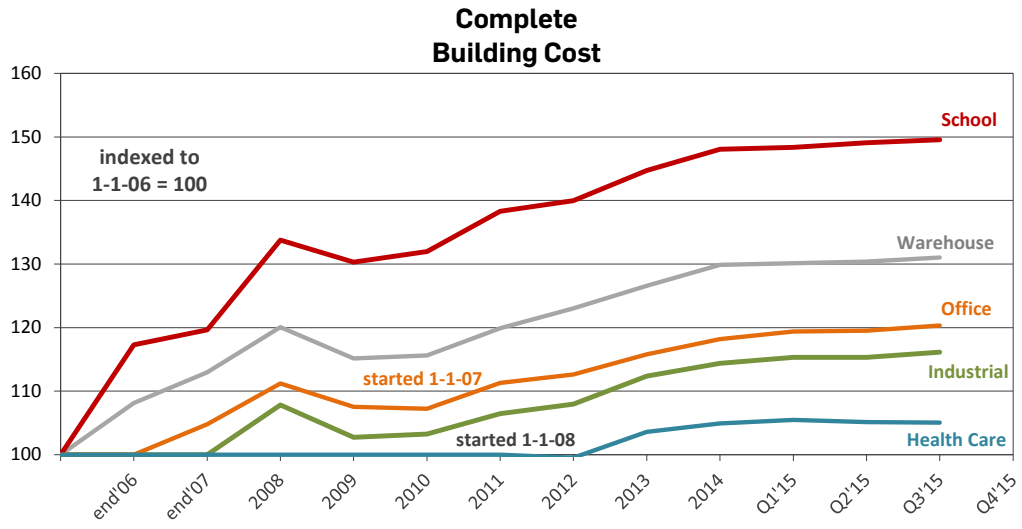
For the last three years, residential construction inflation has averaged 6.7% and nonresidential buildings inflation has averaged 4.2%. Nonresidential buildings cost inflation has increased for five consecutive years. Both are likely to increase in 2016 since anticipated volume in both sectors will grow next year.

In Gilbane's construction spending data set, which goes back to 1993, there were six years with greater than 9% spending growth. By far, the largest spending growth years were 2004 and 2005, at 11.2% and 11.5%. We are about to repeat that historic level of spending growth. This report predicts 2015 will finish with growth of 10.7% and 2016 will experience 9.7% growth.

Expect historic levels of growth in spending will be accompanied by inflation relative to historic high growth periods. Don't expect long-term average inflation in high growth periods. Don't be caught short in your construction cost budgets!

The U.S. Construction Producer Price Index tables for Buildings Complete, which includes the cost complete as charged by the builder, represents one indicator of construction inflation.

FIGURE 30:
Complete Building Cost Index by Building Type 2006-2015



NONRESIDENTIAL BUILDINGS INFLATION

As depicted by U.S. Census PPI completed buildings data:

- 2013 building cost inflation ranged from 2.8% to 4.1%.
- 2014 building cost inflation ranged from 1.3% to 2.6%.

As depicted by Industry Selling Price Indices including margins:

- 2013 building cost inflation ranged from 3.1% to 4.1%.
- 2014 building cost inflation ranged from 4.2% to 4.4%.

NEW HOUSING PRICE INFLATION

As depicted by U.S. Census and Industry Actual Cost Indices:

- 2013 building cost inflation ranged from 6.5 to 9.6%.
- 2014 building cost inflation ranged from 6.6% to 6.7%.

Construction spending is increasing at the fastest rate in more than 10 years. That will continue to support increasing margins. Therefore a building's total construction (final cost) inflation will outpace construction labor and materials inflation.

Expect nonresidential construction cost inflation to remain above 4% for several years. See "Escalation" for near-term and long-term recommendations.

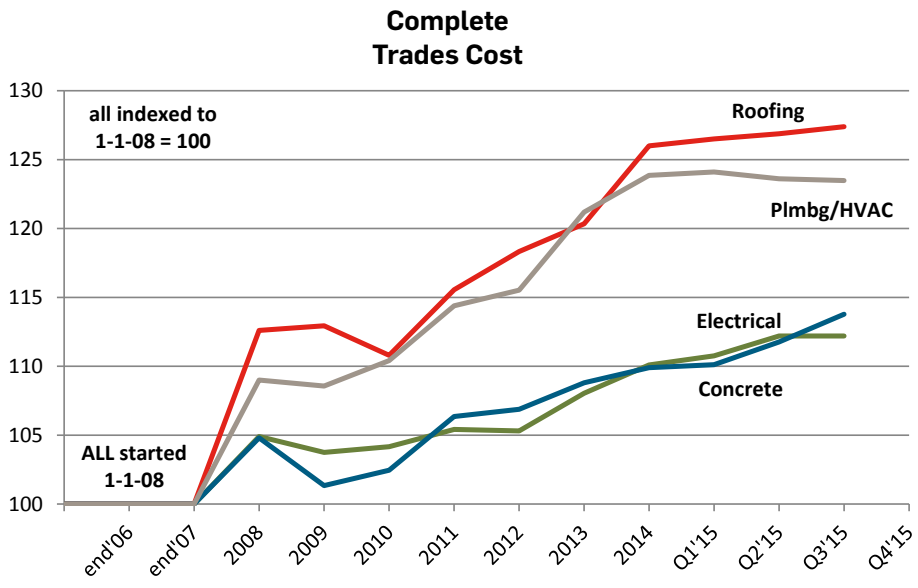
These average values, useful for adjusting whole building costs, cannot be considered to adjust a unique contract type. Construction inflation with a historical average range from 3% to 8% would not be accurate to adjust asphalt paving or shingles. Asphalt products increased 10% in 2005 and 2006 and 20% in both 2008 and 2009.

