FMI

Industry Focus. Powerful Results.™

Design-Build Utilization

Combined Market Study
June 2018

DBIA
DESIGN-BUILD
INSTITUTE OF AMERICA

FMI forecast methodology

To derive a market forecast, FMI uses a triangulation method that utilizes multiple sources to develop and validate the market's size and direction. The following diagram represents the methodology used for developing construction put in place estimates.

Quantitative Market Model:

Utilizing multiple sources, both historical and forward looking, FMI generates a baseline forecast for construction put in place spending at a local level for each of the various segments examined in this study. For example, historical construction spending put in place is reported by the U.S. Census and is then forecast at a local level using local economic indicators, such as population growth, GDP, unemployment rate, etc.

Anticipated Project Examination:

Utilizing FMI's proprietary project databases, CMD Reed, Industrial Info Resources, Dodge and other secondary sources, FMI adjusts the baseline, quantitative market model to reflect planned projects over the term of the forecast. Projects are vetted on likelihood of occurring based upon the known and anticipated market conditions.

Market-Driven Validation:

FMI then validates and adjusts as necessary the market sizing and forecast based upon primary research conducted with actual market participants and senior FMI consultants. These industry members can speak directly to market conditions and direction based upon there intimate knowledge of the individual market and segment.

Approach and Sources

Step 1: Construction Put in Place (CPiP)

Determining total construction put in place (CPiP) for the *assessed segments** is the first and most critical step in estimating the design-build market opportunity. FMI's definitions and historical CPiP estimates match reports released by the U.S. Census Bureau. Five-year CPiP forecasts are modeled and maintained utilizing various resources:

- In-house econometric models analyze trends and predict shifts in construction spending against various demographic and economic drivers.
- Technical in-house publications and subscriptions, including FMI's own Nonresidential Construction Index (NRCI) and construction project databases are utilized to offer insight into each segment considering backlogs, trends influencing demand and various project details.
- FMI's industry relationships and staff expertise/review.

Step 2: Design-build Construction Put in Place

Next, FMI developed custom market-sizing specifically for design-build construction by segmenting spending into various segment types and Census divisions. Estimates for design-build construction spending were derived through a combination of historical project databases, planned project lists, stakeholder interviews and industry stakeholder surveys.

For this research, design-build was defined as a method to deliver a project in which the design and construction services are contracted by a single entity.

- The use of consistent design-build terminology varied by construction segment (i.e., manufacturing, commercial, etc.). To account for all design-build spending, several variations of design-build were considered and assessed when developing the market-sizing model.

Key research sources include, but are not limited to those listed below:

United States Census Bureau

- Construction put in place history

Various Primary and Secondary Resources

- Stakeholder interviews/surveys
- Key secondary resources (e.g., ENR, Dodge, McGraw-Hill, REED, IIR, Global Insights, PWF)
- Industry focused associations (e.g., DBIA, ARTBA, AWWA, AIAI)
- Government agency databases (STIP, CIP, project lists)

Study results/findings

The results of the study were developed through a combination of DBIA provided contacts and FMI internal contacts. In total, 82 interviews were conducted and 101 survey responses were collected.

- Firms of all revenue sizes participated on the study. These ranged from ENR top-10 firms to firms with $10 million in annual revenue. The study was unbiased towards firm type, service/product offering or association affiliation.

**Assessed segments include: religious, public safety, communication, amusement and recreation, lodging, health care, transportation, office, commercial, manufacturing, educational highway/street, water/wastewater*

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Executive Summary

Executive Summary

Design-build construction spending in the assessed segments is anticipated to grow 18% from 2018 to 2021 and reach over $320 billion.

- Design-build is anticipated to represent up to 44% of construction spending in the assessed segments by 2021. Design-build spending in Manufacturing, Highway/Street and Education represent the greatest percentage of design-build construction spending by segment over the 2018-2021 period.
- The Mountain (6.3%), Pacific (6.1%) and South Atlantic (6.2%) census divisions are anticipated to yield the highest growth rates over the 2018-2021 period.

