NSCA Electronic Systems Outlook

Winter Edition

2018

NSCA
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This report provides systems construction put-in-place outlooks for four U.S. regions and Canada. These numbers are based on percentages of total construction put in place for each region. The new regional data will only be available in Winter Editions of the NSCA Electronic Systems Outlook.

This report was made possible through a partnership between NSCA and FMI. FMI is a leading provider of management consulting, investment banking and research to the engineering and construction industry. They work in all segments of the industry, providing clients with value-added business solutions (learn more about FMI at **www.fminet.com**).

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EXECUTIVE SUMMARY

KEY TAKEAWAYS

- Total engineering and construction spending for the U.S. is forecast to end up 5% higher in 2018 as compared to 2017.
- Looking ahead to 2019, FMI forecasts a 3% increase in spending levels over 2018.
- Primary growth segments in 2019 are expected to include office, education, public safety, transportation, conservation and development, and manufacturing — all with forecast growth rates of 5% or more. Most other segments will likely grow by roughly the rate of inflation and therefore be considered stable. Multifamily, lodging, and houses of worship are three segments expected to experience decline through 2019.

2018 Construction Segments (compared to 2017)

Up (5% or more)

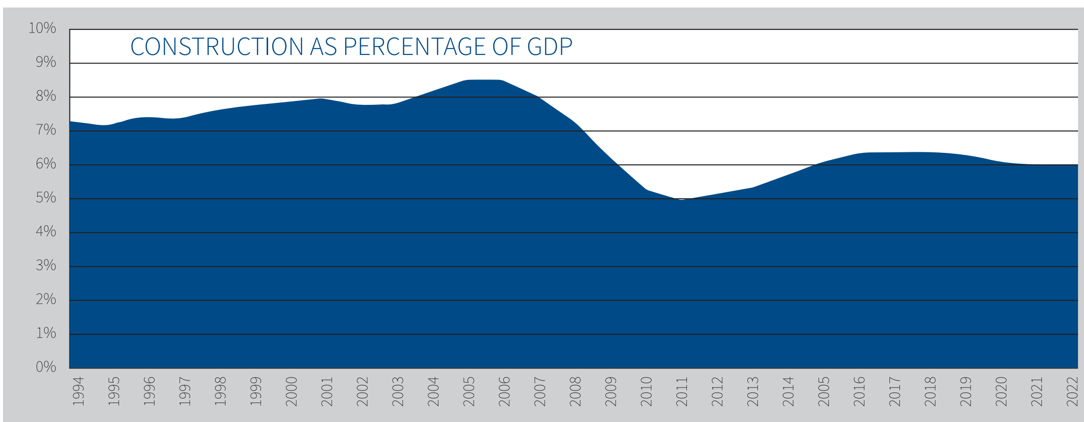
- Residential
- Corporate
- Education
- Government
- Lodging
- Other Buildings

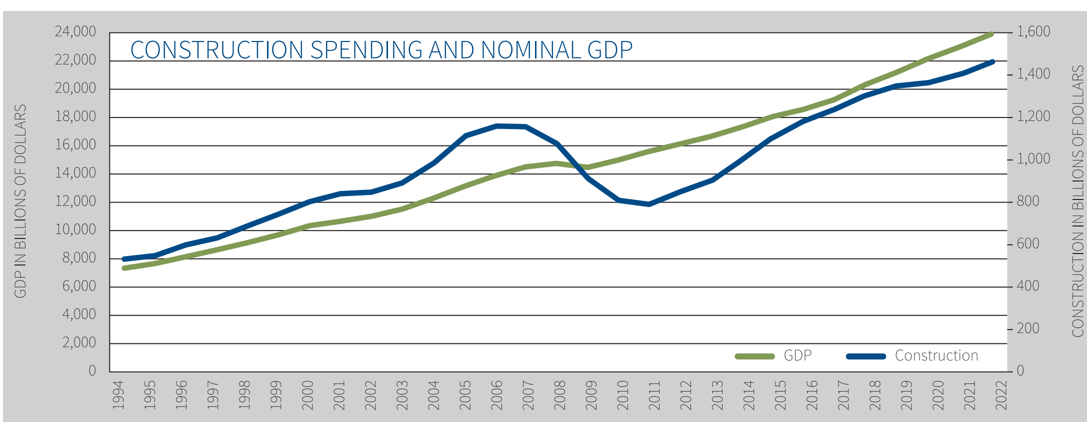
Stable (0% to 4%)

- Manufacturing
- Healthcare
- Retail
- Nonbuilding Structures
- Lodging
- Other Buildings

Down (0% to -5%)

- Houses of Worship





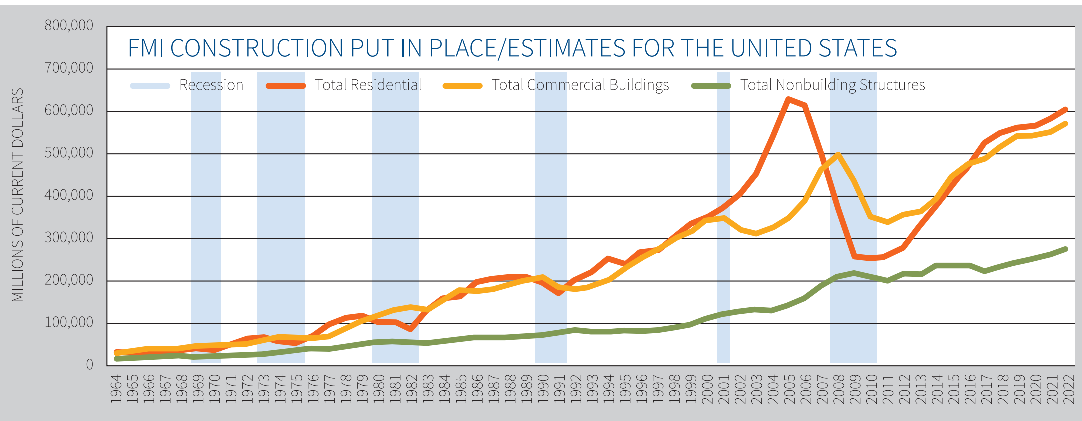
CONSTRUCTION OUTLOOK Overall, our forecast for construction put in place totals for 2018 calls for an increase of just over 6%. With GDP most recently reporting 3.5% growth in the third quarter of 2018, it appears that construction industry growth is at pace with the broader economy and is at risk of a potential slowdown in the near future.

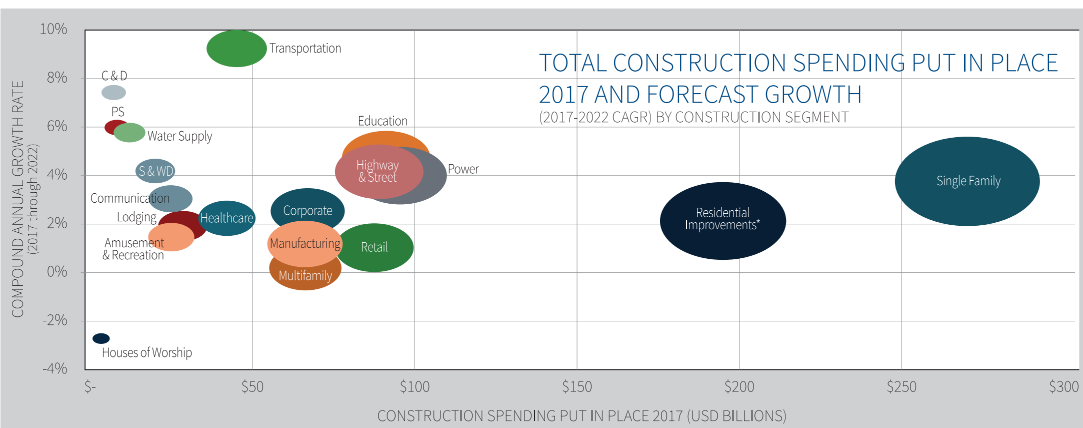
COMMERCIAL ELECTRONIC SYSTEMS CONSTRUCTION PUT IN PLACE

Estimated Forecast for the United States / Millions of Current Dollars

	2018
Total Commercial Building Construction Volume	520,093
Total Commercial Electronic Systems Construction	29,169
Share of Total Construction	5.61%

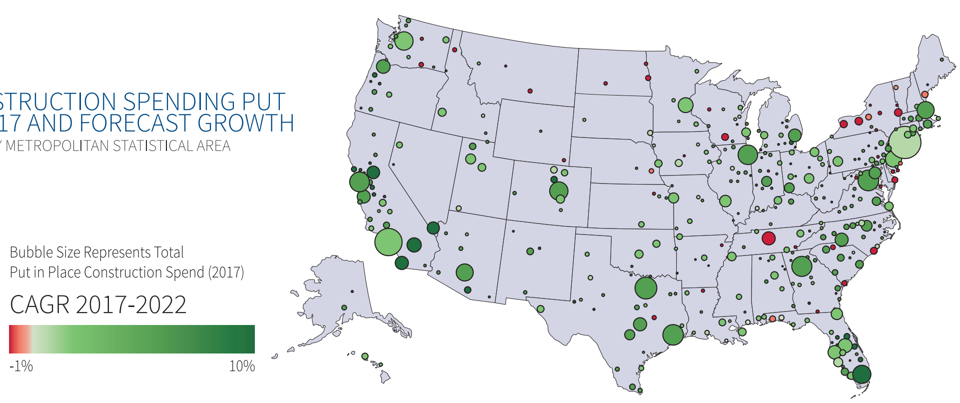
Visit the Summary section of this report on page 26 that provides outlines for all the markets and electronic systems, in addition to showing Canadian construction trends.





