

U.S. Construction Situation Report

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Short Caption: Jobenomics analysis of the U.S. construction industry situation.

Caption: The U.S. Construction industry is the fastest growing supersector of the ten private sector industries. On the other hand, it is facing severe skilled-labor shortages and over-priced real estate prices, both of which are likely to stall growth in this important Goods-Producing industry.

Executive Summary. To say the American construction industry is booming is an understatement. So far this decade, the U.S. Construction supersector's 3.3% annual employment growth is the fastest growing supersector of all ten industry supersectors. Moreover, each of this supersector's sectors and subsectors (Construction of Buildings, Specialty Trade Contractors, and Heavy and Civil Engineering Construction) exceeded the annual rate of U.S. GDP growth by substantial margins—the only supersector to do so. Construction industry's wages for production and nonsupervisory workers are now the fourth highest in the ten supersectors. Employment in Heavy and Civil Engineering is at an all-time high and has a bright future considering a plethora of potential national infrastructure projects. Nonresidential construction is approaching peak employment and is likely to grow as more and more investors commit their financial resources to new commercial enterprises. While residential construction is still 18% below peak employment, new home starts and sales doubled in number from their post-recession lows.

Conversely, the U.S. Construction supersector is facing significant challenges. Nine out of ten construction companies report skilled labor shortages. 99 out the top 100 U.S. metropolitan areas experienced significant housing price increases of up to 130% since the end of the Great Recession. As of July 2018, the average sales price of a new home sold in the United States was \$394,300, which is pricing many potential homebuyers, especially Millennials, out of the housing market. 70% of non-home owning Millennials, the largest living generation, feel it will be difficult for them to get a mortgage. According to the Federal Reserve, the Federal Funds Rate may rise to 3.5% by 2020, making home mortgages and commercial real estate loans more unaffordable. President Trump's \$1.5 billion infrastructure plan and the 40 planned or in-progress U.S. infrastructure projects of "major economic significance" for the nation and the Heavy and Civil Engineering Construction industry are all stalled by a deeply divided Congress.

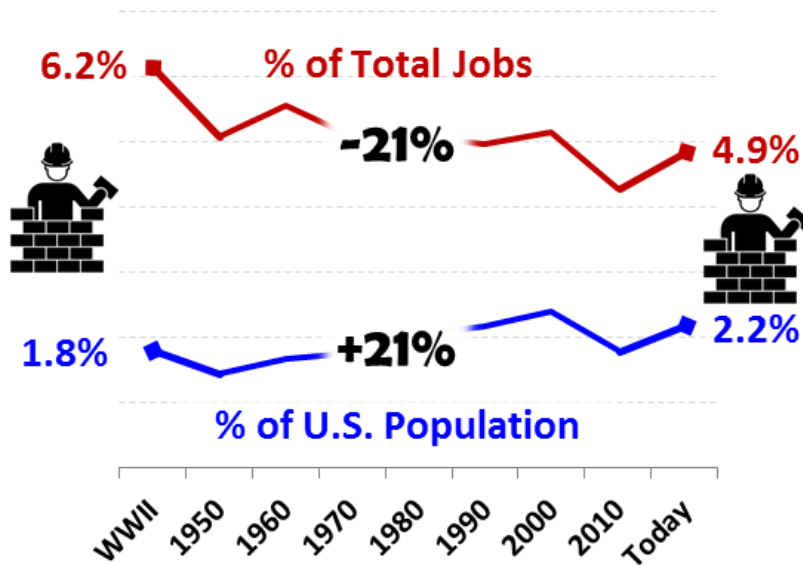
From a Jobenomics standpoint, the future of the U.S. Construction supersector should be bright if the U.S economy continues to grow at robust rates, and if the challenges facing this important Goods-Producing industry can be mitigated.

U.S. Construction Supersector.

The U.S. Construction supersector contributes more than \$700 billion to the U.S. economy, making its health and advancement essential to overall American economic growth.¹

Per the Bureau of Labor Statistics (BLS), the U.S. Construction supersector (NAICS 23) comprises establishments primarily engaged in the construction of buildings or engineering projects. Construction work done may include new work, additions, alterations, or maintenance, and repairs. Construction of Buildings comprises establishments of the general contractor type and for-sale builders involved in the construction of buildings. Heavy and Civil Engineering Construction comprises establishments involved in the construction of engineering projects. Specialty Trade Contractors comprises establishments engaged in specialty trade activities generally needed in the construction of all types of buildings.^{2 3}

U.S. Construction Percent of American Jobs and Population



As a percent of total U.S. jobs, the U.S. Construction supersector currently employs 7.2 million workers or 4.9% of all American nonfarm workers, which is down from 6.2% during WWII and down from 5.6% in 1960 during the peak of the post-war construction boom.

As a percent of the U.S. population, during WWII, when the U.S. population was 137 million citizens, construction employed 2.5 million workers or 1.8% of all Americans. In 1960, when the U.S. population was 181 million citizens, construction employed 3.0 million or 1.7% of all Americans. Today, 7.2 million construction workers represent 2.2% of the 328 million Americans living in the United States.