Owner's have traditionally employed design-bid-build as the project delivery method of choice. As owner needs and project demands have changed, owners have become increasingly likely to assess the option to employ alternative delivery methods.

- Owner selection of a project delivery method involves multiple factors. Overall, owners identified "delivery schedule" as the greatest influence of project delivery method selection. In addition, owner goals and objectives were identified to be highly influential in project delivery method selection.
- The education process for design-build has continued to expand. A continued emphasis toward educating owners and project stakeholders on the process and benefits associated with design-build will facilitate continued adoption and greater utilization.

From an industry perspective, alternative project delivery methods have become a more frequent option for both public and private owners. On the public side, enabling design-build legislation has been put in place to facilitate increased use. Private owners indicated utilizing design-build on projects presenting unique challenges.

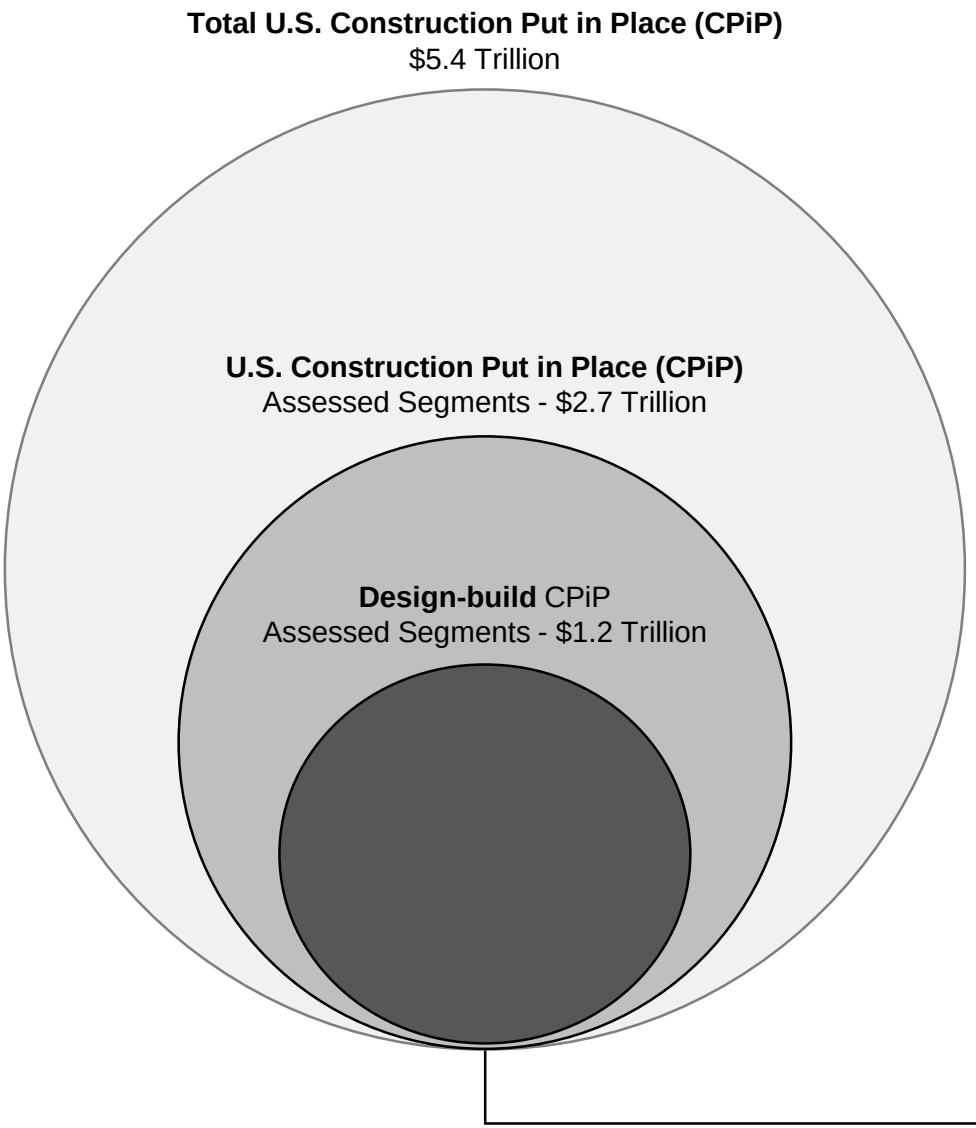
- Overall, owners indicated receiving significant value from design-build when employed on larger and more complex projects. These projects allowed for greater opportunity to provide project innovations and subsequent cost savings.
- In addition to larger and more complex projects, design-build utilization continues to expand into project sizes <$25 million as owners continue to gain exposure to the benefits of design-build.