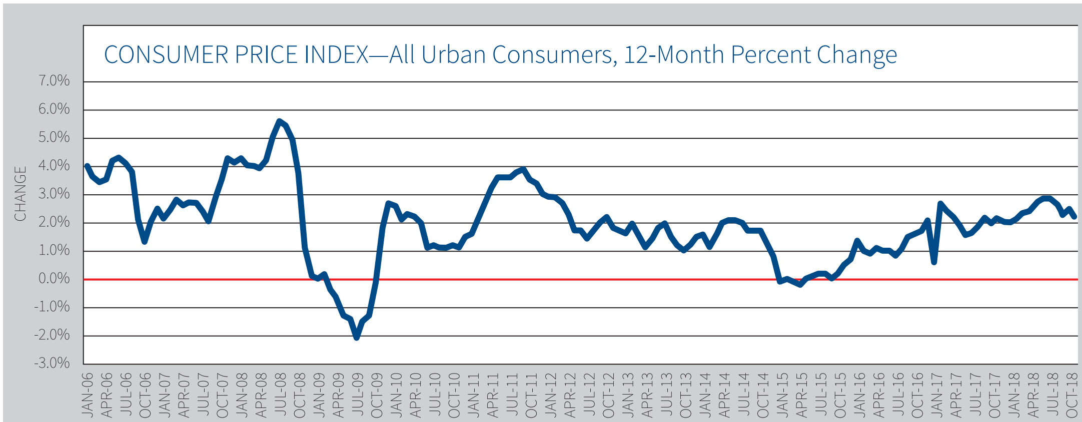
TOTAL CONSTRUCTION SPENDING PUT IN PLACE 2017 AND FORECAST GROWTH

(2017-2022 CAGR) BY METROPOLITAN STATISTICAL AREA

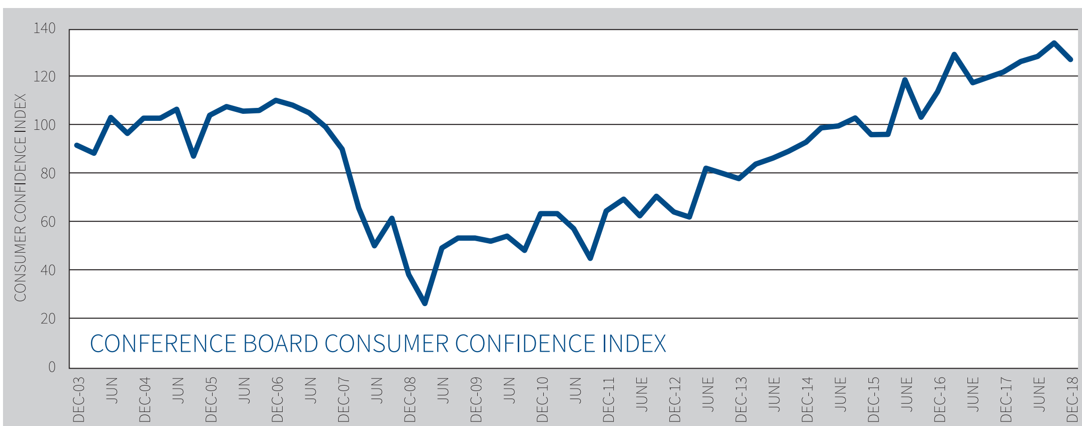


EXECUTIVE SUMMARY

KEY ECONOMIC INDICATORS It is important to consider key economic indicators such as CPI, CCI, and unemployment rates when evaluating this report because they provide the general pulse of the economy. These three factors determine interest rates and funding of construction projects. The Fed (formerly known as the Federal Reserve Bank/Federal Reserve) controls interest rates, which CPI, CCI, and unemployment all affect. The graphs below highlight historical changes in CPI, CCI, and unemployment rates.



CPI is a measure of the average change over time in the price paid by urban households for a set of consumer goods and services. An increase in CPI usually leads to adjustments in interest rates in order to control costs of goods and adjust for inflation. Additionally, CPI is often used in calculating wages, pensions, and salaries. The CPI graph shows the national percent of change of costs for consumer goods and services over the course of the last 29 years.



CCI is calculated based on a survey of 5,000 U.S. households; it is interpreted by the Conference Board, which extracts data from the survey to forecast future spending by consumers. In general, a 5% swing in either direction is needed to influence a change in decision-making.

The Conference Board Consumer Confidence Index graph shows that NSCA members are still struggling to attract, onboard, and retain employees at nearly every level. Similar to previous years, the critical stages include qualified technical workers and sales professionals. The low unemployment rate makes it tough, especially when adjacent industries are reaching into our member companies to recruit their top talent. NSCA members that provide traditional AV, physical security, alarm, and life safety systems at low margin are especially vulnerable. We are seeing dramatic compensation differences with the building automation and control, MSPs, IT VARs, solutions providers, and bundled services providers. The higher billed rates have afforded the adjacent industry competitors to drive up the labor costs in businesses that have not prepared for the increases.

EXECUTIVE SUMMARY

NSCA continues to assist members in competing for top technical talent through resources such as:

Ignite: To Help You Find New Staff This program's goal is to attract, engage, and encourage students and young professionals to join the fast-growing commercial electronics systems industry. It offers free resources to integrators and manufacturers to assist with recruiting and hiring, guidelines and framework for subsidized internship programs (to help interns and the organizations that bring these interns on board), and connections to scholarships for interested students and professionals who want to learn more about our industry.

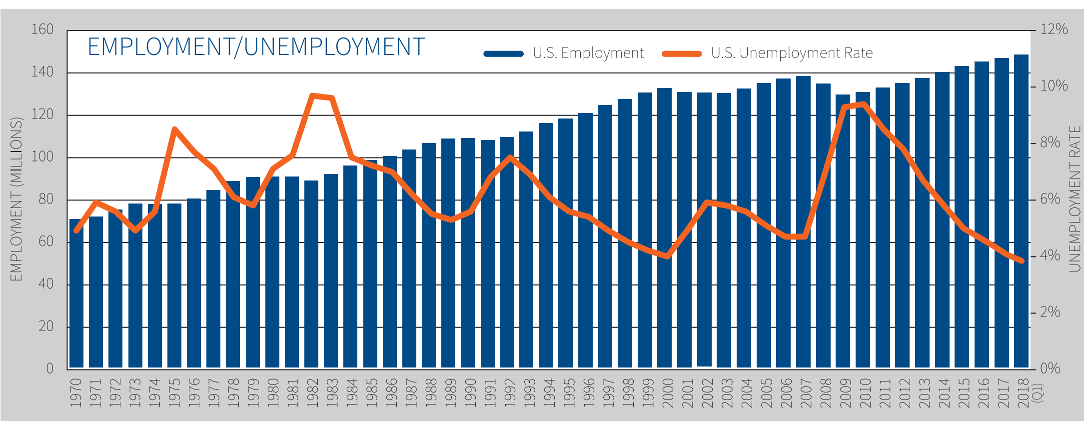
Technical Assessment Tool: To Help You Analyze Employee Proficiency This online tool allows you to scrutinize technician and installer proficiency before you hire – saving time, money, and frustration. It walks the test-taker through basic, intermediate, and advanced questions about the industry and specific technologies. Because it is 100% customizable, you get to select which categories to test for each candidate. The tool is perfect for screening new candidates, but it can also give you a better read on internal candidates.

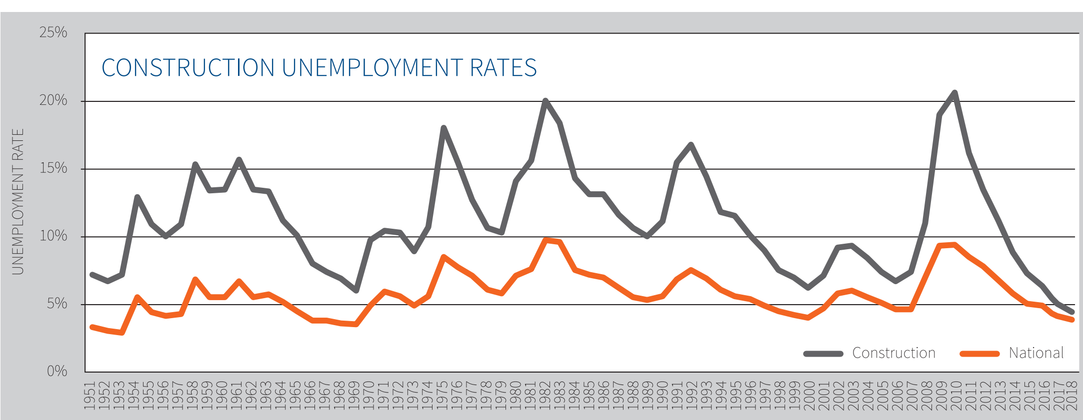
C-SIP (Certificate as a Systems Integration Professional): To Help with Onboarding & Training
This program is an effective and deliberate onboarding program that helps you develop the best people in the industry. Bringing new employees on board is an exciting process – but providing training to get them up to speed can be time-consuming and overwhelming, with no one able to take full responsibility for the task.

The C-SIP program helps you get new employees started on the right foot – without a lot of hands-on time required from existing staff. It provides industry and job-specific training in an online, at-your-own-pace environment without placing the training or information-transfer burden onto other staff members.

Business Accelerators: To Help with HR and Onboarding Some of NSCA's Business Accelerators offer HR, onboarding, and workforce resources and solutions to help you shape company culture, offer benefits that attract new employees, and create processes and procedures to keep your talent pipeline full.

Job Board: To Promote Your Open Positions Our free, industry-specific job board is where electronic systems manufacturers, distributors, and integrators across the country advertise available positions. List yours, too, so that NSCA members, Ignite Ambassadors, and other industry professionals can find them.





EXECUTIVE SUMMARY

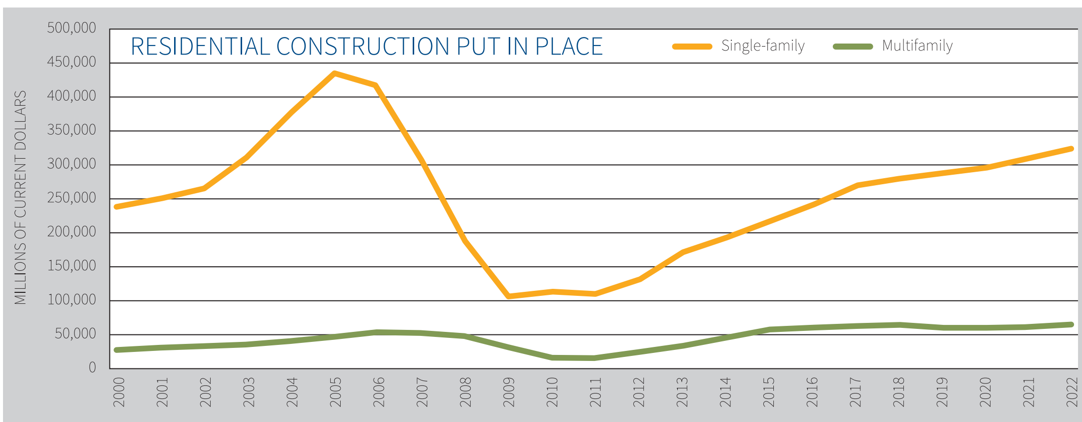
RESIDENTIAL CONSTRUCTION

UP 6%
$513 Billion
2018/2017 Comparison

Trends:

- Home prices, as well as mortgage rates, are keeping a growing number of buyers from committing to new purchases
- Multifamily construction plateaued toward the end of 2018, with declining investment expected through 2019 and 2020
- Recent tax legislation disincentivizing homeownership, rising mortgage rates, Millennial buying preferences and practices, and a growing need for affordable housing will continue to uphold multifamily demand long-term
- Home values are expected to plateau within the next 18-24 months, suggesting that improvements may experience decline in the years following

Drivers include unemployment rates, core CPI, income, mortgage rates, home prices, housing starts, and housing permits.



While the residential sector does not directly create demand for NSCA members, we should recognize the impact that housing has on other construction segments. Commercial, healthcare, and education segments in particular tend to follow changes in the housing sector. Likewise, home equity values have a direct impact on consumer confidence and discretionary spending that drive markets such as retail and hospitality.

VERTICAL MARKET OUTLOOK Each of the market segments detailed in this report (corporate, education, government, healthcare, houses of worship, lodging, manufacturing, and retail) features a 2018 outlook to show growth potential and the evaluation of electronic systems for that market, as well as trends and drivers. This information is based upon actual data through Q3 2018 and forecasted for the remainder of the year.

Consultants and integrators will find this data helpful in the very early stages of design, and should consider using the "percentage of total vertical market construction" averages as a starting point in discussions with clients, tracking how their local marketplace compares to national averages.