NONRESIDENTIAL TRADES INFLATION

As depicted by PPI complete trades cost data:

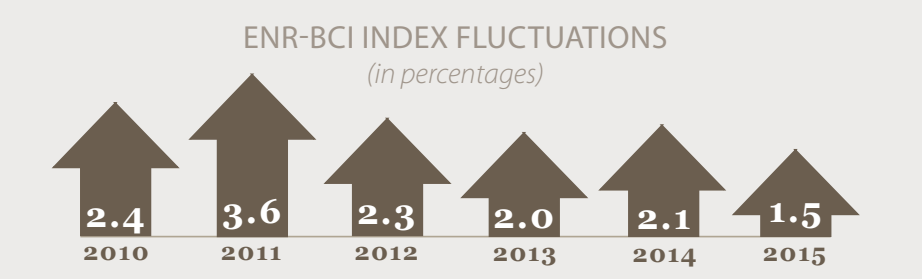
- 2013 trades cost inflation ranged from 1.7% to 4.9%.
- 2014 trades cost inflation ranged from 1.0% to 4.7%.

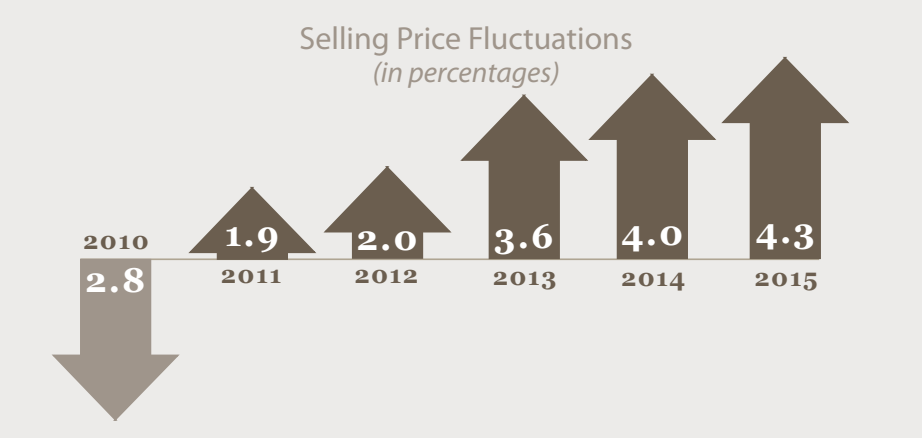
FIGURE 31:
Complete Trades Cost Index by Trade 2006-2015




ENR
Building Cost
Index
Gilbane

ENR Building Cost Index





The December 2015 Engineering News-Record 20 Cities Average Building Cost Index (ENR-BCI) is 5564, up 1.5% year-over-year. ENR predicts the BCI will increase 1.8% in 2016.

The ENR-BCI is one of the most well-known and most widely-used building cost indices. However, its long-term strengths can also be weaknesses, particularly in times of fluctuating selling prices because:

- It is made up of a small shopping basket of labor and materials. Therefore, it is not always the best representation of all building types, which can vary considerably in composition.
- That shopping basket includes no representation for any mechanical, electrical or plumbing items, which can comprise 30%-50% of the cost of the building. In many cases, the shopping basket comprises less than 20% of the building cost.
- Building materials differ widely in rate and timing of cost growth and can dramatically affect the cost of projects. In 2009, while structural steel products declined in price by 10% to 15%, copper products increased in price by 40%.

ENR-BCI does not take into consideration bid prices, so it often does not represent the final cost of buildings. Bid prices are referred to as Selling Price, and this is not included in the ENR-BCI. Selling prices show increased or reduced margin bids due to market activity.

The annual average ENR Index has gone up every year for 70 years.

There were several monthly declines in the ENR index from late 2008 through early 2010, but the annual average has gone up every year for 70 years. More importantly, from Q2 2008 through Q2 2011, during the only recent period in which true deflation occurred, the ENR-BCI would indicate a 10% cost increase! The actual final cost of buildings, documented by several reliable measures, from Q2 2008 through Q4 2010 went down by 8% to 13%.

Whenever there are very active periods or very depressed periods of construction activity, contractor selling prices rise or fall accordingly, and since the ENR-BCI does not track selling price, it cannot reflect accurately what effect selling price had on the cost of buildings during those periods. Nonetheless, the ENR-BCI is often relied upon as an indicator of cost movement over time.