Combined Market Sizing *(Assessed Segments)*

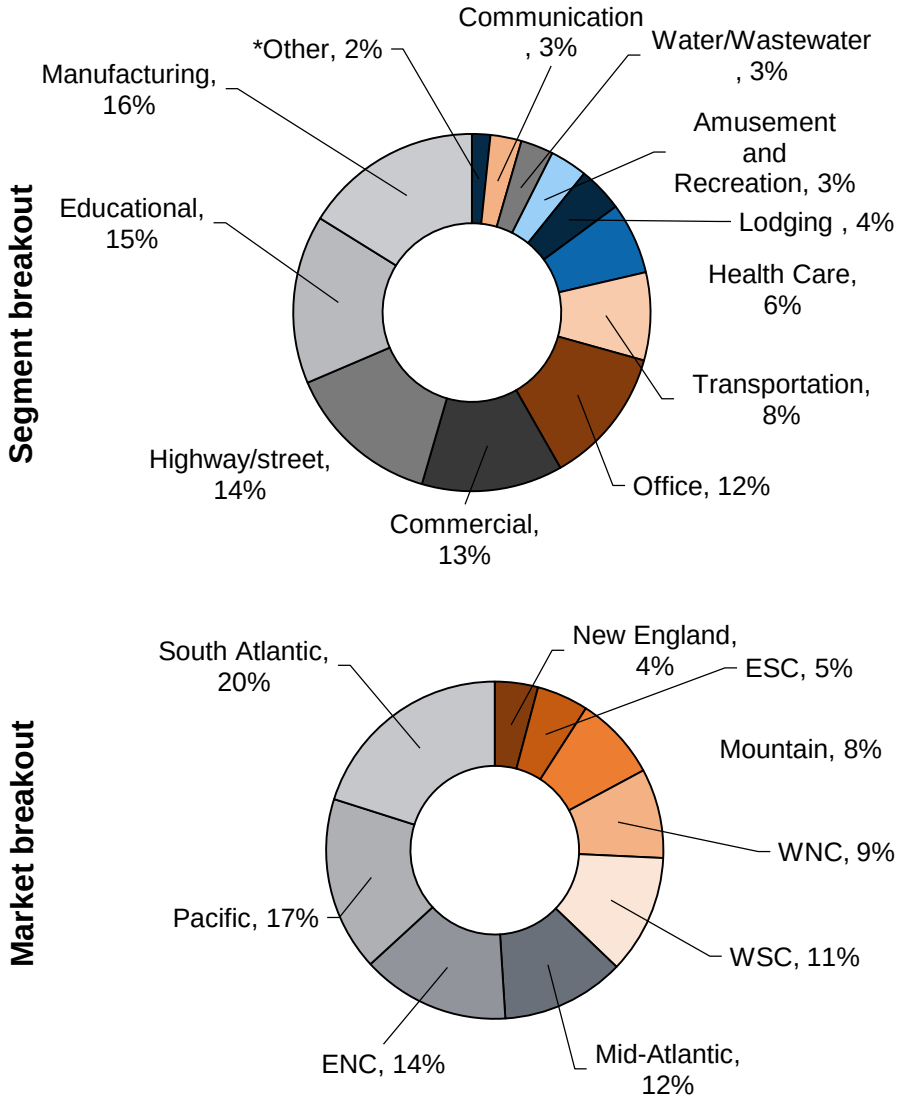
Assessed segments include: religious, public safety, communication, amusement and recreation, lodging, health care, transportation, office, commercial, manufacturing, educational, highway/street, water/wastewater

Overall, design-build is anticipated to account for 44% of construction spending in the assessed segments over the 2018-2021 forecast period.