¹ The Q1 2018 USG Corporation + U.S. Chamber of Commerce Commercial Construction Index, https://www.uschamber.com/sites/default/files/q1_2018_cci_2-28_final.pdf

² Bureau of Labor Statistics (BLS), Industries at a Glance, Construction: NAICS 23, <https://www.bls.gov/iag/tgs/iag23.htm>

³ NAICS, Sector 23: Construction, <https://classcodes.com/lookup/sector-23/>

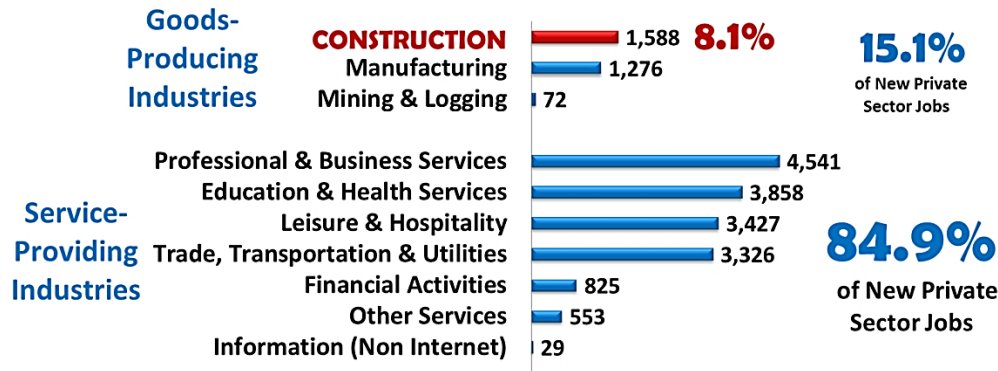
U.S. Construction Employment Growth This Decade (the 2010s)

Source: Bureau of Labor Statistics

Thousands of Jobs (000s)

1 January 2010 to 1 August 2018

Total Private Sector Gains = 19,495,000



Since 1 January 2010, the U.S. Construction supersector produced 1,588,000 new jobs. 1,588,000 jobs equate to 8.1% of all the new jobs created by the U.S. private sector during this post-Great Recession recovery period. 1,588,000 new jobs also equates to more than the combined number of new jobs produced by the other two supersectors (Manufacturing and Mining & Logging) in the Goods-Producing supersector group. However, as shown above, 1,588,000 new construction jobs represent less than half the number of new jobs generated by each of the four fastest-growing supersectors in the Service-Providing supersector group.

Construction Earnings (July 2018)

Rank	All Employees		Production and Nonsupervisory Employees	
1	Information	\$39.39	Information	\$31.53
2	Financial Activities	\$34.85	Mining & Logging	\$28.46
3	Mining & Logging	\$33.01	Financial Activities	\$26.91
4	Professional & Business Services	\$32.48	CONSTRUCTION	\$27.69
5	CONSTRUCTION	\$29.86	Professional & Business Services	\$26.74
6	Education & Health Services	\$27.04	Education & Health Services	\$23.66
7	Manufacturing	\$27.01	Manufacturing	\$21.44
8	Other Services	\$24.39	Other Services	\$20.68
9	Trade, Transportation, & Utilities	\$23.27	Trade, Transportation, & Utilities	\$19.84
10	Leisure & Hospitality	\$15.99	Leisure & Hospitality	\$13.87

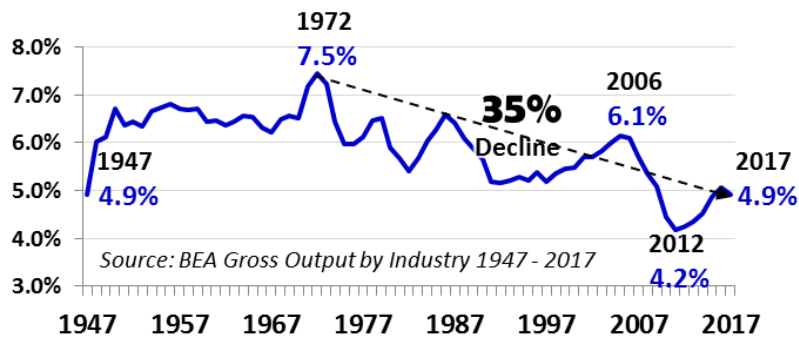
Source: BLS, Industries At A Glance

According to the Bureau of Labor Statistics (BLS), the U.S. Construction supersector wages rank in the upper half of all industry supersectors. The average construction production and nonsupervisory worker earned \$27.69 per hour in July 2018. All construction employees (including supervisory officials) averaged \$29.86 per hour.⁴ Within the Goods-Producing supersector group, Mining & Logging employees earned the highest wages. Manufacturing earned the lowest wages. Surprisingly,

⁴ BLS, Industry at a Glance, Manufacturing: NAICS 31-33, <https://www.bls.gov/iag/tgs/iag31-33.htm>

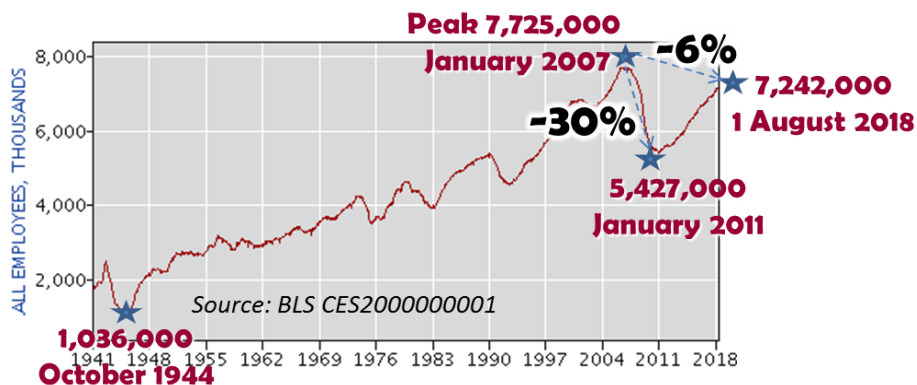
Manufacturing is no longer the high-paying industry sector that it used to be, nor will it be in the future. According to the U.S. Berkeley Labor Center and the National Employment Law Project, contrary to public perception that manufacturing jobs are “good jobs,” manufacturing wages now ranks in the bottom half of all jobs in the United States and are not even keeping up with inflation. In the largest segment of the American manufacturing base, automotive manufacturing, wages have declined further, falling three times faster than manufacturing as a whole and nine times faster than all occupations.^{5 6} For more information on the current U.S. manufacturing situation download Jobenomics’ 17-page U.S. Manufacturing Employment Report, updated 25 August 2018.⁷