TABLE 17:
ENR Building Cost Index History

ENR'S BUILDING COST INDEX HISTORY (2000-2015)													
Base = 1913=100	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL AVERAGE
2000	3503	3523	3536	3534	3558	3553	3545	3546	3539	3547	3541	3548	3539
2001	3545	3536	3541	3541	3547	3572	3625	3605	3597	3602	3596	3577	3574
2002	3581	3581	3597	3583	3612	3624	3652	3648	3655	3651	3654	3640	3623
2003	3648	3655	3649	3652	3660	3677	3683	3712	3717	3745	3765	3757	3693
2004	3767	3802	3859	3908	3956	3996	4013	4027	4102	4129	4128	4123	3984
2005	4112	4116	4127	4168	4189	4195	4197	4210	4242	4265	4312	4329	4205
2006	4335	4337	4330	4335	4331	4340	4356	4359	4375	4431	4462	4441	4369
2007	4432	4432	4411	4416	4475	4471	4493	4512	4533	4535	4558	4556	4485
2008	4557	4556	4571	4574*	4599	4640	4723	4733	4827	4867	4847	4797	4691
2009	4782	4765	4767	4761	4773	4771	4762	4768	4764	4762	4757	4795	4769
2010	4800	4812	4811	4816	4858	4888	4910	4905	4910	4947	4968	4974	4884
2011	4969	5007	5010	5028	5035	5059	5074	5091	5098	5104	5113	5115	5059
2012	5115	5122	5144	5150	5167	5170	5184	5204	5195	5203	5213	5210	5174
2013	5226	5246	5249	5257	5272	5286	5281	5277	5285	5308	5317	5326	5278
2014	5324	5321	5336	5357	5370	5375	5383	5390	5409	5442	5468	5480	5387
2015	5497	5488	5487	5501	5490	5507	5510	5515	5542	5544	5564	5564	5517

Data reprinted by permission *Engineering News-Record* - ENR.com

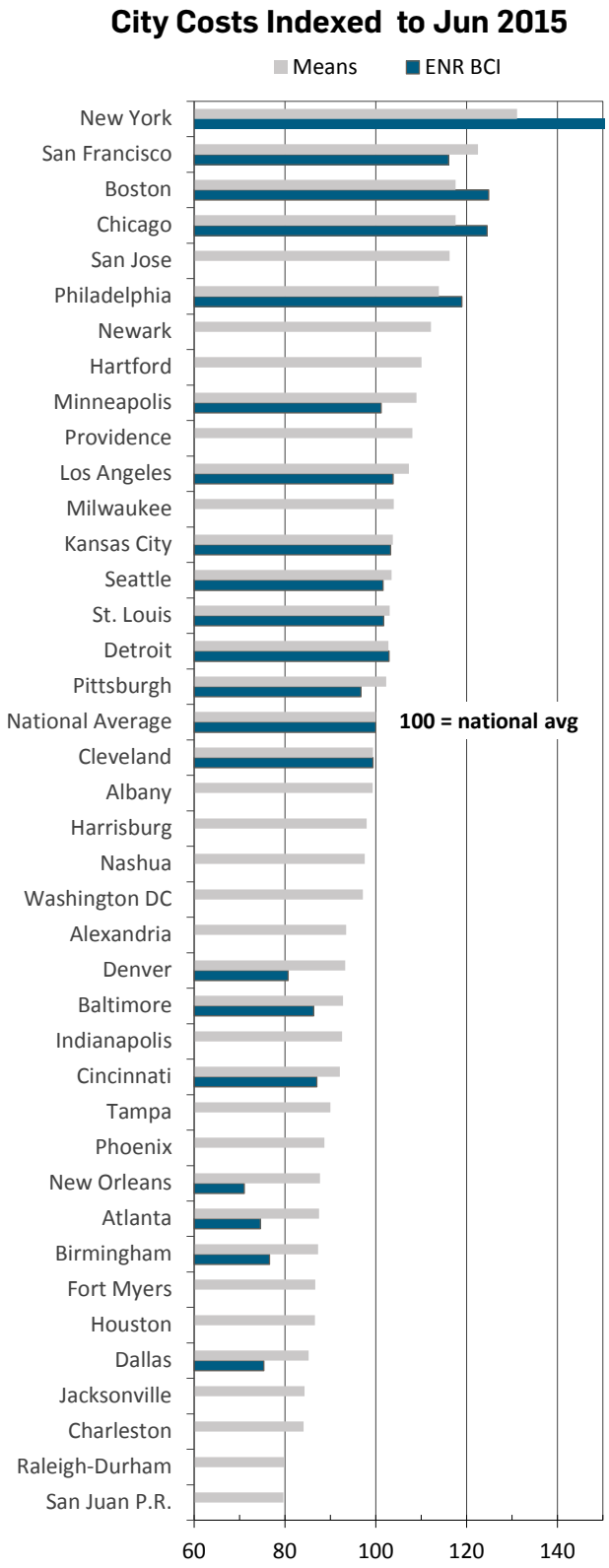
For a procedure to adjust for actual selling prices see the "Indexing – Addressing the Fluctuation in Margins" section of this report, and refer to Figure 35: Escalation Growth vs. Actual Margin Cost. This is particularly important for those using conceptual cost modelling tools such as the Gilbane CostAdvisor.

Indexing by Location – City Indices

Gilbane

Indexing By Location – City Indices

FIGURE 32:
City Location Cost Index 2015



Equally important as indexing for time is the process of indexing for location. The practice of using historical projects, regardless of location, to get an idea of cost of future projects is quite common. Not only must project costs be moved over time, but also move the location. City indices provide the means to move project costs from one location to another.

Suppose the historical project was built in Phoenix and the goal is to determine the cost of a similar project built in Boston.

Assume

- Project cost as built = $10,000,000
- Boston index = 120
- Phoenix index = 90

Move costs to Boston from Phoenix;
Divide "To" city by "From" city
Multiply original cost by factor.

- Boston / Phoenix = 120/90 = 1.33x
- $10,000,000 x 1.33 = $13,300,000

Through this example, you can see the danger of simply using unadjusted project costs from one location to determine costs in another location. Without adjusting for differences in cost due to location, it is possible to over- or under-state project costs by substantial amounts.

ENR provides city indices for 20 major metropolitan cities. RS Means annually updates tables for hundreds of cities. The chart here lists 40 major cities from highest to lowest RS Means index. The ENR index is shown for those available.