Furthermore, this information is critical when budgeting for a project. It can be used to measure growth opportunities and monitor market-share potential. These averages can be used when working with clients to show comparable solutions that fit within the average dollars spent on systems in each vertical market. It gives a baseline average for a good-better-best solution, and helps guide clients by avoiding underfunding, which leads to a subpar system installation.

The graphs throughout this report specifically outline the systems involved in the low-voltage industry:

- **Acoustics, Audio, and AV**: includes, but not limited to, cable and satellite television systems, public address, paging and intercom systems, security cameras, videoconferencing, video projectors, CCTV, touchscreen controls
- **Phone Systems, Data Networks, IT**: includes, but not limited to, phone and computer systems and cabling, buses, networks, fiber optics
- **Building Automation & Control**: includes, but not limited to, energy metering and monitoring, mechanical systems, malfunction alarms, humidity and ventilation, water systems monitoring, emergency power, electrical fault detection, leak detection
- **Life Safety — Fire & Security**: includes, but not limited to, fire, smoke, and security alarm systems, flood safety, air quality sensors, building access systems, nurse call systems
- **Lighting, Digital Signage**: includes, but not limited to, building lighting control, emergency lighting, accent lighting, digital signage

DATA COLLECTION This biannual report includes forecasting and systems modeling. FMI first generates a forecast for building construction put in place (new construction, repair, and renovation). Econometric modeling is used to estimate demand. Each market segment has an independent algorithm based on five to eight metrics that have historically correlated best to changes in activity for that market segment over the past 50 years. A preliminary forecast is generated based on projections for each metric (retail sales, consumer confidence, population under age 18) supporting each market segment. The preliminary forecast is then adjusted based on database records for current/planned projects, funding and timing of those projects, contractor backlogs, and FMI's direct interaction with engineers, architects, owners, and contractors in the field.

Next, the forecast for total construction put in place is modeled to its components and systems. This report is based on analysis of proprietary project records (what goes into construction of a K-12 school of a certain size and geography, for example), and through discussion with architects and estimators. Emerging trends (code changes) are explored through supporting secondary research; final adjustments to the model are then made.

VERTICAL MARKET OUTLOOKS Corporate

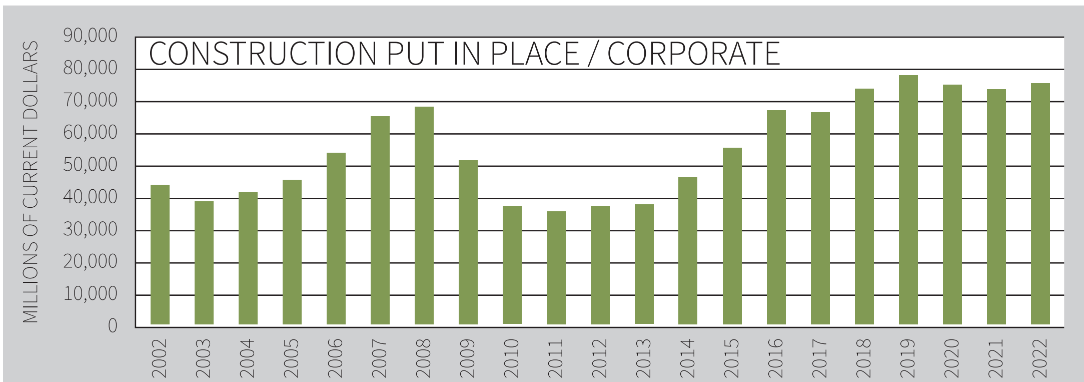
CORPORATE

UP 11%
$71 Billion
2018/2017 Comparison

Trends:

- Large projects are planned by Amazon, Apple, Google, and other corporate giants
- Urban office construction activity has been stable through the end of 2018
- Suburban and rural area project activity has progressively slowed
- Increasing lease costs and the growing trend of hoteling and remote work flexibility are contributing to slowing traditional office investment
- Data center investment growth continues to be strong

Key drivers include office vacancy rates and unemployment rates.



CORPORATE CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	34,647	36,368	36,540	44,817	53,418	65,055	65,055	71,289	75,340	72,742	71,178	72,993
% Change From Year Prior	-8.5%	5%	0.5%	22.7%	19.2%	21.8%	-1.1%	10.8%	5.7%	-3.4%	-2.1%	2.6%

SYSTEMS OUTLOOK / CORPORATE in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	407	874.3	105.5	1,055.2	572.8	3,014.9
2016 Total	442.8	1,107	147.6	1,273	719.5	3,690
2017 Total	516.7	1,112.9	238.5	1,430.8	675.7	3,974.5
2018 Summer Outlook	599.9	1,242.7	278.5	1,499.8	664.2	4,285.3
2018 Winter Outlook	638.9	1,320.5	319.5	1,405.6	575	4,259.5
% of Total Construction	0.9%	1.85%	0.45%	1.97%	0.81%	5.98%

2015 through 2017 Totals – total electronic systems construction put in place in their respective years
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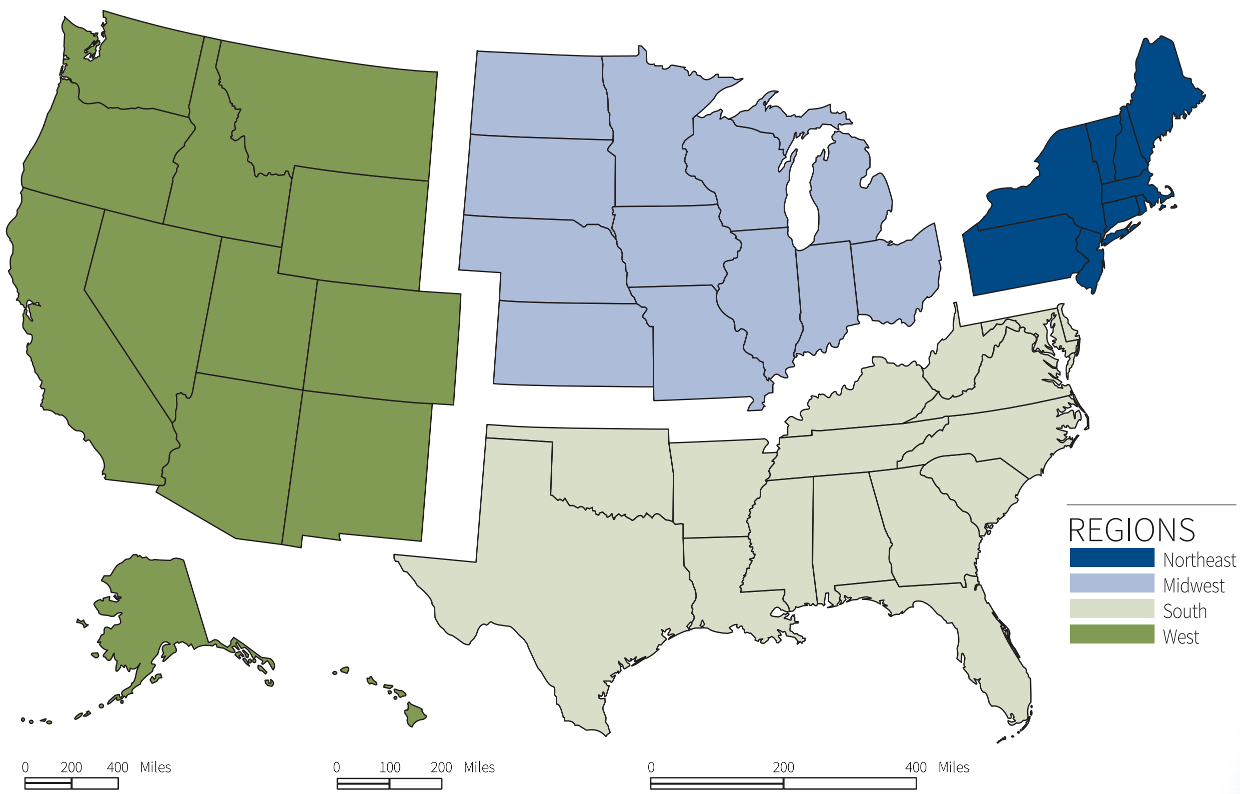
% of Total Construction – percentage of 2018 dollars spent on electronic systems in relation to the total dollars spent on construction in each vertical market

Corporate VERTICAL MARKET OUTLOOKS

REGIONAL SYSTEMS OUTLOOK / CORPORATE in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	111.2	239.5	51.3	307.9	145.4	855.4
Midwest Region	119.1	256.5	55	329.7	155.7	916
South Region	207.1	446	95.6	573.4	270.8	1,592.8
West Region	116.4	250.7	53.7	322.4	152.2	895.4



VERTICAL MARKET OUTLOOKS Education

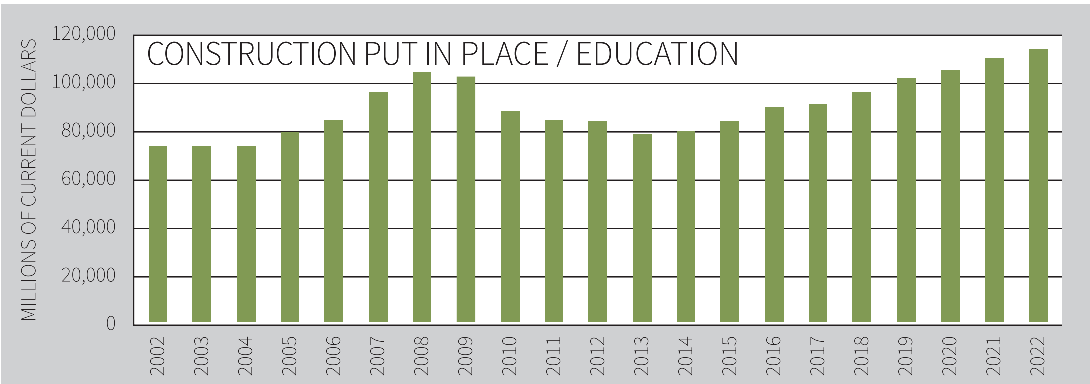
EDUCATION

UP 6%
$97 Billion
2018/2017 Comparison

Trends:

- Educational enrollments – in K-12 and higher-education markets – are expected to grow at an increasing rate over the forecast period
- Endowments continue to increase despite implications from the 2017 tax restructure
- Within higher education, tuition revenue growth in private schools is expected to nearly double the revenue growth seen at public institutions
- K-12 modernization projects are found to offer the greatest impact on a student's ability to learn and the faculty's ability to teach

Key drivers include population change in those younger than age 18, population change in ages 18-24, stock market, government spending, and nonresidential structure investment.