U.S. Construction Gross Output Percentage of All Private Industries



According to the Bureau of Economic Analysis, the gross output of an industry is the market value of the goods and services produced by an industry. Since the peak in 1972, Construction gross output declined by 35%. Fortunately, U.S. Construction gross output rebounded from a post-recession low of 4.2% in 2012 to 4.9% in 2017. Compared to the U.S. Manufacturing supersector, which declined 53% since its gross output peak in 1947, the Construction supersector is looking relatively healthy.⁸

U.S. Construction Supersector Employment since WWII



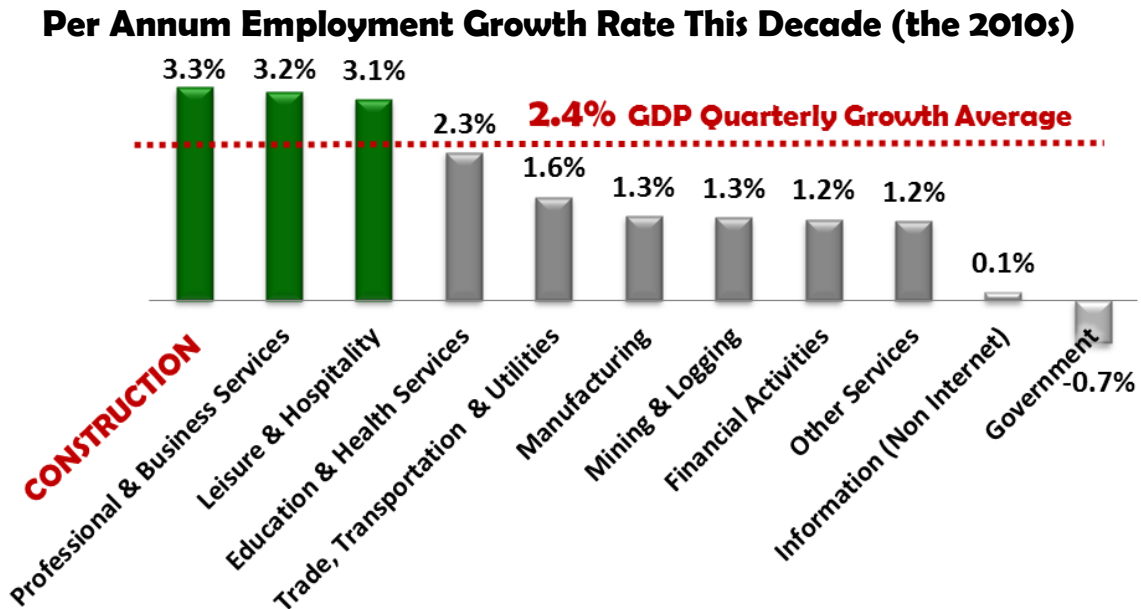
⁵ UC Berkeley Labor Center, Producing Poverty: The Public Cost of Low-Wage Production Jobs in Manufacturing, May 2016, <http://laborcenter.berkeley.edu/pdf/2016/Producing-Poverty.pdf>

⁶ National Employment Law Project, Manufacturing Low Pay: Declining Wages in the Jobs That Built America’s Middle Class, November 2014, <http://www.nelp.org/content/uploads/2015/03/Manufacturing-Low-Pay-Declining-Wages-Jobs-Built-Middle-Class.pdf>

⁷ Jobenomics, U.S. Manufacturing Employment Report, 25 August 2018, <https://jobenomicsblog.com/library/u-s-manufacturing-employment-report-25-august-2018-r1/>

⁸ Bureau of Economic Analysis, Gross Output by Industry, 19 April 2018, <https://www.bea.gov/industry/gdpbyind-data>

In January 2007, peak construction employment was 7,725,000 that declined precipitously by 30% during the Great Recession to a low of 5,427,000 in January 2011. As of 1 August 2018, construction employed 7,242,000 workers, up 33% from its post-recession low but still down 6% from its 2007 employment peak.



Since the beginning of this decade, the U.S. Construction supersector’s per annum employment growth rate outperformed all other Goods-Producing, Service-Providing, and Government groups. Construction, Professional & Business Services, and Leisure & Hospitality were the only three supersectors that outperformed the average quarterly rate of GDP growth of 2.4%. Government (Federal, State, and Local) was the only group that lost jobs during this period.

U.S. Construction Supersector Trends This Decade

Source: BLS CES7000000001, Seasonally Adjusted

	1-Jan-10	1-Aug-18	New Jobs	% Growth	% Growth
	Jobs (000s)		(000s)		Per Year
Construction	5,654	7,242	1,588	28%	3.3%
Construction of Buildings	1,263	1,608	346	27%	3.2%
Residential Building	596	797	201	34%	3.9%
Nonresidential Building	667	812	145	22%	2.5%
Specialty Trade Contractors	3,581	4,618	1,036	29%	3.4%
Residential Specialty Trade Contractors	1,522	2,027	505	33%	3.9%
Nonresidential Specialty Trade Contractors	2,059	2,591	531	26%	3.0%
Heavy and Civil Engineering Construction	810	1,016	206	25%	3.0%
Lost Jobs	<i>Below GDP Annual 2.4% Growth Rate</i>			<i>Above GDP</i>	

Employment growth in all of the Construction industry’s sectors and subsectors have been stellar this decade. Construction’s Specialty Trade Contractors sector grew the fastest at 3.4% per annum, adding 1,036,000 new jobs—the highest number of new jobs in any sector in the Goods-Producing Industries supersector group (the second highest sector was Manufacturing’s Durable Goods that added 982,000 new jobs at a subpar growth rate of 1.6%). Of the dozens of sectors in the Service-

Providing supersector group, only the Administrative & Waste Services sector in the Professional & Business Services supersector exceeded Construction’s Specialty Trade Contractors sector with a growth rate of 3.6%. The Construction of Buildings sector grew 3.2% per annum and added 346,000 new jobs, and the Heavy and Civil Engineering Construction sector grew 3.0% per annum adding 206,000 new jobs.