Market size comparison
Total combined spend, Rollup, 2018-2021 US$



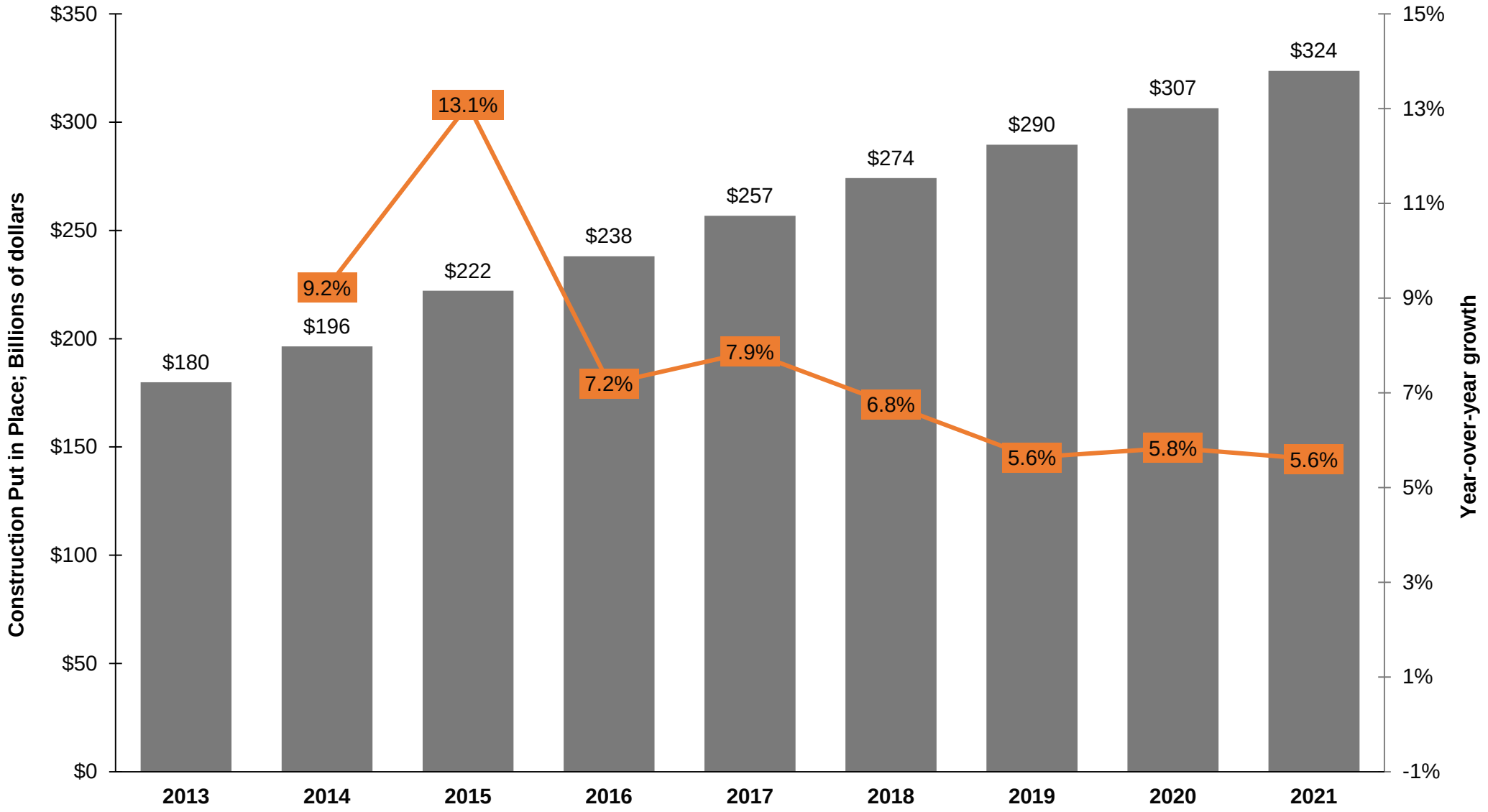
Distribution of market
CPiP spending, 2018-2021