EDUCATION CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	84,985	84,672	79,060	79,681	84,771	90,348	91,213	96,780	102,640	106,057	110,801	114,994
% Change From Year Prior	-3.9%	-0.4%	-6.6%	0.8%	6.4%	6.6%	1%	6.1%	6.1%	3.3%	4.5%	3.8%

SYSTEMS OUTLOOK / EDUCATION in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	659	604.7	366.1	2,814.4	1,156.9	5,601.1
2016 Total	718.7	639.6	243.6	3,106.4	1,382.7	6,091
2017 Total	724.6	664.2	241.5	3,079.6	1,328.5	6,038.5
2018 Summer Outlook	713.7	778.5	259.5	3,308.8	1,427.3	6,487.8
2018 Winter Outlook	801.3	801.3	267.1	3,405.7	1,402.3	6,677.8
% of Total Construction	0.83%	0.83%	0.28%	3.52%	1.45%	6.9%

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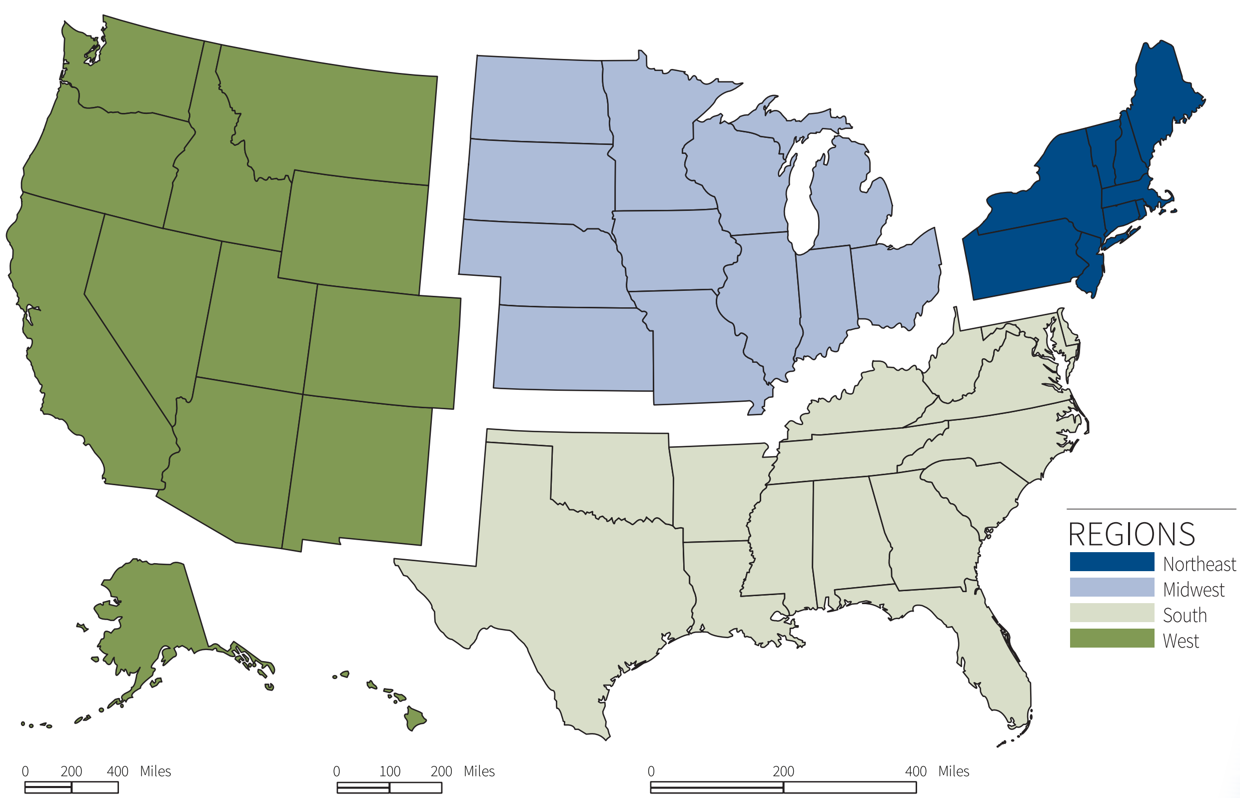
Education VERTICAL MARKET OUTLOOKS

REGIONAL SYSTEMS OUTLOOK / EDUCATION in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	155.6	142.6	51.9	661.2	285.2	1,296.5
Midwest Region	168.2	154.2	56.1	715	308.4	1,401.9
South Region	297.4	272.6	99.1	1,264	545.2	2,478.4
West Region	180.1	165.1	60	765.5	330.2	1,501



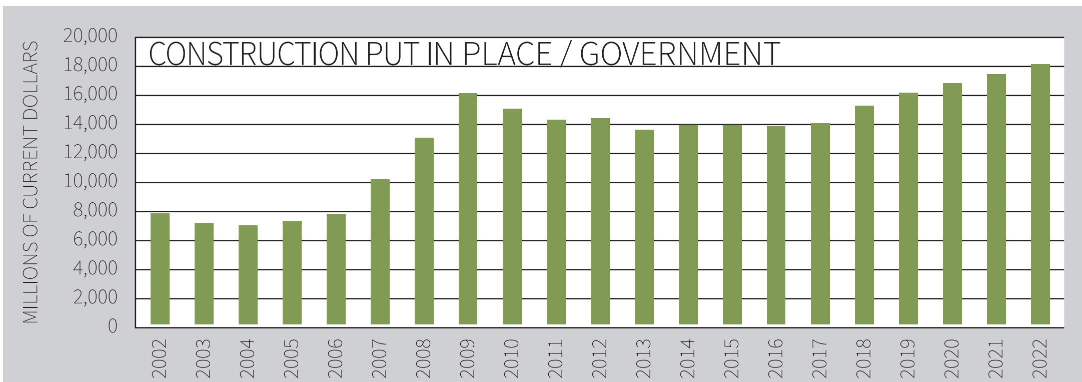
GOVERNMENT

UP 10%
$16 Billion
2018/2017 Comparison

Trends:

- States and municipal governments are experiencing growing revenues and increasing construction budgets
- Growth is led by expanding metropolitans that require additional emergency and correctional resources
- Continued fiscal constraints, tied to ever-increasing pension and Medicaid needs, continue to weigh heavily on capital programs

Key drivers include population, government spending, incarceration rates, and nonresidential structure investment.



GOVERNMENT CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	14,301	14,433	13,624	14,016	13,797	13,861	14,330	15,819	16,926	17,411	17,775	18,625
% Change From Year Prior	-5.1%	0.9%	-5.6%	2.9%	-1.6%	0.5%	3.4%	10.4%	7%	2.9%	2.1%	4.8%

SYSTEMS OUTLOOK / GOVERNMENT in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	74	188.9	39.1	508.1	167.2	977.3
2016 Total	50.8	202.2	43.3	479.7	164.6	940.6
2017 Total	47.6	219	66.6	476.1	142.8	952.1
2018 Summer Outlook	52	239.2	72.8	520.1	156	1,040.2
2018 Winter Outlook	64.8	248.3	86.4	518.2	161.9	1,079.6
% of Total Construction	0.41%	1.57%	0.55%	3.28%	1.02%	6.83%

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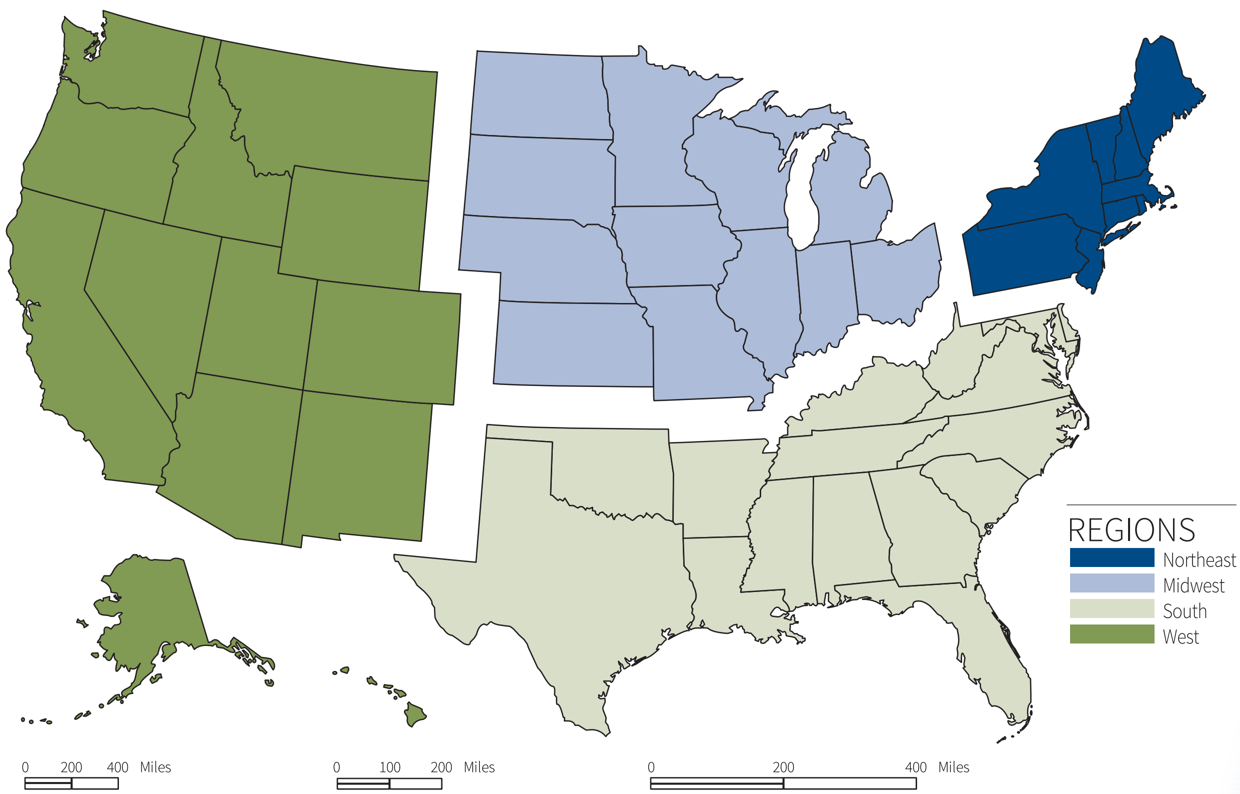
Government VERTICAL MARKET OUTLOOKS

REGIONAL SYSTEMS OUTLOOK / GOVERNMENT in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	10.4	47.7	14.5	103.8	31.1	207.6
Midwest Region	11.4	52.3	15.9	113.7	34.1	227.4
South Region	19.6	90.3	27.5	196.3	58.9	392.5
West Region	12.6	58	17.7	126.1	37.8	252.2



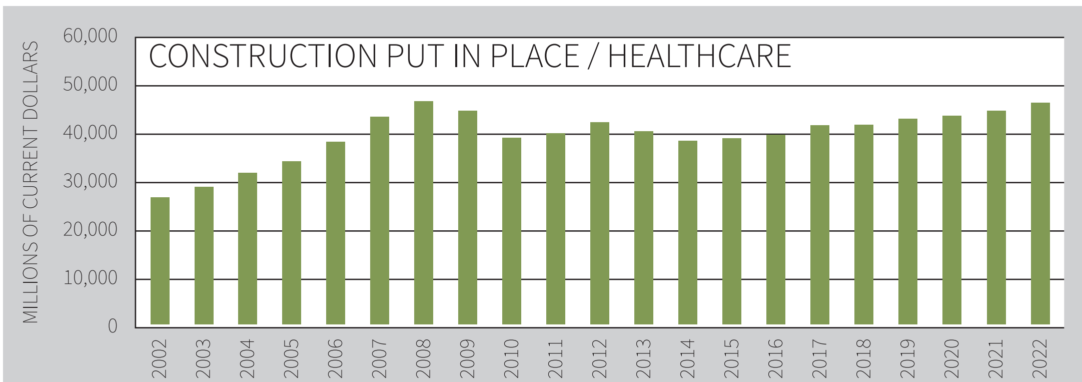
HEALTHCARE

UP 1%
$42 Billion
2018/2017 Comparison

Trends:

- Demographic shifts indicate a need for more medical office space, and increased modular construction within healthcare is anticipated as a means to streamline projects and reduce project costs
- Telehealth, wearable health technologies, and artificial intelligence are considered technological breakthroughs in the industry, each potentially tempering growing demand for healthcare facilities
- Data management and cybersecurity are increasing concerns within the industry

Key drivers include population change, population change in ages 75 and up, uninsured population, government spending, and nonresidential structure investment.