Construction Job Gains/Losses per Decade

Source: BLS (Nonfarm Employment), BEA (GDP, Year over Year Change) As of 1 August 2018

	WWII	1950s	1960s	1970s	1980s	1990s	2000s	2010-18
New Jobs (000s)	1,065	851	649	923	679	1,400	-1,055	1,588
Average Annual Growth	9.3%	3.9%	2.1%	2.5%	1.5%	2.6%	-1.6%	2.8%
Average GDP YoY Growth	6.0%	4.3%	4.5%	3.2%	3.2%	3.2%	1.8%	2.5%
Difference	3.3%	-0.4%	-2.4%	-0.7%	-1.7%	-0.6%	-3.4%	0.3%

Regarding job creation, the U.S. Construction supersector lagged behind the rate of GDP year-over-year growth in six out of the last eight decades.⁹ The construction-intensive WWII decade set an employment growth high-water mark of 9.3% per annum (93.3% per decade), which exceeded the rate of GDP growth by 3.3%. The period between the 1950s to the 1990s produced new construction jobs at positive but sub-GDP growth rates. The 8-month 2002 Recession and 18-month 2007-2009 Great Recession decimated the U.S. Construction workforce with a loss of 1,055,000 jobs—a downturn of 1.6% and 3.4% below the average rate of GDP growth. So far this decade, the U.S. Construction supersector is booming growing at a rate higher than GDP (2.8% versus 2.5%) and adding 1.5 million new jobs.

Construction Job Gains/Losses in the 2010s

84 Months		2010-16	2017-18	19 Months	
		Obama	Trump		
	Total	1,168	420		Period
	Per	20.7%	6.2%		Year
		3.0%	3.9%		

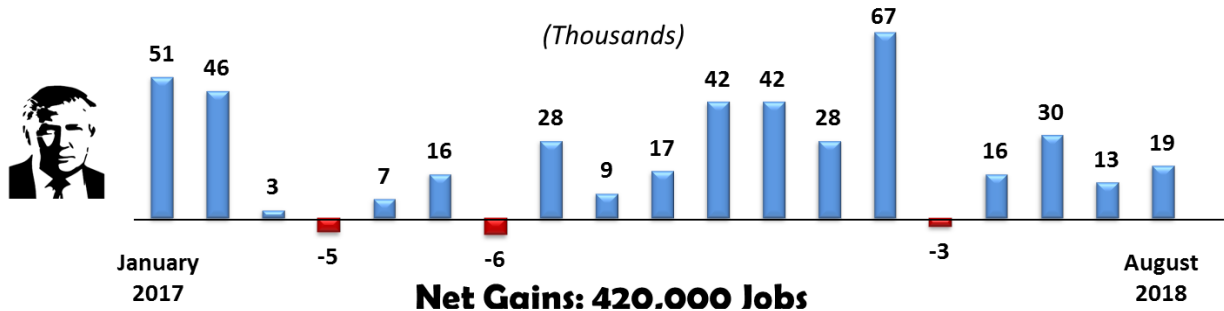
Both the Obama and Trump Administrations can lay claim to the booming U.S. Construction supersector in the 2010s. During the 84-month period associated with the post-Great Recession period during the Obama Administration, the U.S. Construction supersector added 1,168,000 jobs (13,909 jobs per month) and grew at a rate of 3.0% per annum, which was double the Obama Administration’s average quarterly GDP growth of 2.2%.¹⁰ During the 19-months of the Trump

⁹ U.S. Bureau of Economic Analysis, GDP, Table 1.1.1. Percent Change From Preceding Year, <https://www.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey>

¹⁰ Note: year-over-year GDP growth from 2010 through 2016 was a sclerotic 1.5%.

Administration, the U.S. Construction supersector added 420,000 jobs (22,105 jobs per month) and grew at a rate of 3.9%, which exceeded the Trump Administration quarterly GDP growth of 3.2%.¹¹

U.S. Construction Supersector Employment during the Trump Administration

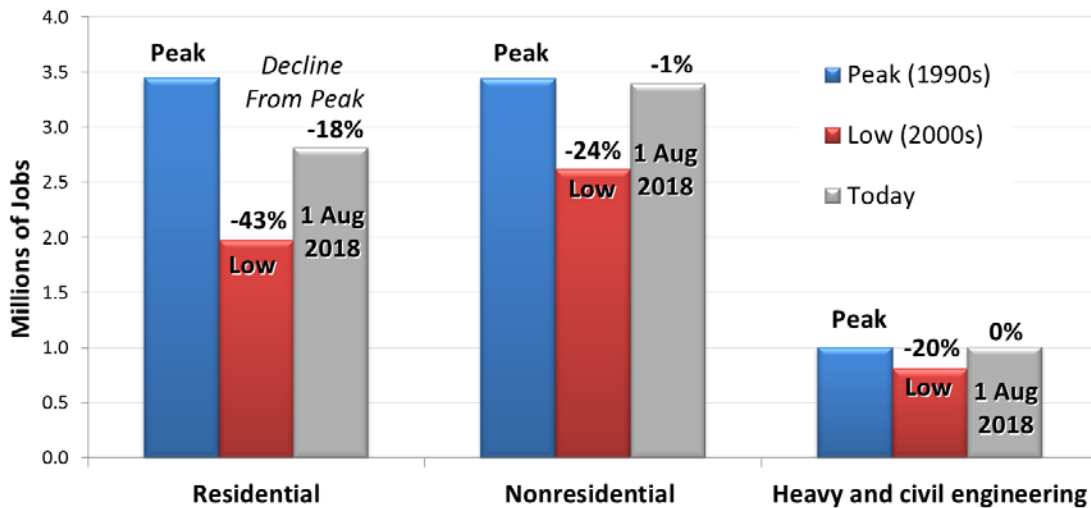


Construction gains and losses over the last 19-months included wide swings with 3-months with job losses, 6-months with job gains over 40,000 workers, and 10-months of low to moderate gains, for a net increase of 420,000 jobs. 420,000 new construction jobs equate to 11.4% of the 3,691,000 new jobs produced during the Trump Administration.