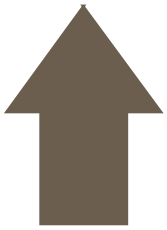

Selling
Price

Selling Price

Selling price is the total price at which a contractor is willing to bid to win a project, even if that selling price eliminates all profit from the bid.

You must take into consideration the selling price of buildings, past and present, if you want to accurately index the cost of buildings over time.

Few inflation or material/labor cost predictors address the issue of bidders raising or lowering margins in bids and hence affecting what is known as selling price. Selling price is dramatically affected by economic conditions such as market volume and contractor booked revenue. When market volume is low, contractor's margin, or selling price, comes down. As business volume picks up, and contractors secure more work, even if material prices stay low, contractors begin to increase their margins and selling price increases.



Increasing activity leads to higher selling price.

In some areas, selling prices are still depressed, and it will take time before workload volumes increase to a point that contractors see a return to normal margins. In 2012 and 2013, margins were increasing. The AGC Business Outlook survey for 2014 indicates optimism at a post-recession high. That will lead to increased margins.

The industry is currently in a growth period as reflected in monthly construction spending. Construction spending is increasing at the fastest rate of growth in more than 10 years. From beginning to end of 2015, the rate of spending will increase by 15%. Construction spending is projected to grow by 6% to 10% for the next several years. Although it may be several years before building market activity returns to pre-recession levels, there is clear evidence that the rate of activity will remain strong. A growth trend leads to higher margins.

FIGURE 33:
Nonresidential Buildings and Infrastructure Spending Rate of Growth 2013-2016

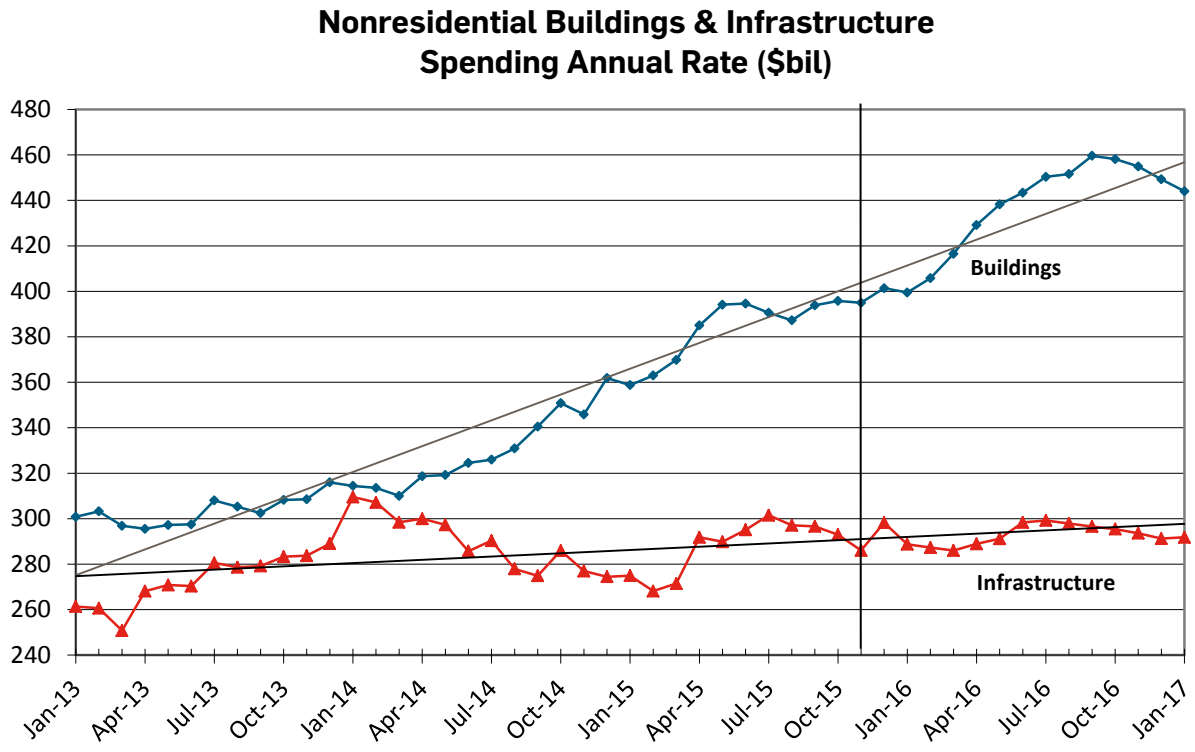
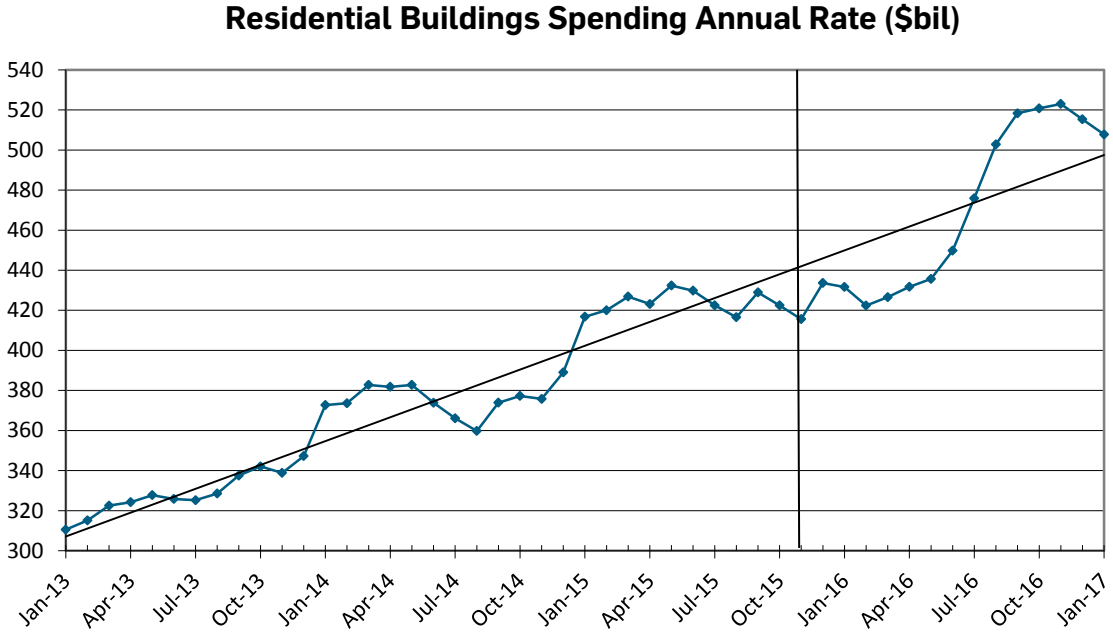