HEALTHCARE CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	40,204	42,544	40,689	38,647	39,147	40,157	41,916	42,186	43,270	43,989	45,060	46,740
% Change From Year Prior	2.2%	5.8%	-4.4%	-5%	1.3%	2.6%	4.4%	0.6%	2.6%	1.7%	2.4%	3.7%

SYSTEMS OUTLOOK / HEALTHCARE in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	70	560.4	112.1	1,470.9	588.4	2,801.8
2016 Total	115.8	637	86.9	1,476.7	579.1	2,895.6
2017 Total	84	644.2	140	1,400.3	532.1	2,800.7
2018 Summer Outlook	89.7	687.5	119.6	1,494.5	597.8	2,989
2018 Winter Outlook	105.1	705.9	120.1	1,486.8	585.7	3,003.7
% of Total Construction	0.25%	1.67%	0.28%	3.52%	1.39%	7.12%

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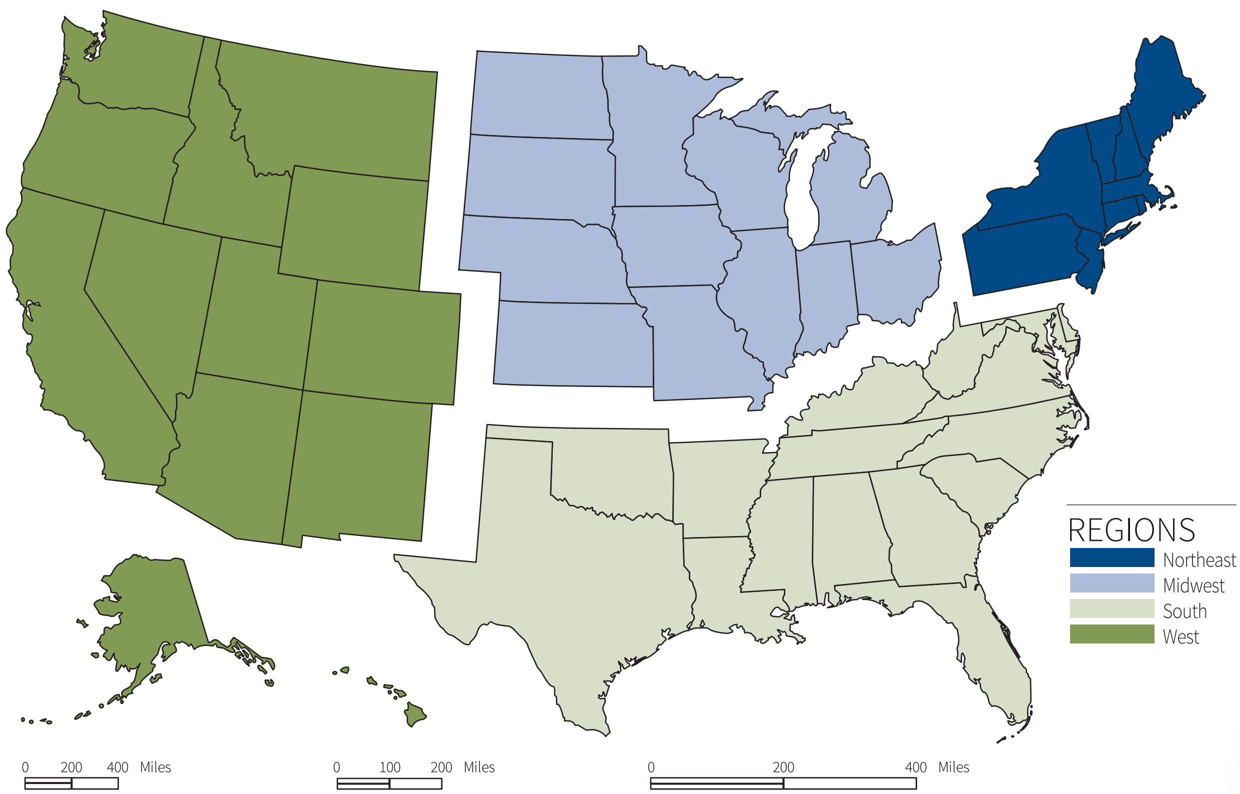
REGIONAL SYSTEMS OUTLOOK / HEALTHCARE in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	17.3	132.8	28.9	288.7	109.7	577.5
Midwest Region	19.3	148.1	32.2	322	122.4	644
South Region	33.4	255.9	55.6	556.4	211.4	1,112.7
West Region	20.1	154	33.5	334.7	127.2	669.5



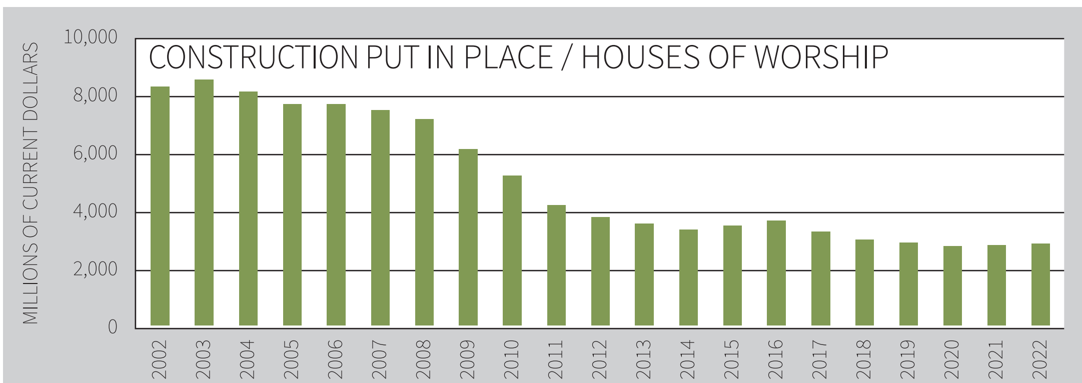
HOUSES OF WORSHIP

DOWN 8%
$3 Billion
2018/2017 Comparison

Trends:

- Declining attendance frequency, especially among active members, is the predominant driver of declining construction investment
- Design trends continue to favor smaller, multi-site local facilities over larger, single-site alternatives
- Very few large-scale, single-site projects are expected over the forecast period
- Facilities are increasingly designed with more gathering spaces and family appeal (e.g., cafés and play areas)

Key drivers include GDP, population, income, and personal savings.



HOUSES OF WORSHIP CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	4,239	3,846	3,590	3,386	3,577	3,721	3,366	3,083	2,975	2,837	2,853	2,931
% Change From Year Prior	-19.8%	-9.3%	-6.7%	-5.7%	5.6%	4%	-9.5%	-8.4%	-3.5%	-4.6%	0.6%	2.7%

SYSTEMS OUTLOOK / HOUSES OF WORSHIP in Millions of Current Dollars

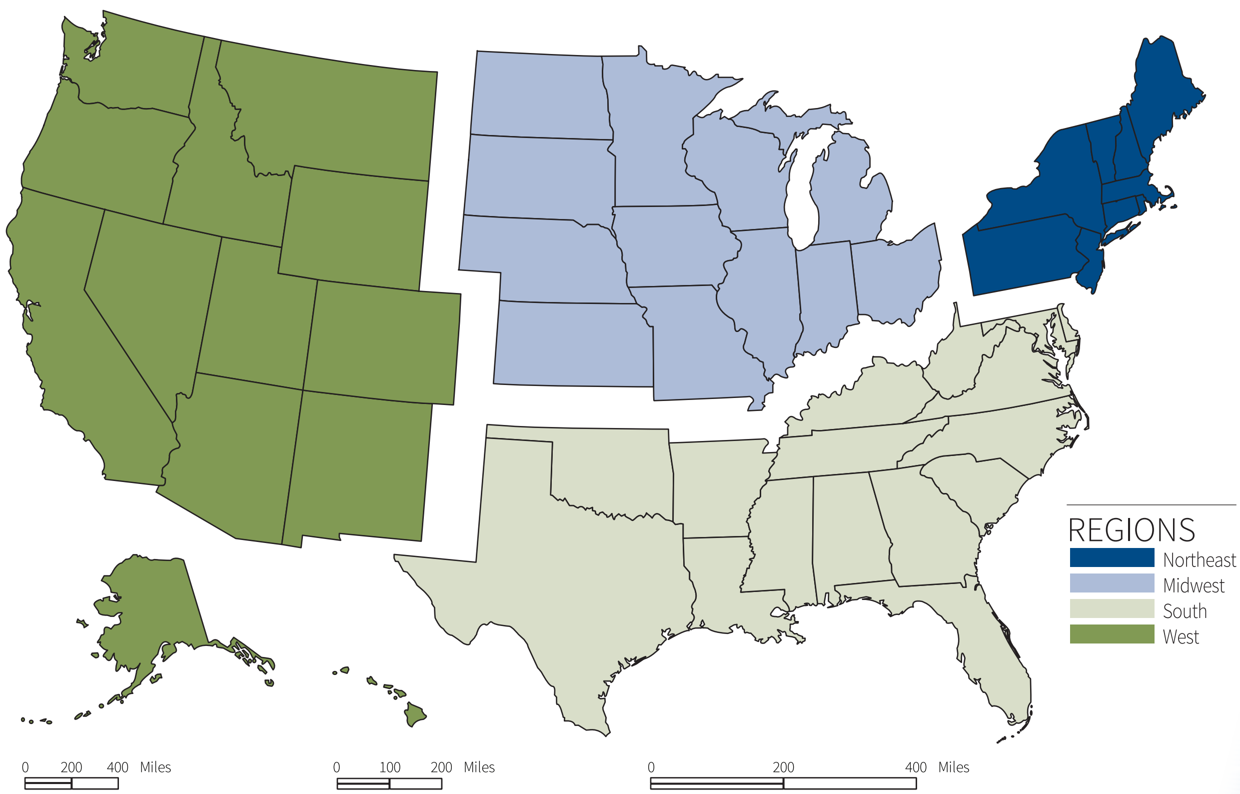
	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	29.2	25.9	25.8	80.4	55.2	216.5
2016 Total	28.4	24.9	31.7	84.5	58	227.5
2017 Total	26.2	23	27.3	78	55.4	209.9
2018 Summer Outlook	26.3	23	27.4	78.1	55.5	210.3
2018 Winter Outlook	24.4	22.4	26.4	75.3	54.9	203.5
% of Total Construction	0.79%	0.73%	0.86%	2.44%	1.78%	6.6%