As of the most recent BLS Job Openings and Labor Survey (JOLTS), U.S. construction companies have 243,000 open jobs (3.6% of the total of 6,672,000 unfilled U.S. jobs).¹² The skilled labor shortage is largely responsible for these vacancies.

U.S. Construction Supersector Recovery From Peak Employment, to Great Recession Low, thru Q2 2018

Source: BLS, Jobenomics



Residential construction employment remains the hardest hit sector. Residential construction employment declined 43% from its pre-recession peak of 3,451,000 to a post-recession low of

¹¹ Note: year-over-year GDP growth for 2017 was 2.3% and 2018 is not yet available.

¹² BLS, Job Openings and Labor Turnover, Table 7. Job openings levels and rates by industry and region, not seasonally adjusted, <https://www.bls.gov/news.release/jolts.toc.htm>

1,982,000. As of 1 August 2018, residential construction employment is still below its pre-recession peak by 18% currently employing 2,824,000 workers. Nonresidential construction fared much better with losses of 24% from peak and 1% today with 3,402,000 workers. Heavy and civil engineering construction fared the best losing 20% from peak and now slightly ahead of the pre-recession peak (1,066,000 workers compared to 1,011,000 in June 2007).

Residential Construction

Source: BLS CE57000000001, Seasonally Adjusted

	1-Jan-10	1-Aug-18	New Jobs (000s)	% Growth	% Growth Per Year
	Jobs (000s)				
Residential Building	596	797	201	34%	3.9%
Residential Specialty Trade Contractors	1,522	2,027	505	33%	3.9%
Residential Construction	2,118	2,824	706	33%	3.9%

The Residential Construction sector created 706,000 new jobs or 45% of Construction supersector's 1,588,000 new jobs. Both the Residential Building and Residential Speciality Trade Contractors subsectors grew at 3.9% per annum, percentages well about the 2.4% per annum average rate of GDP growth. While this is great news, there are major challenges that could upend the residential construction boom.

Annual Rate of Residential Starts and Sales

	New Home Starts	New Home Sales	Existing Home Sales	New-to-Existing Home Sales Ratio
Peak 2005	2,030,467	1,252,029	7,003,227	1-to-5.6
2006	1,902,250	1,128,529	6,741,276	1-to-6.0
2007	1,504,515	865,818	5,551,137	1-to-6.4
Great Recession 2008	1,052,831	581,235	4,429,130	1-to-7.6
2009	673,637	441,343	4,251,944	1-to-9.6
Post Recession 2010	574,935	339,325	4,233,212	1-to-12.5
Lows 2011	603,010	311,184	4,244,649	1-to-13.6
2012	724,527	346,563	4,528,289	1-to-13.1
2013	879,518	408,563	4,930,703	1-to-12.1
2014	976,376	436,049	4,973,018	1-to-11.4
2015	1,070,527	480,957	5,123,904	1-to-10.7
2016	1,511,767	540,608	5,367,965	1-to-9.9
2017	1,203,164	594,115	5,509,783	1-to-9.3
August 2018	1,260,656	640,208	5,480,176	1-to-8.6
2005 to Low	-72%	-75%	-40%	
Low to Aug 2018	119%	106%	29%	
2005 to Aug 2018	-38%	-49%	-22%	
Color Key	Peak	Recession	Post Recession Low	Aug-18

According to a U.S. Home Sales analysis of U.S. Census Bureau data, New Home Starts, New Home Sales and Existing Home Sales started to decline several years before the advent of the Great Recession. Once the Great Recession began (December 2007), all three categories dropped precipitously, bottoming out 72%, 75% and 40% below the 2005 peak. Since hitting bottom, all three

categories rebounded strongly gaining 119%, 106%, and 29%, but not to the level of their former glory. Today, all three categories are still below the 2005 peak by 38%, 49%, and 22%.^{13 14}

As indicated by the New-to-Existing Home Sales Ratio scale, the ratio of New Homes Sales versus Existing Home Sales increased from 1-to-5.6 in 2005 to 1-to-13.6 in 2011 due to insolvent homebuilders and homebuyers as well as buyer preference for existing homes that were selling at a steep discount. Also, flipping (the practice of buying a home and quickly reselling it for a profit), and do-it-yourself fixer-uppers buoyed the existing home market during the downturn and slow-growth recovery period. Since 2011, the ratio of New-to-Existing Home Sales began decreasing as investors and consumers became more confident in the new home market. Today, the New-to-Existing Home Sales Ratio is 1-to-8.6 and is expected to continue to decrease as long as the economy stays strong, the rental market stays high, and new home ownership is considered a solid long-term investment opportunity.

Some bullish economists point to decreasing unemployment rates and “pent-up demand” as reasons to expect that the residential construction boom will continue, thereby creating as many as 250,000 new construction jobs when New Home Starts return to its 2005 peak level.

Many other economists are not so optimistic fearing that homeownership is not the solid long-term investment opportunity that it used to be. The U.S. Census Bureau reports that U.S. homeownership rates were 64.3% as of August 2018, which is down from a peak of 69.2% in 2004.¹⁵ This drop is generally attributed to less affordable housing, more restrictive lending, fewer first-time buyers, and people who have dropped out of the housing market completely. The drop has become more pronounced in the last several years, which could be an early harbinger of a housing downturn similar to what happened in the two years before the Great Recession.