FIGURE 34:
Residential Spending Rate of Growth 2013-2016



On average, labor cost represents approximately 35% - 40% of building cost.

Contractors need to recover the cost for all expenses that affect their cost to build. Any cost not recovered is taken as a reduction to margin or reduced selling price. Cost recovered over and above expenses raises selling price and is a growth to margins.

- On average, labor cost represents approximately 35% - 40% of building cost.
- On average, materials cost represents approximately 50% -55% of building cost.
- Equipment and contractor services represent 10% of building cost.
- Margins are applied on all 100% of building costs.

Labor wage cost growth is generally 2% to 3% per year. The labor wage cost long-term average is 3%. Labor demand and changes in labor productivity either increases or decreases total labor cost. In growth periods, labor demand tends to increase wages, and productivity generally declines, increasing overall labor cost.

The Q4 Construction Industry Confidence Index Survey by ENR shows more than 85% of executives responded positively that they would increase compensation to hire new or keep existing employees in 2016. The average planned increase was 4.63%.

Materials cost growth is tracked by several reports such as the PPI. Materials costs fluctuate widely, but in general, in times of higher demand, material prices go up.

Equipment and services have the least effect on overall project cost. Contractor efficiencies or unusual project conditions may vary this cost. Margins represent contractor overhead and profit. Selling price includes contractor margins and is market activity dependent. Competition will cause project bid margins to move lower. Increasing volume will allow margins to move higher.

If...	Then Cost to Project...
Labor wage ⬆ INCREASE by 3%	+1.2%
Productivity ⬇ DECREASE by 2%	+0.8%
Material costs ⬆ INCREASE by 5%	+2.5%
Services costs ⬆ INCREASE by 5%	+0.5%
Margin ⬆ INCREASE by 1%	+1.0%

During a period of low volume and competitive pricing (assuming no room for margins to move lower), margins are not increasing. During a period of margin recovery, anticipate a 1% to 1.5% annual increase to margins until margins fully recover.

When there is substantial growth in the volume of projects coming to bid, the need to keep margins reduced will diminish, and margins will return to normal. There is no room left for depressed market activity to move margins lower. Expect margins to increase slowly over time.

Margins vary considerably by market and activity within individual markets.

MARGINS INCREASING OR DECREASING?

Indices like the PPI MTRLS deal only with materials costs or prices charged at the producer level. They do not include delivery, equipment, installation, or markups, nor do they reflect the cost of services provided by the general contractor or construction manager.

Total project cost encompasses all of these other costs. Whole Buildings Completed PPI doesn't give us any details about the retail price of the materials used, but it does include all of the contractors costs incurred for delivery, labor for installation and markups on the final product delivered to the consumer, the building owner.

The PPI for construction materials IS NOT an indicator of construction inflation. It does not include the selling price. In 2010, the PPI for construction inputs was up 5.3%, but the selling price was flat. In 2009, PPI for inputs was flat, but construction inflation as measured by cost of buildings decreased 8% to 10%.

For several years, many construction firms have been competing for a very low volume of new work. In 2011 and 2012, construction spending, adjusted for inflation to get real volume, reached a 20-year low. There was little work available for bidders, forcing contractors to remain extremely competitive. As a result, contractors had been unable to pass on all cost increases to the owner. This had the effect of keeping selling price low, reducing both contractors' and producers' margins. In some cases, margins may be reduced to a loss just to get work.

Expect whole building costs to rise and remain above material/labor inflation as long as work volume continues to increase.

TABLE 18:
BLS PPI Buildings Completed 2011-2014

U.S. Construction Producer Price Indexes - November

Buildings Completed whole building cost	annual for 2014	2013	2012	2011
Inputs to Nonresidential	-1.9	0.9	0.9	5.7
New Nonrsdntl Bldgs	2.1	3.3	1.5	4.0
New Industrial Bldg	1.8	4.1	1.4	3.1
New Warehouse Bldg	2.6	2.9	2.6	3.7
New School Bldg	2.3	3.4	1.2	4.8
New Office Bldg	2.1	2.8	1.2	3.8
New Health Care Bldg	1.3	4.1	-0.5	NA

except inputs, includes labor, material overhead and profit
Source: Producer Price Index. Bureau of Labor Statistics

Margin growth resumed in 2012. Independent selling price indices show both 2014 and 2015 margins increasing by over 2%.