2015 through 2017 Totals – total electronic systems construction put in place in their respective years
2018 Summer Outlook – outlook of total 2018 electronic systems construction put in place based on actual data from 2018 Q1 and Q2 and forecasted for the remainder of 2018
2018 Winter Outlook – outlook of total 2018 electronic systems construction put in place based on actual data from 2018 Q1 through November and forecasted for the remainder of 2018
% of Total Construction – percentage of 2018 dollars spent on electronic systems in relation to the total dollars spent on construction in each vertical market

Houses of Worship **VERTICAL MARKET OUTLOOKS**

REGIONAL SYSTEMS OUTLOOK / HOUSES OF WORSHIP in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	4.9	4.3	5.1	14.7	10.4	39.5
Midwest Region	5.2	4.6	5.5	15.6	11.1	41.9
South Region	9.4	8.3	9.8	28	19.9	75.4
West Region	5.8	5.1	6.1	17.3	12.3	46.6



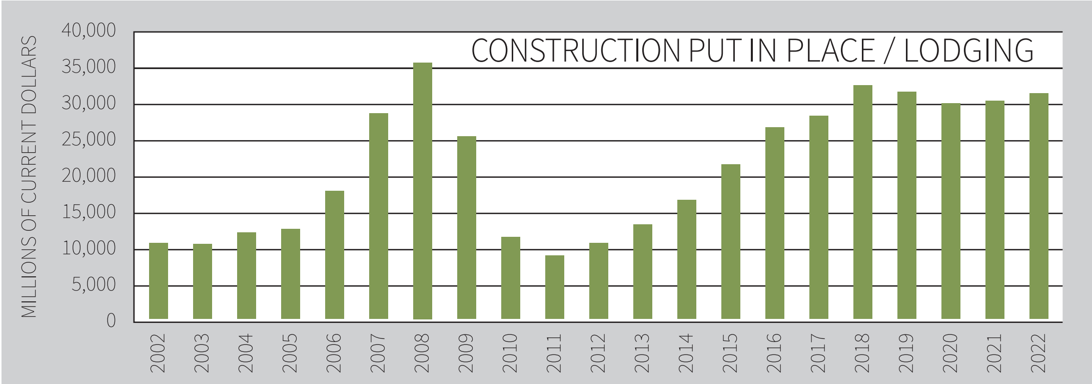
LODGING

UP 14%
$33 Billion
2018/2017 Comparison

Trends:

- Momentum in 2018 is due to persistent economic expansion, which has boosted corporate earnings, business and leisure travel, and investments in amusement and convention center spending
- Occupancy rates are near the strongest point within the past decade
- Rising construction costs and large projects coming online will have an adverse impact on owners' continued willingness to expand in 2019

Key drivers include occupancy rates, RevPAR, average daily rates, and room starts.



LODGING CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	9,129	10,836	13,484	16,738	21,908	26,969	28,672	32,744	31,845	30,236	30,663	31,539
% Change From Year Prior	-21.5%	18.7%	24.4%	24.1%	30.9%	23.1%	6.3%	14.2%	-2.7%	-5.1%	1.4%	2.9%

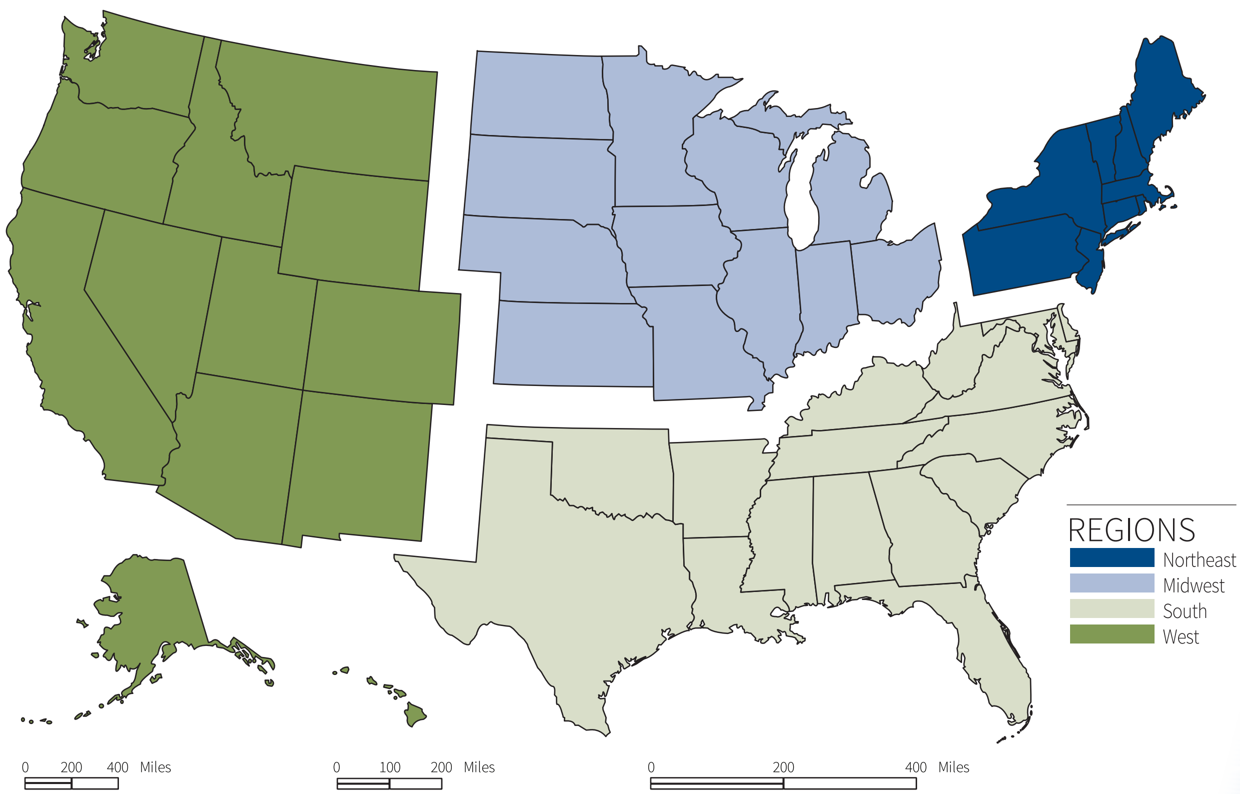
SYSTEMS OUTLOOK / LODGING in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	40.5	86.1	25.3	536.9	324.2	1,013.1
2016 Total	53.9	161.7	26.9	687.2	417.7	1,347.4
2017 Total	89.1	163.4	44.6	742.5	445.5	1,485.1
2018 Summer Outlook	108.3	201.1	46.4	757.8	433.1	1,546.6
2018 Winter Outlook	137.5	257.9	86	808	429.8	1,719
% of Total Construction	0.42%	0.79%	0.26%	2.47%	1.31%	5.25%

2015 through 2017 Totals – total electronic systems construction put in place in their respective years
2018 Summer Outlook – outlook of total 2018 electronic systems construction put in place based on actual data from 2018 Q1 and Q2 and forecasted for the remainder of 2018
2018 Winter Outlook – outlook of total 2018 electronic systems construction put in place based on actual data from 2018 Q1 through November and forecasted for the remainder of 2018
% of Total Construction – percentage of 2018 dollars spent on electronic systems in relation to the total dollars spent on construction in each vertical market

REGIONAL SYSTEMS OUTLOOK / LODGING in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	21.1	38.8	10.6	176.2	105.7	352.4
Midwest Region	20.9	38.3	10.4	174	104.4	347.9
South Region	37.2	68.1	18.6	309.7	185.8	619.4
West Region	24	43.9	12	199.7	119.8	399.4



VERTICAL MARKET OUTLOOKS Manufacturing

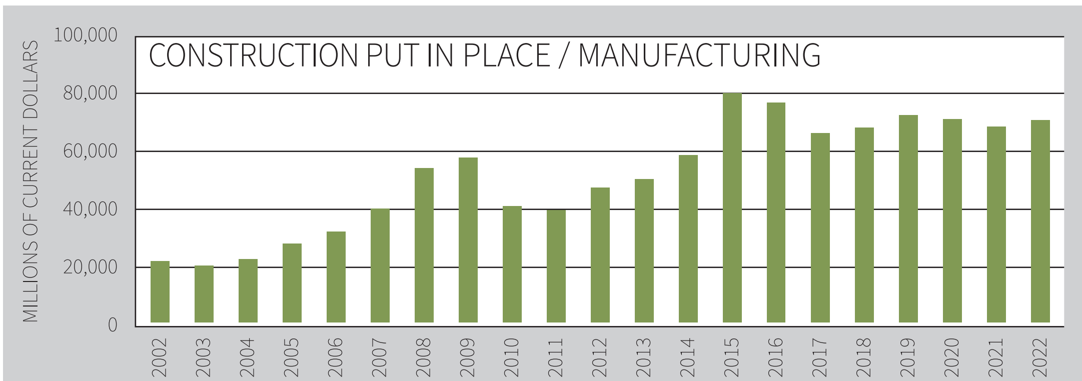
MANUFACTURING

UP 3%
$68 Billion
2018/2017 Comparison

Trends:

- 2017's tax reform is expected to continue fueling a rise in manufacturing plant investment
- Tariffs on Chinese imports, as well as retaliatory tariffs on U.S. goods, continue to generate uncertainty
- Increased volatility in manufacturing construction is expected if the Trump administration maintains the use of tariffs as a strategic initiative

Key drivers include PMI, industrial production, capacity utilization, durable goods orders, and manufacturing inventories.