Since President Trump took office, the number of New Home Starts dropped 17% from 1,511,767 at the end of 2016 to 1,260,656 in August 2018. This drop means fewer homes in the construction pipeline. New Home Starts is the segment that provides the greatest amount of jobs and underpins future New Home Sales. While New Home Starts have doubled since its 2010 low point, New Home Starts are unlikely to grow at this robust pace due to the high cost of housing and changing attitudes towards homeownership.

The average cost of an Existing Home Sale increased 11.3% from \$273,000 in October 2005 to \$307,800 in July 2018, an increase of \$34,800.^{16 17} The average cost of a New Home Sale increased

¹³ U.S. Debt Clock.org, U.S. Home Pricing and Sales, <http://www.usdebtclock.org/home-sales.html> and U.S. Census Bureau, Table 14. Homeownership Rates for the U.S. and Regions: 1965-to- Present, <http://www.census.gov/housing/hvs/data/histtabs.html>

¹⁴ U.S. Census Bureau, Business and Industry, Time Series/Trend Charts, New Residential Construction, Annual Rate for Housing Units Started, http://www.census.gov/construction/nrc/historical_data/

¹⁵ U.S. Census Bureau, Table 14. Homeownership Rates for the U.S. and Regions: 1965-to- Present, <http://www.census.gov/housing/hvs/data/histtabs.html>

¹⁶ FedPrimeRate.com, Average & Median Sale Price for A Previously Occupied (Used) Home In The United States, http://www.fedprimerate.com/preowned_used-home_sales_price_history.htm

¹⁷ Federal Reserve Bank of St. Louis and U.S. Census Bureau, Median Sales Price of Existing Homes (HOSMEDUSM052N), <https://fred.stlouisfed.org/series/HOSMEDUSM052N>

25.5% from \$293,600 in October 2005 to \$394,300 in July 2018, an increase of \$100,700.¹⁸ These price increases put homeownership out of reach for many middle-class and entry-level Americans who have not realized any significant increase in wages over this period.

As reported by Kiplinger, a leader in personal finance news and business forecasting, housing prices increased substantially in the 100 largest U.S. metro areas since the housing market hit bottom on 31 March 2012 after the Great Recession. Since hitting bottom, housing prices zoomed in 99 out of 100 U.S. metropolitan areas. 42 metro areas experienced housing price increases above 50%. Six cities (five in California and Detroit) doubled in prices.¹⁹

According to the National Association of Realtors, 85% of home buyers bought existing homes while 15% opted for a new home. Millennials (37 years and younger) are the largest share of home buyers at 36%. Sixty-five percent of Millennial buyers were also first-time home buyers. Gen Xers (38 to 52), Young Baby Boomers (53 to 62), Old Baby Boomers (63 to 71) and the Silent Generation (72 to 92) represent 26%, 18%, 14%, and 6% respectively of the home buying population.²⁰

According to Homes.com, “7 in 10 non-home owning Millennials, the largest living generation, feel it will be difficult for them to get a mortgage – with close to 1 in 10 (nine percent) saying they’ve given up completely. Over half (52 percent) feel that their financial situation is what is ultimately blocking them from being able to make a massive purchase like buying a home. 37 percent of those who don’t own a home think that the only way they’ll have their property is through inheritance, a lottery win, or being given one.”²¹

Since young Americans cannot afford homeownership, they are living with parents longer than ever before in recent history. 35% of all male and 28% of all females 18 to 34 years old are now living with their parents. While the percentage of young adults, aged 18 to 24 years old living at home, has remained relatively constant over the last three decades (between -6% for males to 9% females), the percentage of Millennials, ages 25 to 34, living with parents climbed sharply since the 1980s by 64% for females and 43% for males.²²

Nonresidential (Commercial) Construction

Nonresidential Building	667	812	145	22%	2.5%
Nonresidential Specialty Trade Contractors	2,059	2,591	531	26%	4.3%
Nonresidential Construction	2,726	3,402	676	25%	2.9%

¹⁸ Federal Reserve Bank of St. Louis and U.S. Census Bureau, Average Sales Price for New Houses Sold in the United States (ASPNHSUS), <https://fred.stlouisfed.org/series/ASPNHSUS>

¹⁹ Kiplinger, Home Prices in the 100 Largest (U.S.) Metro Areas, March 2018, <https://www.kiplinger.com/tool/real-estate/T010-S003-home-prices-in-100-top-u-s-metro-areas/index.php>

²⁰ National Association of Realtors, Home Buyer and Seller Generational Trends Report 2018, <https://www.nar.realtor/research-and-statistics/research-reports/home-buyer-and-seller-generational-trends>

²¹ Home.com, Millennial Survey: A Look At The Millennial Attitude-to-wards Home Buying, 9 March 2018, <https://www.homes.com/blog/2018/03/millennial-survey-a-look-at-the-millennial-attitude-towards-home-buying/>

²² U.S. Census Bureau, Historical Living Arrangements of Adults, Table AD-1, Young Adults, 18-34 Years Old, Living At Home, <https://www2.census.gov/programs-surveys/demo/tables/families/time-series/adults/ad1.xls>

The Nonresidential Construction sector grew 2.9% per annum and produced 676,000 new jobs. The Nonresidential Specialty Trade Contractors subsector was the star performer with a 4.3% rate of growth and 531,000 new jobs. The Nonresidential Building subsector performed slightly better than the average rate of GDP growth, growing at a rate of 2.5% per annum adding 145,000 new jobs.

While 2.9% is a healthy rate of growth for the Nonresidential Construction sector, interest rate growth, shortages of skilled labor, and more costly building materials are likely to further stifle labor force growth as well as the economics of the Construction supersector writ large.