The flow of projects coming to bid during the coming months will strongly influence the cost movement of the bids. If the volume of projects coming to bid decreases, overall construction business will remain depressed and bids will remain low, strongly influenced by depressed margins. When there is a continued increase in the volume of projects coming to bid, the need to keep margins reduced will diminish and margins will continue a return to normal.

Indicators are pointing to growth signs, and that will eventually lead to a more normal bidding environment and higher margins.

Indexing - Addressing Fluctuations In Margins

Gilbane

Indexing - Addressing Fluctuation in Margins

The cost of previously built buildings is often looked at as a historical guide for what to expect in the future. Escalation indices allow the cost of buildings to be moved over time. City indices allow location to be moved. To index accurately, both margin and productivity need to be reviewed to determine what effect they might have on cost.

The Gilbane Building Cost Index is a complete selling price index. The inflation index shows the percent change each year due to inflationary (or deflationary) cost only.

TABLE 19:
Gilbane Building Cost Index 2007-2016

Gilbane Building Cost Index - Inflation Factors
Index value set to 2015 = 100

% growth vs. prior year	2007	2008	2009	2010	2011	2012	2013	2014	Gilbane Forecast 2015	Gilbane Forecast 2016
Nonresidential Bldgs	87.6	93.7	88.1	85.7	87.3	89.0	92.2	95.9	100.0	105.5
	7.8%	7.0%	-6.0%	-2.8%	1.9%	2.0%	3.6%	4.0%	4.3%	5.5%
Nonbuilding Hvy Engr	89.4	98.4	90.7	90.8	94.8	96.6	98.0	100.4	100.0	103.5
	5.6%	10.0%	-7.8%	0.2%	4.4%	1.8%	1.4%	2.5%	-0.4%	3.5%
Residential	98.6	92.4	85.7	83.8	82.7	83.6	90.4	96.4	100.0	106.5
	-0.6%	-6.3%	-7.3%	-2.2%	-1.3%	1.1%	8.0%	6.7%	3.8%	6.5%

Average costs of buildings from Q2 2008 through Q4 2010 fell by 13% to 15%. However, normal labor/material indices increased by 4% during that time. Normal indices will not account for all changes in individual material costs, wages, productivity changes and margin fluctuations.

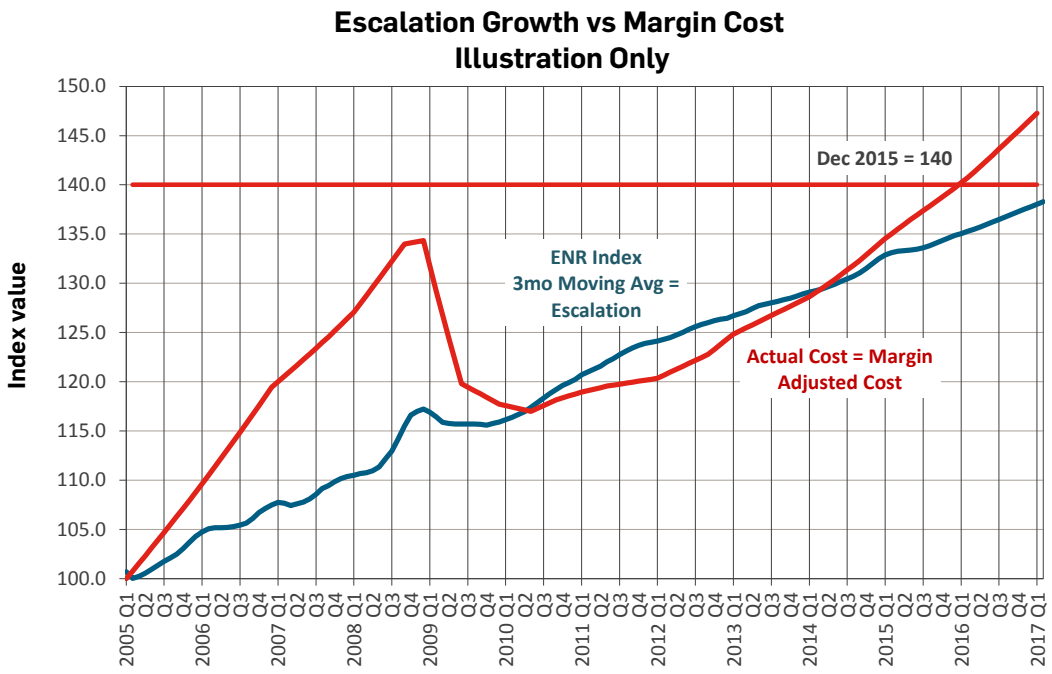
Standard labor and material index tables will not address the inflection points in this unusual time period, nor will standard labor and material inflation factors address productivity or margin fluctuation.

Figure 35, Escalation Growth vs. Actual Margin Cost, illustrates nonresidential building inflation during this unusual period and provides a means to properly account for these unusual occurrences.

In Figure 35, the blue line indicates ENR-BCI actual values through December 2015 and predicted escalation near 2.5% thereafter. The plotted values are three-month moving averages to smooth out the line. The red (thicker) line indicates Contractor Bid Price Movement or Adjusted Margin Cost representative of as-built cost. Current Index is through December 2015 and predicted escalation is 5.5% for 2016.