**Other includes: Public safety and religious*

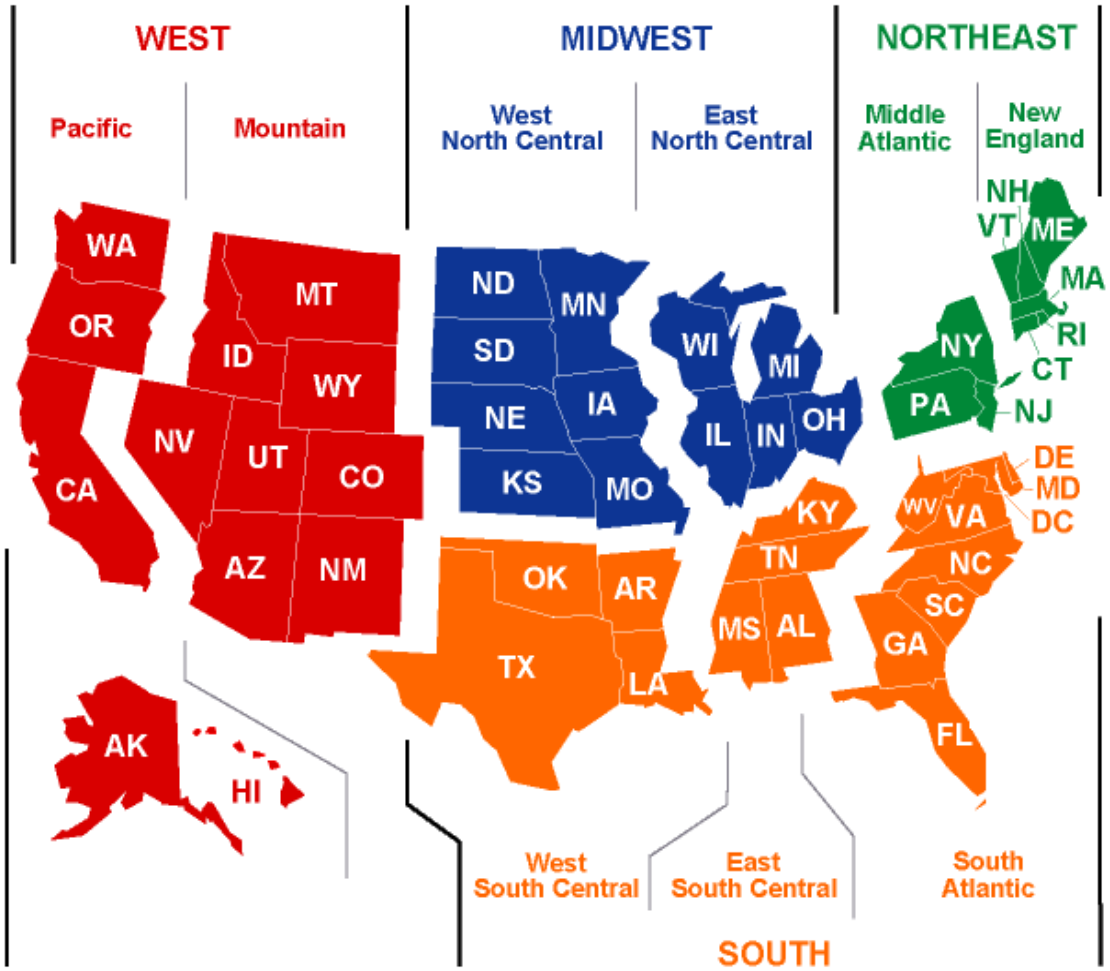
Design-build construction spending in the assessed segments is anticipated to grow 18% from 2018 to 2021.