The possibility of multiple Fed interest rate hikes is also likely to limit Construction supersector growth by making residential mortgages and commercial construction loans more expensive. Over the last ten years, the Federal Funds Rate (the baseline interest rate for mortgages and loans) increased from 0.25% in December 2015 to 2.0% in June 2018, with many more increases expected in the future. The Federal Reserve signaled it might raise the Federal Funds Rate to 2.5% by the end of 2018, 3.0% in 2019, and 3.5% in 2020. The Federal Funds Rate reached 5.25% before the Great Recession and an all-time high of 18.0% in 1980 to combat runaway double-digit inflation.²³ While these extreme rates are unlikely, even relatively minor rate increases disrupt consumer, investor and developer confidence, all of which are at recent record levels.

The Fed manipulates the Federal Funds Rate to control inflationary and deflationary trends. Over the last decade, inflation stayed within reasonable bounds (2% inflation is considered both reasonable and healthy). However, the emerging trade war is likely to cause higher inflation and increase the cost of labor, goods and building materials. The construction industry is already grappling with high materials prices, and a trade war could cause prices to soar. Levies of 25% on steel imports and 10% on aluminum imports are causing construction costs to rise. Steel accounts for roughly 16% of total building costs for a typical commercial project. Some steel suppliers were already boosting prices for wide-flange steel shapes by \$300 to \$400/ton and boosting medal stud bid prices by 3% to 5%, according to CBRE.²⁴ Fortunately, many developers anticipated this rise and stockpiled material in hopes of a short trade war. If the trade war lingers, developers will be less likely to initiate future projects and cancel projects in the formative stages.

The USG Corporation and U.S. Chamber of Commerce Commercial Construction Index (CCI) is a quarterly economic index designed to gauge the outlook for and resulting confidence in the commercial construction industry. As reported by the CCI, “while the (construction) industry outlook remains high, confidence is tempered by a narrow talent pipeline and a lack of workers. The Q2 2018 CCI findings reveal “nine out of ten contractors report a skilled labor shortage.” Sadly the percentage of contractors expecting to employ more workers in 2018 is well below the hiring expectation from one year ago due to the difficulty of finding skilled workers. According to CCI, “Most contractors (90%) are at least moderately concerned about finding workers with adequate skill levels, and over

²³ The Balance, U.S. Inflation Rate by Year from 1929 to 2020, <https://www.thebalance.com/u-s-inflation-rate-history-by-year-and-forecast-3306093>

²⁴ BISNOW, New Tariffs Set To Intensify Already Soaring Construction Prices, Have A Ripple Effect Across Real Estate Industry, 31 May 2018, <https://www.bisnow.com/national/news/construction-development/steel-tariffs-official-89043>

half (52%) are highly concerned. Nearly half of contractors believe workers’ skill levels will worsen in the next six months (Q2 and Q3 2018).”²⁵

The National Association of Homebuilders (NAHB) estimates that construction jobs that have been left unsatisfied are largely due to the skilled labor shortage and the “graying” of the existing workforce. The NAHB believes that the Hispanic workforce is “key to combating the labor shortage,” which “is projected to account for 74% of the growth in the workforce from 2010-2020, a 20% increase from the previous decade.”²⁶ Ostensibly, many of these workers are likely to be foreign-born workers who are facing greater and greater immigration challenges.

Many builders are turning to prefabricated/modular approaches, robotics and digital-age technologies to fill the skilled workforce gap and increase productivity throughout the entire design-build-appoint value chain. A plethora of indoor homebuilding factories, such as Blueprint Robotic Inc.’s new production facility in Baltimore, robotically builds modular walls, floors, and roofs to improve efficiency and reduce costs.²⁷ Marriott, the biggest hotel operator, recently opened a 97-room, 52-module, three-story modular Fairfield Inn and Suites in Folsom, California, that was built by Guerdon Modular Buildings Inc. These modules, include fixtures (HVAC, plumbing, electrical), furniture (beds, sofas, chairs, pictures), and equipment (TVs, refrigerators). Marriott’s Folsom hotel was built, installed and appointed in less than six weeks at substantial savings in labor costs.²⁸ New digital-age technologies, like Building Information Modeling (BIM), is transforming the way that architects and engineers design, construct and operate buildings and infrastructure. According to Autodesk, a leader in 3D design, engineering and entertainment software, BIM is an intelligent 3D model-based process that gives architecture, engineering, and construction professionals insight and tools to more efficiently plan, design, construct and manage buildings and infrastructure across the building and infrastructure lifecycle.²⁹

Heavy and Civil Engineering Construction

Source: BLS CES7000000001, Seasonally Adjusted

Heavy and Civil Engineering

1-Jan-10	1-Aug-18	New Jobs (000s)	% Growth	% Growth Per Year
810	1,016	206	25%	3.0%

The Heavy and Civil Engineering Construction sector currently employs 1,016,000 people (a record high) and is growing at a healthy 3.0% annual rate.

²⁵ The Q1 2018 USG Corporation + U.S. Chamber of Commerce Commercial Construction Index, https://www.uschamber.com/sites/default/files/q1_2018_cci_2-28_final.pdf

²⁶ National Association of Homebuilders, 30 April 2017, <http://nahbnow.com/?s=skilled+labor+shortage> & Hispanic Workforce Key-to- Combating Labor Shortage, 9 November 2017, <http://nahbnow.com/2015/11/hispanic-workforce-key-to-combating-labor-shortage/>

²⁷ Blueprint Robotic Inc., <http://www.blueprint-robotics.com/video/>

²⁸ Guerdon Modular Buildings, Folsom Fairfield Inn & Suites | Folsom, California, <http://www.guerdonmodularbuildings.com/our-work/folsom-fairfield-inn-suites/>

²⁹ Autodesk, BIM And The Future Of AEC, <https://www.autodesk.com/solutions/bim>

Heavy and Civil Engineering Construction (NAICS 237) comprises establishments whose primary activity is the construction of entire engineering projects, and specialty trade contractors, whose primary activity is the production of a specific component for such projects. Specialty trade contractors in Heavy and Civil Engineering Construction generally perform activities that are specific to heavy and civil engineering construction projects and are not normally performed by the Residential and Nonresidential Construction sectors.³⁰

Heavy and Civil Engineering Construction activity depends heavily on the health of the U.S. and global economies, government budgets and national initiatives, and the accuracy of project bids and efficient operations.