Very low margin cost in mid-2010 reflects contractor bids at low cost to secure a portion of a dramatically reduced amount of available work. Predicted future cost shows long-term cost growth, which accounts for both normal labor/material escalation equal to the escalation outlined above, and a very slow but steady 0.5% per quarter recovery of margins.

FIGURE 35:
Escalation Growth vs. Actual Margin Cost 2005-2017



How to Use the Above Graph:

If your project is not previously indexed using ENR-BCI, reference only the Margin index (red line).

1. Pick the date for midpoint of the historical reference project.
2. At that date, draw a vertical line so it passes through both curves. Now pick today's date.
3. At that date, draw a vertical line so it passes through both curves. Record the ENR Index at the historical reference date and today.
4. Record the Margin Cost Index at the historical reference date and today. Subtract historical ENR index from today's ENR index. Label that value A. Subtract historical Margin index from today's Margin index. Label that value B. Pay attention to sign (+ or -).
5. The difference between the movement due to the ENR index and the Margin Cost Index is the needed correction factor. Use the differences from the ENR Index (A) and the Margin Index (B) to develop an adjustment factor for your project. Since baseline is 100, all factors are the same as percentages.
6. B minus A = Margin Adjustment factor. Pay attention to signs (+ or -).

CostAdvisor users can record the Margin Adjustment value determined here into the Similarity Adjustment factor field. Treat all system indexing and future escalation as you would normally.


Escalation –
What Should
You Carry?
Gilbane

Escalation – What Should You Carry?

Escalation is typically thought of as one simple value. An estimator typically prepares a budget in today's dollars, but then must escalate the total estimate to the midpoint of the project construction schedule. As explained in prior sections, when determining escalation, the value must account for several factors.

Escalation must account for all anticipated differences from today's cost to expected future cost.

TO MOVE COSTS FROM TODAY'S DOLLARS TO FUTURE DOLLARS, WE MUST ACCOUNT FOR THE CUMULATIVE EFFECT OF:

- Market activity
- Labor wage rate changes
- Productivity changes
- Materials cost changes
- Equipment cost changes
- Margins fluctuations

The following escalation recommendations are based on the previous analysis of anticipated market activity, labor and material cost movement, productivity expectations and anticipated margin movement.

- Looking back at Q4 2014, construction activity growth was expected in most major sectors. Healthcare and infrastructure heavy engineering declined, but manufacturing buildings began to expand rapidly.
- For both 2015 and 2016, the general consensus across several construction economic reports is growth in spending of 8% to 11%.
- Residential construction expanded at a rate of 15% per year for the period 2013 to 2015.
- Nonresidential buildings activity in 2015 will post the second highest year to year percentage gains ever recorded.
- Nonresidential buildings spending will reach 17% growth above 2014.
- In 2015, office construction is expected to register 20% growth for the second year in a row.
- Manufacturing will post a 45% gain in 2015, a percent gain rarely seen in any market.
- The Architectural Billings Index for Institutional building hit an all-time high in June. The institutional sector is the last to recover after a downturn. The institutional ABI has been positive for 13 consecutive months and just reached a new high. This is an indicator that the rate of spending activity will increase 9 to 12 months from now.

- Inflationary pressures may push the rate of material cost increases higher. All material cost increases from the manufacturer through the supplier may be passed along to the owner.
- Labor shortages may be significant resulting in higher labor retention costs.
- Growing work volume will have the effect of reducing productivity, driving up labor cost.
- Contractors may increase margins 1% to 2% per year.
- Any assumption of low escalation (3%-3.5%) requires that market activity does not experience strong growth. All signs indicate otherwise.

Historical labor and material index growth is 75% in 20 years. That is 3.75% simple index growth per year or 2.85% compounded inflation cost growth for 20 years.

Historical as-sold building cost growth is 89% for 20 years. That is 4.45% simple index growth per year or 3.25% compounded inflation cost growth for the last 20 years.

Historical average spending growth is 7% per year (not including 2008 to 2011 when spending declined 35%).

Since the U.S. Census began keeping construction spending records in 1993, it has recorded a rate of spending growth more than 10% per year only twice and only three other years have exceeded 9% per year growth. In 2015, we will have 10% growth. 2014 had 9.6% growth and 2016 is projected to have 9.7% growth.

FOR NONRESIDENTIAL BUILDINGS

In years when nonresidential spending growth exceeded 10%, as-sold cost escalation was 9% to 11%.

Potentially, there may be escalation similar to the growth years of 2004 through 2008 when (for nonresidential buildings) spending grew 53%, and escalation averaged 8% per year for five years. All leading indicators point to continued growth for the next few years.

For each year above, consider your market. If you are in a market area or sector that has expectations of a huge volume of work that may start within a narrow window of time, then market pricing can turn rapidly for you.