Design-build construction put in place (Assessed segments); 2013-2021
Billions of dollars
Source(s): FMI analysis of multiple sources



The Mountain, Pacific and South Atlantic census divisions are anticipated to yield the highest growth rates over the 2018-2021 period.

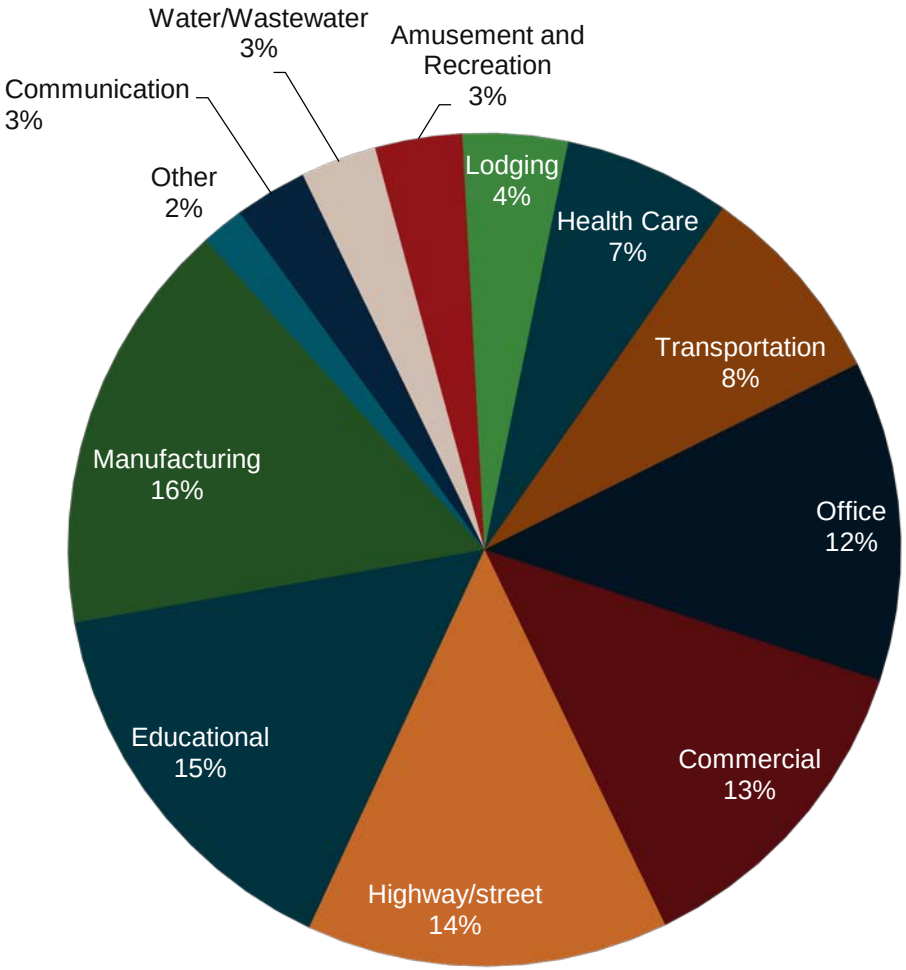
Design-build construction put in place by census division (Assessed Segments)
Billions of dollars
Source(s): FMI analysis of multiple sources