Compared to its Residential and Nonresidential Construction counterparts, Heavy and Civil Engineering Construction is better positioned to compete for skilled workers due to higher wages (\$30.86/hour for All Employees, \$29.51/hour for Production and Nonsupervisory Employees), longer-term contracts, and the innate power of global, prime contractors, like U.S.-based Bechtel and Fluor that are \$20 billion/year companies.

Heavy and Civil Engineering Construction consists of these industry subsectors: Utility System Construction (NAICS 2371); Land Subdivision (NAICS 2372); Highway, Street, and Bridge Construction (NAICS 2373); and Other Heavy and Civil Engineering Construction (NAICS 2379). Worldwide, Utility System Construction (water and sewer, oil and gas, electric power, and communications) accounts for approximately 50% of the industry's revenue. Highway, Street, and Bridge Construction accounts for 35% of global industry revenue. The United States accounts for approximately 28% of worldwide revenue.³¹

The Bureau of Labor Statistics Employment Projections 2016-2026 Report projects that Heavy and Civil Engineering Construction sector's employment growth will reach 1,153,000 by 2026.³² If this BLS assessment is correct, Heavy and Civil Engineering Construction will only produce 137,000 new jobs over the next 7.4 years (18,514 jobs/per average), which is three fourths the rate of the 206,000 jobs this industry created over the last 8.6 years (23,953 jobs/per average). However, if the U.S. economy remains strong and if a national infrastructure renewal program is implemented as planned by the Federal government, this industry's employment prospects should exceed the BLS estimates by a wide margin.

A 2016 U.S. Department of the Treasury report, written on behalf of the Build America Investment Initiative, identified 40 potential or in-progress U.S. transportation and water infrastructure projects of "major economic significance" requiring \$200 billion in net capital costs that could generate as

³⁰ Bureau of Labor Statics, Industries at a Glance, Heavy and Civil Engineering Construction: NAICS 237, <https://www.bls.gov/iag/tgs/iag237.htm>

³¹ D&B Hovers, <http://www.hoovers.com/industry-facts.heavy-civil-engineering-construction.2060.html>

³² BLS, Employment Projections 2016-2026 Summary, 237000 Heavy and civil engineering construction, <https://www.bls.gov/news.release/ecopro.nr0.htm>, and https://www.bls.gov/emp/ep_table_201.htm

much as \$1.3 trillion in net U.S. economic benefits.³³ The Treasury report also includes two large-scale national programs: recapitalization of the entire U.S. Interstate Highway system (projected net economic benefits of over \$1.6 trillion) and an autonomous vehicle initiative (between \$5.0 and \$7.5 trillion in net economic benefits). The report's list does not include airport, toll road, or large water and wastewater treatment projects that would also provide huge economic benefits.

The Treasury report also states that the major roadblock in starting work on or completing these projects is funding, followed by budget overruns, disagreements between project stakeholders and regulatory red tape. President Trump's regulatory reform actions and his proposed 55-page \$1.5 trillion infrastructure plan³⁴ could make the Treasury project list more of a reality than a plan.

Per President Trump, "I ask the Congress to act soon on an infrastructure bill that will: stimulate at least \$1.5 trillion in new investment over the next 10 years, shorten the process for approving projects to 2 years or less, address unmet rural infrastructure needs, empower State and local authorities, and train the American workforce of the future." To stimulate State, Local and private sector investment, President Trump wants the Federal government to provide \$200 billion in incentives for improving surface transportation and airports, passenger rail, ports and waterways, flood control, water supply, hydropower, water resources, drinking water facilities, wastewater facilities, stormwater facilities, and Brownfield and Superfund sites.

Whether or not the Treasury or the President's plans receive Congressional approval and funding in today's highly divided political environment is questionable. Congressional approval hinges on the results of November 2018 mid-term elections. If both houses of Congress remain under Republican control and the economy continues to grow at its current robust rate, the likelihood of funding major new infrastructure projects is high. If approved, major Heavy and Civil Engineering Construction companies will then have to decide if the incentives offered by the Federal government and cost-sharing arrangements with State and Local governments are worth the risk.

In conclusion, Jobenomics forecasts that the Residential Construction sector will not produce a significant number of new jobs for the remainder of this decade due to lack of skilled-labor, automation, the high-cost of homeownership, and changing attitudes to the value of homeownership by the next generation of home buyers. The Nonresidential Construction sector suffers many of the same issues, but a strong economy and the plethora of planned commercial development opportunities should buoy this industry and its workforce. If America implements even a small portion of the planned infrastructure programs, the Heavy and Civil Engineering Construction sector is likely to grow well beyond the current BLS forecast.

About Jobenomics: *Jobenomics deals with the economics of business and job creation. The non-partisan Jobenomics National Grassroots Movement's goal is to facilitate an environment that will*

³³ U.S. Treasury, AECOM Study Prepared for the Build America Initiative, 40 Proposed, U.S. Transportation and Water Infrastructure Projects of Major Economic Significance, Fall 2016, <https://www.treasury.gov/connect/blog/Documents/final-infrastructure-report.pdf>

³⁴ SCRIBD, Trump's infrastructure plan, https://www.scribd.com/document/371350091/Read-President-Trump-s-infrastructure-plan#from_embed



create 20 million net new middle-class U.S. jobs within a decade. The Movement has reached an estimated audience of 30 million people. The Jobenomics website contains numerous books and material on how to mass-produce small business and jobs as well as valuable content on economic and industry trends. For more information see Jobenomics.com.