TOTAL ESCALATION

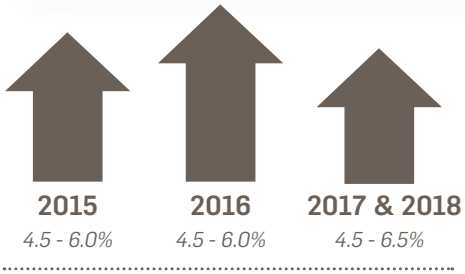


FIGURE 36:
Inflation/Escalation Minimum and Potential 2000-2017

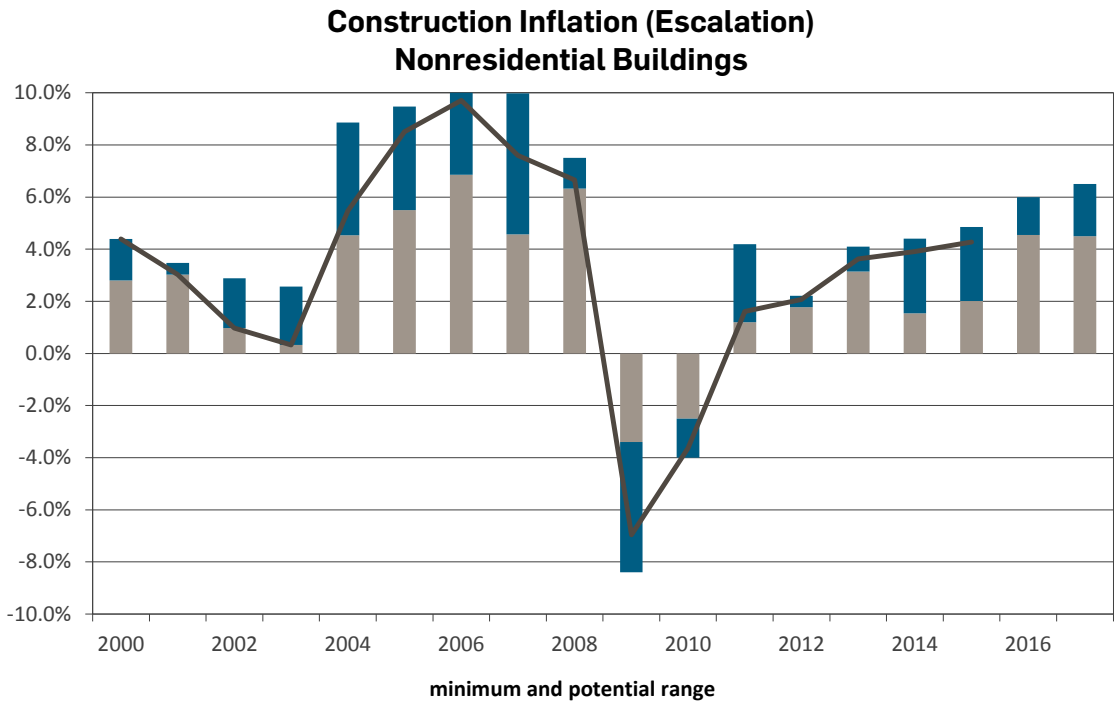


Figure 36 shows the low and high range of various independent nonresidential buildings construction actual cost indices. In 2015, the range of estimates varied from 2% to 5%. Actual inflation came in at 4%. The plotted line shows the actual resulting inflation. A chart for residential or non-building construction inflation would show much different values.

BUILDING MORE THAN BUILDINGS®

Gilbane, Inc. is a full service construction and real estate development company, composed of Gilbane Building Company and Gilbane Development Company. The company (www.gilbaneco.com) is one of the nation's largest construction and program managers providing a full slate of facilities related services for clients in education, healthcare, life sciences, mission critical, corporate, sports and recreation, criminal justice, public and aviation markets. Gilbane has more than 50 offices worldwide, with its corporate office located in Providence, Rhode Island.

The information in this report is not specific to any one region. The information is limited to the United States and does not address international economic conditions.

Author Ed Zarenski, a 42-year construction veteran and a member of the Gilbane team for 35 years, managed multi-million dollar project budgeting, owner capital plan cost control, value engineering and life cycle cost analysis. As a construction economics analyst, he compiles economic information and provides data analysis and opinion for this report.

Questions regarding this report can be addressed to:

Edward R. Zarenski

Construction Economics Analyst
Construction Analytics
Providence, Rhode Island

EZarenski@Gilbaneco.com
Twitter: @EdZarenski
LinkedIn: Ed Zarenski
www.edzarenski.com

This report and the materials contained therein are provided as estimates and projections for what may happen in the future. Information herein is believed to be reliable but Gilbane does not warrant its completeness or accuracy. Gilbane, its related business entities and the author make no guarantee that the projections and expectations will reflect actual future market and industry behavior and the information is used at the reader's own risk.

Data Sources

Along with countless news articles, these sources are used for data in this report:

- American Institute of Architects – www.aia.org/practicing/economics/index.htm
- American Iron and Steel Institute - steel.org
- Associated Builders and Contractors - abc.org
- Associated General Contractors of America - agc.org
- Bloomberg L.P. Financial News - Bloomberg.com
- Bureau of Labor Statistics - Stats.BLS.gov
- Construction Industry Round Table – cirt.org
- CMD - CMDGroup.com (formerly Reed Construction Data)
- Data Digest – DataDigest
- Dodge Data & Analytics - construction.com/about-us/press
- Economic Cycle Research Institute - businesscycle.com
- Engineering News-Record - ENR.com
- Financial Trend Forecaster - Fintrend.com
- FMI Management Consulting - FMINET.com
- IHS Global Insight - ihs.com
- Institute for Supply Management - ism.ws
- Metal Prices – metalprices.com
- National Association of Home Builders – NAHB.org
- Producer Price Indexes - bls.gov/ppi
- Random Lengths - randomlengths.com
- U.S. Census Bureau - census.gov

Engineering News-Record BCI table reprinted by permission.

Financial Trend Forecaster Moore Inflation Predictor graph reprinted by permission.

U. S. Census Bureau data obtained from public domain.

U. S. Bureau of Labor Statistics data obtained from public domain.

Graphics and tables reprinted by permission may not be reproduced outside this report.

All other figures and tables created by E. Zarenski for Gilbane Building Company.

Permission required to reproduce any part of this report.