MANUFACTURING CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	40,559	47,741	50,548	58,648	79,930	76,380	66,448	68,091	72,091	70,977	68,461	70,564
% Change From Year Prior	-1.5%	17.7%	5.9%	16%	36.3%	-4.4%	-13%	2.5%	5.9%	-1.5%	-3.5%	3.1%

SYSTEMS OUTLOOK / MANUFACTURING in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	60.8	152.1	1,003.7	1,125.3	699.5	3,041.4
2016 Total	59.3	178	1,008.7	1,068	652.7	2,966.7
2017 Total	54.6	136.5	1,010.3	1,037.6	491.5	2,730.4
2018 Summer Outlook	60.4	181.3	1,148.5	1,118.3	513.8	3,022.3
2018 Winter Outlook	61.3	245.1	1,164.4	1,103.1	490.3	3,064.1
% of Total Construction	0.09%	0.36%	1.71%	1.62%	0.72%	4.5%

2015 through 2017 Totals – total electronic systems construction put in place in their respective years
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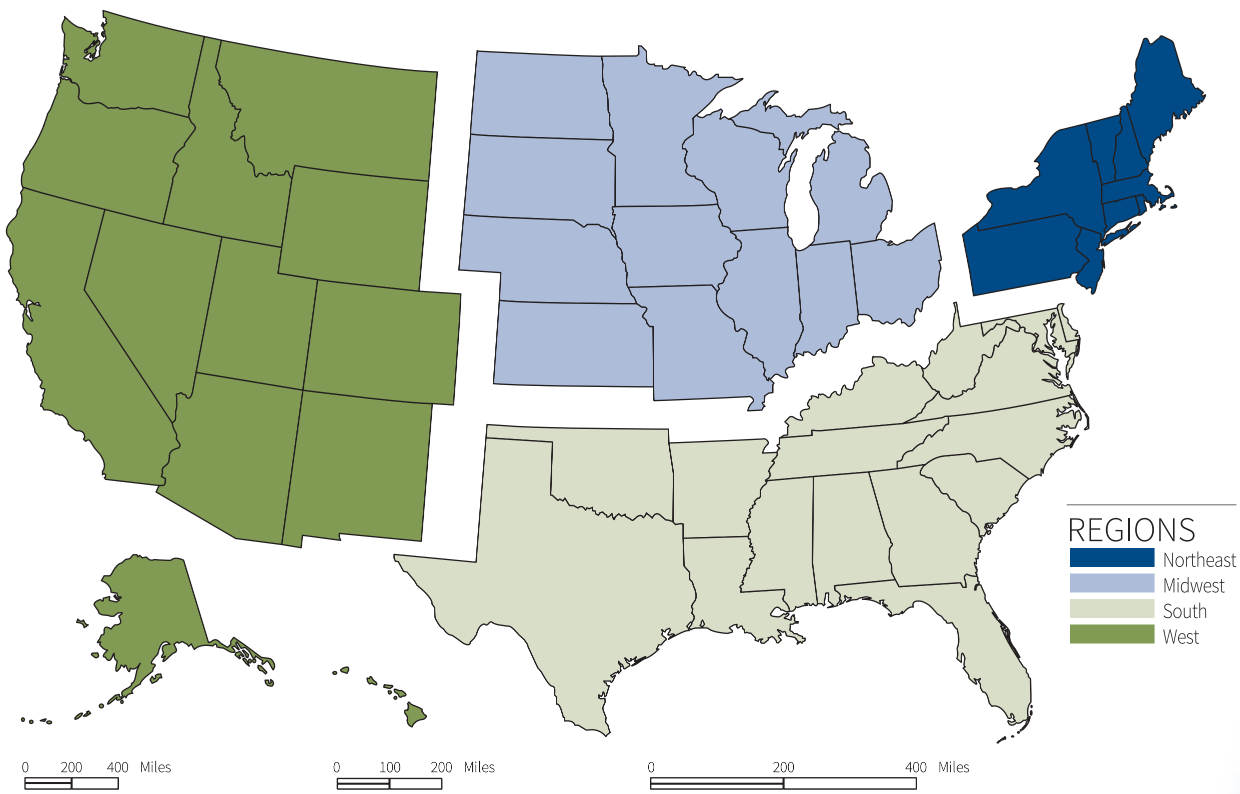
2018 Winter Outlook – outlook of total 2018 electronic systems construction put in place based on actual data from 2018 Q1 through November and forecasted for the remainder of 2018
% of Total Construction – percentage of 2018 dollars spent on electronic systems in relation to the total dollars spent on construction in each vertical market

Manufacturing VERTICAL MARKET OUTLOOKS

REGIONAL SYSTEMS OUTLOOK / MANUFACTURING in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	11.9	29.8	220.3	226.3	107.2	595.5
Midwest Region	13.1	32.8	242.6	249.1	118	655.6
South Region	23.1	57.8	427.5	439.1	208	1,155.5
West Region	13.1	32.9	243.2	249.8	118.3	657.4



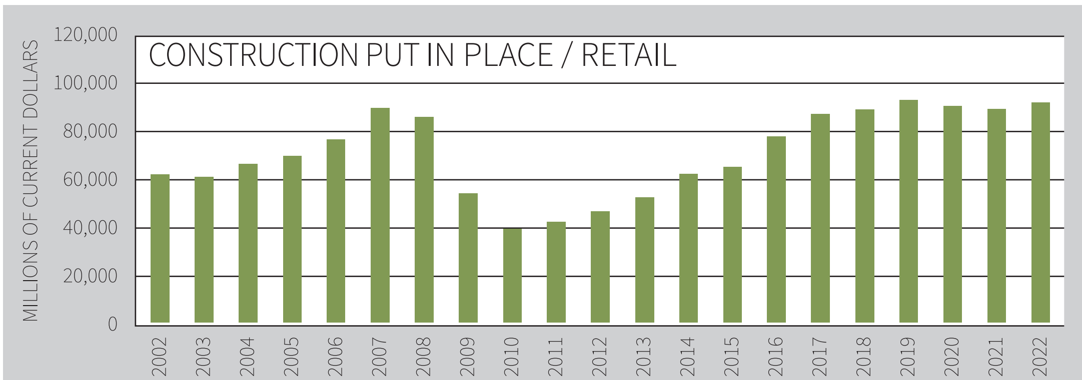
RETAIL

UP 2%
$89 Billion
2018/2017 Comparison

Trends:

- The shift from brick-and-mortar space to e-commerce has significantly augmented the capital investment focus of large retailers
- Storefront infrastructure, including shopping centers and malls, will continue to moderate through 2019
- Investment in warehouse and distribution logistics centers will continue to expand

Key drivers include retail sales, CPI, income, home prices, housing starts, and housing permits.



RETAIL CONSTRUCTION

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Millions of Current Dollars	42,816	47,335	53,159	62,841	65,899	78,151	87,733	89,225	93,163	90,782	89,552	92,231
% Change From Year Prior	6.8%	10.6%	12.3%	18.2%	4.9%	18.6%	12.3%	1.7%	4.4%	-2.6%	-1.4%	3%

SYSTEMS OUTLOOK / RETAIL in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
2015 Total	101.6	330.3	76.2	1,067.2	965.6	2,541
2016 Total	147.3	334.8	80.3	1,071.3	1,044.5	2,678.3
2017 Total	194	355.6	129.3	1,293.2	1,260.8	3,232.9
2018 Summer Outlook	210.9	456.9	175.7	1,370.8	1,300.5	3,514.9
2018 Winter Outlook	173.1	450.1	173.1	1,384.8	1,280.9	3,461.9
% of Total Construction	0.19%	0.5%	0.19%	1.55%	1.44%	3.88%

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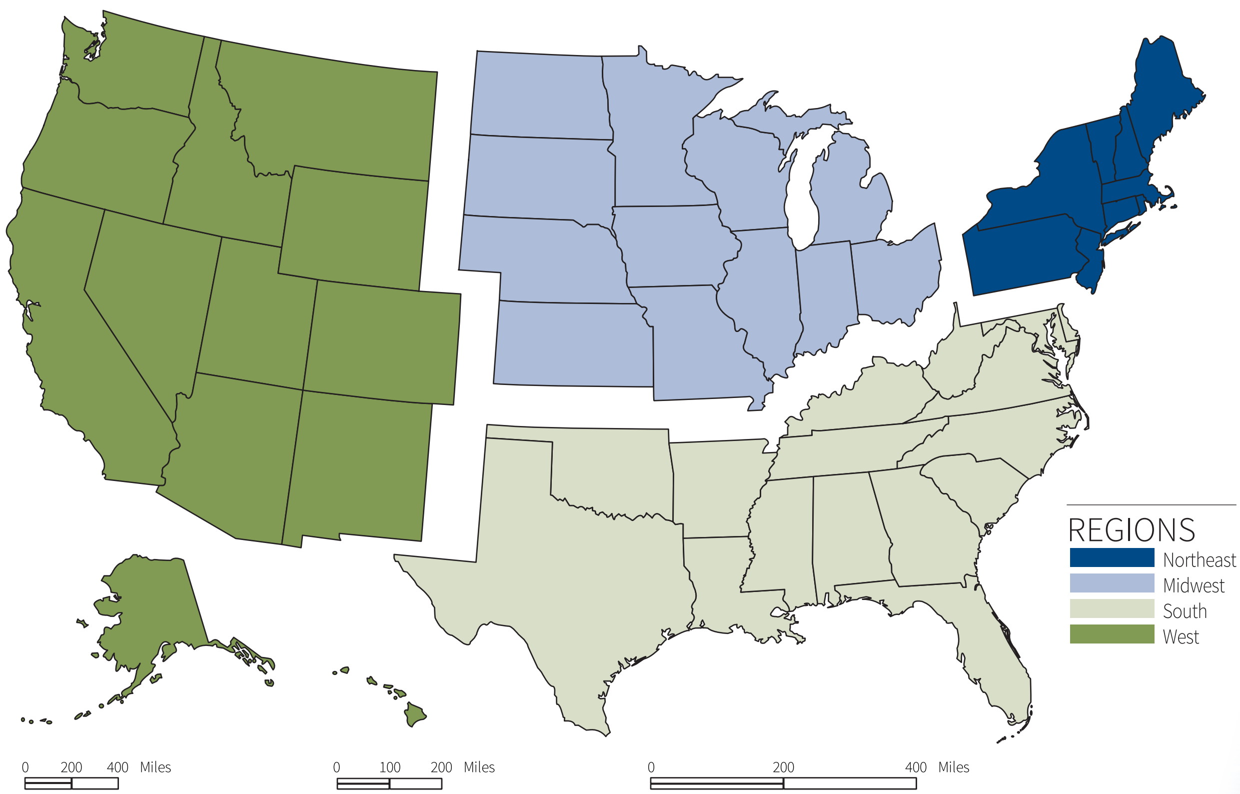
% of Total Construction – percentage of 2018 dollars spent on electronic systems in relation to the total dollars spent on construction in each vertical market

REGIONAL SYSTEMS OUTLOOK / RETAIL in Millions of Current Dollars

	Acoustic, Audio & AV	Phone Systems, Data Networks, IT	Building Automation & Control	Life Safety: Fire & Security	Lighting, Digital Signage	All Systems
Northeast Region	41.4	75.8	27.6	275.8	268.9	689.5
Midwest Region	45.6	83.6	30.4	303.9	296.3	759.6
South Region	75.2	137.9	50.1	501.4	488.9	1,253.6
West Region	45.6	83.5	30.4	303.7	296.1	759.2



CONSTRUCTION OUTLOOK SUMMARIES

SYSTEMS OUTLOOK in Millions of Current Dollars (December 2018 Forecast)

	Acoustic, Audio & AV				Phone Systems, Data Networks, IT				Building Automation & Control			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
Corporate	381.5	442.8	516.7	638.9	762.9	1,107	1,112.9	1,320.5	109	147.6	238.5	319.5
Education	669.7	718.7	724.6	801.3	618.9	639.6	664.2	801.3	290.5	243.6	241.5	267.1
Government	59.3	50.8	47.6	64.8	192.3	202.2	219	248.3	42.2	43.3	66.6	86.4
Healthcare	80.7	115.8	84	105.1	565	637	644.2	705.9	80.7	86.9	140	120.1
Houses of Worship	26.7	28.4	26.2	24.4	23.4	24.9	23	22.4	29.7	31.7	27.3	26.4
Lodging	42.3	53.9	89.1	137.5	89.2	161.7	163.4	2257.9	28.2	26.9	44.6	86
Manufacturing	54.5	59.3	54.6	61.3	163.6	178	136.5	245.1	927.2	1,008.7	1,010.3	1,164.4
Retail	120.2	147.3	194	173.1	288.6	334.8	355.6	450.1	72.1	80.3	129.3	173.1
Total Electronic Systems	**1,434.9**	**1,617**	**1,736.8**	**2,006.5**	**2,703.9**	**3,285.2**	**3,318.7**	**4,051.4**	**1,579.6**	**1,669**	**1,898.1**	**2,243**

	Life Safety: Fire & Security				Lighting, Digital Signage				All Systems			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
Corporate	953.7	1,273	1,430.8	1,405.6	517.7	719.5	675.7	575	2,724.7	3,690	3,974.5	4,259.5
Education	2,583.9	3,106.4	3,079.6	3,405.7	1,083.7	1,382.7	1,328.5	1,402.3	5,246.7	6,091	6,038.5	6,677.8
Government	450.9	479.7	476.1	518.2	157.3	164.6	142.8	161.9	901.9	940.6	952.1	1,079.6
Healthcare	1,399	1,476.7	1,400.3	1,486.8	565	579.1	532.1	585.7	2,690.4	2,895.6	2,800.7	3,003.7
Houses of Worship	79.4	84.5	78	75.3	54.5	58	55.4	54.9	213.7	227.5	209.9	203.5
Lodging	478.9	687.2	742.5	808	300.5	417.7	445.5	429.8	939.1	1,347.4	1,485.1	1,719
Manufacturing	981.7	1,068	1,037.6	1,103.1	599.9	652.7	491.5	490.3	2,726.9	2,966.7	2,730.4	3,064.1
Retail	986	1,071.3	1,293.2	1,384.8	937.9	1,044.5	1,260.8	1,280.9	2,405	2,678.3	3,232.9	3,461.9
Total Electronic Systems	**7,913.5**	**9,246.8**	**9,538**	**10,187.5**	**4,216.5**	**5,018.8**	**4,932.3**	**4,980.9**	**17,848.4**	**20,837.1**	**21,424**	**23,469.2**

CONSTRUCTION OUTLOOK / U.S. in Millions of Current Dollars

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Corporate	34,647	36,368	36,540	44,817	53,418	65,055	64,318	71,289	75,340	72,742	71,178	72,993
Education	84,985	84,672	79,060	79,681	84,771	90,348	91,213	96,780	102,640	106,057	110,801	114,994
Government	14,301	14,433	13,624	14,016	13,797	13,861	14,330	15,819	16,926	17,411	17,775	18,625
Healthcare	40,204	42,544	40,689	38,647	39,147	40,157	41,916	42,186	43,270	43,989	45,060	46,740
Houses of Worship	4,239	3,846	3,590	3,386	3,577	3,721	3,366	3,083	2,975	2,837	2,853	2,931
Lodging	9,129	10,836	13,484	16,738	21,908	26,969	28,672	32,744	31,845	30,236	30,663	31,539
Manufacturing	40,559	47,741	50,548	58,648	79,930	76,380	66,448	68,091	72,091	70,977	68,461	70,564
Retail	42,816	47,335	53,159	62,841	65,899	78,151	87,733	89,225	93,163	90,782	89,552	92,231
Total Commercial Buildings	**270,880**	**287,775**	**290,694**	**318,774**	**362,446**	**394,641**	**397,995**	**419,218**	**438,251**	**435,032**	**436,342**	**450,616**
Total Residential Buildings	252,646	276,057	329,217	374,860	428,762	473,933	531,657	553,609	562,984	566,440	584,837	609,018
Total Nonbuilding Structures	198,918	219,687	216,670	238,695	238,854	237,906	225,002	235,938	245,561	253,302	264,479	278,076
Total Construction Put in Place	**859,391**	**935,821**	**998,051**	**1,112,589**	**1,240,523**	**1,331,858**	**1,382,789**	**1,444,095**	**1,490,140**	**1,493,596**	**1,522,246**	**1,581,714**

CONSTRUCTION OUTLOOK / U.S. % Change From Year Prior

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Corporate	-8.5%	5%	0.5%	22.7%	19.2%	21.8%	-1.1%	10.8%	5.7%	-3.4%	-2.1%	2.6%
Education	-3.9%	-0.4%	-6.6%	0.8%	6.4%	6.6%	1%	6.1%	6.1%	3.3%	4.5%	3.8%
Government	-5.1%	0.9%	-5.6%	2.9%	-1.6%	0.5%	3.4%	10.4%	7%	2.9%	2.1%	4.8%
Healthcare	2.2%	5.8%	-4.4%	-5%	1.3%	2.6%	4.4%	0.6%	2.6%	1.7%	2.4%	3.7%
Houses of Worship	-19.8%	-9.3%	-6.7%	-5.7%	5.6%	4%	-9.5%	-8.4%	-3.5%	-4.6%	0.6%	2.7%
Lodging	-21.5%	18.7%	24.4%	24.1%	30.9%	23.1%	6.3%	14.2%	-2.7%	-5.1%	1.4%	2.9%
Manufacturing	-1.5%	17.7%	5.9%	16%	36.3%	-4.4%	-13%	2.5%	5.9%	-1.5%	-3.5%	3.1%
Retail	6.8%	10.6%	12.3%	18.2%	4.9%	18.6%	12.3%	1.7%	4.4%	-2.6%	-1.4%	3%
Total Commercial Buildings	**-3.2%**	**5.3%**	**1.6%**	**8.8%**	**13.8%**	**7.6%**	**2%**	**6.3%**	**4.8%**	**0.1%**	**1%**	**3.7%**
Total Residential Buildings	0.1%	9.3%	19.3%	13.9%	14.4%	10.5%	12.2%	4.1%	1.7%	0.6%	3.2%	4.1%
Total Nonbuilding Structures	-4.8%	10.4%	-1.4%	10.2%	0.1%	-0.4%	-5.4%	4.9%	4.1%	3.2%	4.4%	5.1%
Total Construction Put in Place	**-2.6%**	**7.9%**	**6.6%**	**11%**	**10.7%**	**7%**	**4.5%**	**5.1%**	**3.4%**	**0.9%**	**2.6%**	**4.2%**

NOTE: "Nonbuilding Structures" are generally horizontal construction projects, including roadways, bridges, tunnels, etc.
This data is construction-related, and only projects with building permits were factored into the data.

CANADA CONSTRUCTION OUTLOOK

FMI does work extensively in Canada with a team dedicated to that area. The historic rule of thumb for Canada was that it was 10% of the United States — no matter what you were talking about. Over the past eight years, that has changed dramatically; today, total Canadian construction volume is closer to one-quarter of the United States. The recession in Canada was not nearly as deep or broad, and the residential sector held up relatively well. The government invested heavily in real infrastructure projects, especially in Ontario. And the oil and gas industry created a boom in Western Canada. We are expecting moderation in the rate of Canada's growth, but the economy will show steady gains for the next 10 years. It is estimated that the Canadian volume is about 18% of the U.S. systems contracting based on the nonresidential building sector; however, drivers and owner practices are different in Canada, which needs to be taken into consideration. NSCA will review this information in the reports to come.

CONSTRUCTION OUTLOOK/CANADA in Millions of Current Dollars

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Corporate	7,659	8,262	7,949	8,243	6,907	6,302	6,344	6,631	6,312	6,295	6,371	6,483
Education	6,935	5,099	5,206	4,685	4,257	4,664	5,582	5,728	5,448	5,604	5,840	6,099
Government	1,861	2,258	2,043	1,300	853	833	913	918	953	1,025	1,097	1,163
Healthcare	2,960	2,837	2,849	3,479	3,668	2,856	2,368	2,884	3,059	3,370	3,689	4,002
Houses of Worship	3,028	3,504	3,259	3,446	3,262	2,403	2,650	2,725	2,637	2,684	2,757	2,833
Lodging	3,028	3,504	3,259	3,446	3,262	2,403	2,650	2,687	2,674	2,757	2,829	2,905
Manufacturing	6,301	8,033	7,454	6,873	6,046	5,544	5,935	6,976	7,199	7,421	7,552	7,605
Retail	5,898	7,182	7,629	6,592	5,957	6,158	6,110	5,998	5,874	6,021	6,200	6,375
Total Commercial Buildings	**35,276**	**37,554**	**36,792**	**35,082**	**31,353**	**29,108**	**30,242**	**32,210**	**31,814**	**32,760**	**33,847**	**34,909**
Total Residential Buildings	87,077	94,603	91,858	89,294	79,967	81,291	89,914	95,837	98,919	104,276	108,160	111,680
Total Nonbuilding Structures	108,146	117,324	116,001	109,959	91,031	85,254	88,459	102,824	110,506	117,593	123,487	128,802
Total Construction Put in Place	**230,499**	**249,481**	**244,651**	**234,335**	**202,351**	**195,653**	**208,615**	**230,871**	**241,239**	**254,629**	**265,494**	**275,391**

CONSTRUCTION OUTLOOK / CANADA % Change From Year Prior

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Corporate	7.87%	-3.79%	3.71%	-16.21%	-8.77%	0.67%	4.53%	-4.82%	-0.26%	1.19%	1.77%
Education	-26.47%	2.09%	-10.01%	-9.14%	9.56%	19.69%	2.63%	-4.9%	2.88%	4.20%	4.44%
Government	21.36%	-9.54%	-36.39%	-34.35%	-2.36%	9.59%	0.55%	3.76%	7.66%	6.96%	6.05%
Healthcare	-4.15%	0.44%	22.1%	5.43%	-22.15%	-17.08%	21.82%	6.05%	10.19%	9.44%	8.5%
Houses of Worship	-40.3%	6.2%	15.6%	-13.21%	-13.12%	-2.83%	2.48%	-4.46%	1.33%	1.64%	1.41%
Lodging	15.71%	-7%	5.74%	-5.33%	-26.34%	10.29%	2.82%	-3.23%	1.8%	2.69%	2.78%
Manufacturing	27.49%	-7.21%	-7.79%	-12.04%	-8.31%	7.05%	17.55%	3.2%	3.09%	1.76%	0.71%
Retail	21.77%	6.23%	-13.6%	-9.63%	3.37%	-0.77%	-1.83%	-2.07%	2.49%	2.98%	2.83%
Total Commercial Buildings	**3.52%**	**-2.4%**	**-4.16%**	**-10.12%**	**-5.74%**	**4.15%**	**6.5%**	**-2.51%**	**2.19%**	**2.95%**	**2.94%**
Total Residential Buildings	8.64%	-2.9%	-2.79%	-10.45%	1.66%	10.61%	6.59%	3.22%	5.42%	3.72%	3.25%
Total Nonbuilding Structures	8.49%	-1.13%	-5.21%	-17.21%	-6.35%	3.76%	16.24%	7.47%	6.41%	5.01%	4.3%
Total Construction Put in Place	**7.56%**	**-2.01%**	**-4.14%**	**-13.41%**	**-3.22%**	**6.54%**	**10.46%**	**3.99%**	**5.31%**	**4.17%**	**3.67%**

NOTE: We don't have the actual system type values per category determined as of yet. For now, use the averages in the U.S. to estimate value.

NOTE: "Nonbuilding Structures" are generally horizontal construction projects, including roadways, bridges, tunnels, etc.
This data is construction-related project based, and only projects with building permits were factored into the data.

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