	Billions of current dollars	2018e	2021f	CAGR (18-21)
WEST	Mountain	$22.0	$26.4	6.3%
	Pacific	$45.7	$54.5	6.1%
MIDWEST	East North Central	$39.1	$45.9	5.5%
	West North Central	$23.7	$27.5	5.1%
NORTHEAST	New England	$11.4	$13.1	4.8%
	Middle Atlantic	$32.7	$37.8	5.0%
SOUTH	South Atlantic	$54.7	$65.6	6.2%
	East South Central	$13.6	$16.1	5.6%
	West South Central	$31.2	$36.7	5.5%
U.S. Total		$274.2	$323.7	5.7%

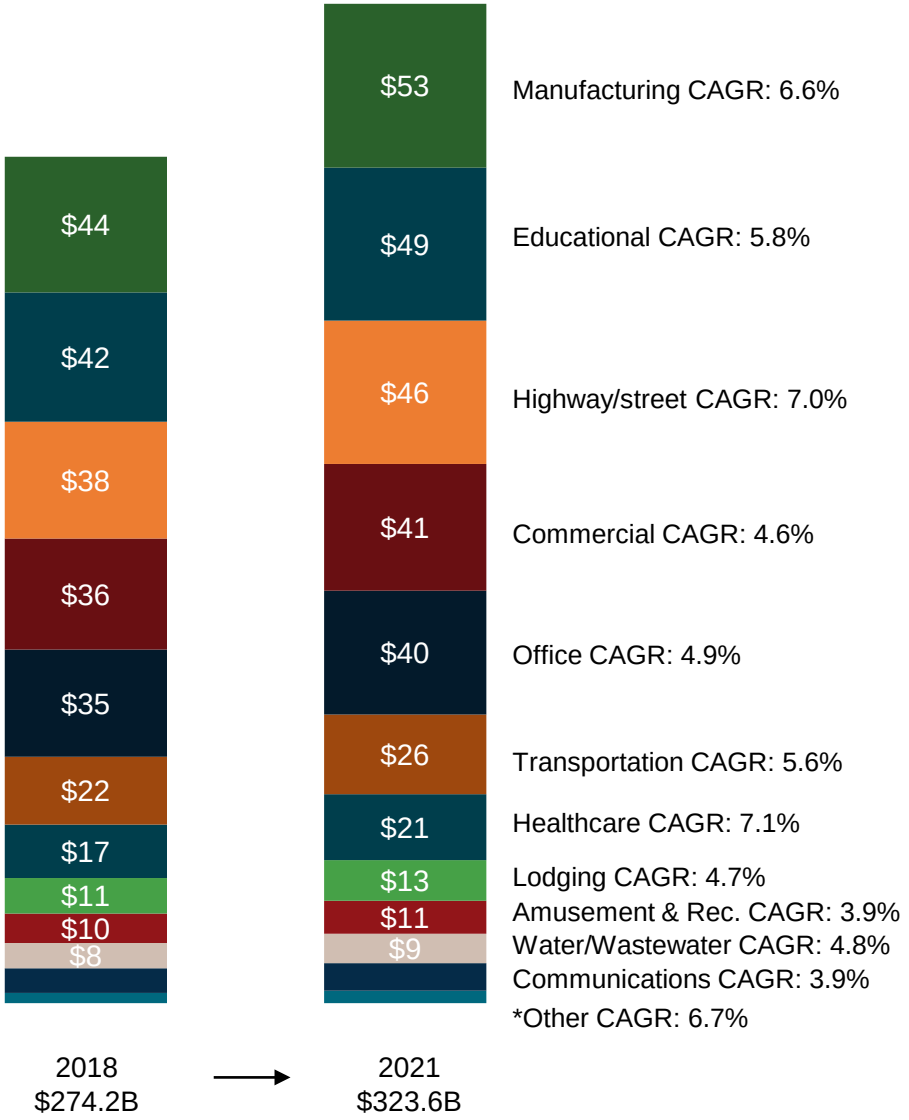
Manufacturing, educational and highway/street hold the largest share of design-build spending through 2021.

Distribution of forecast spending by segment
Combined CPiP spending, 2018-2021
Source(s): FMI analysis of multiple sources



Total spend 2018-2021: $1,193B

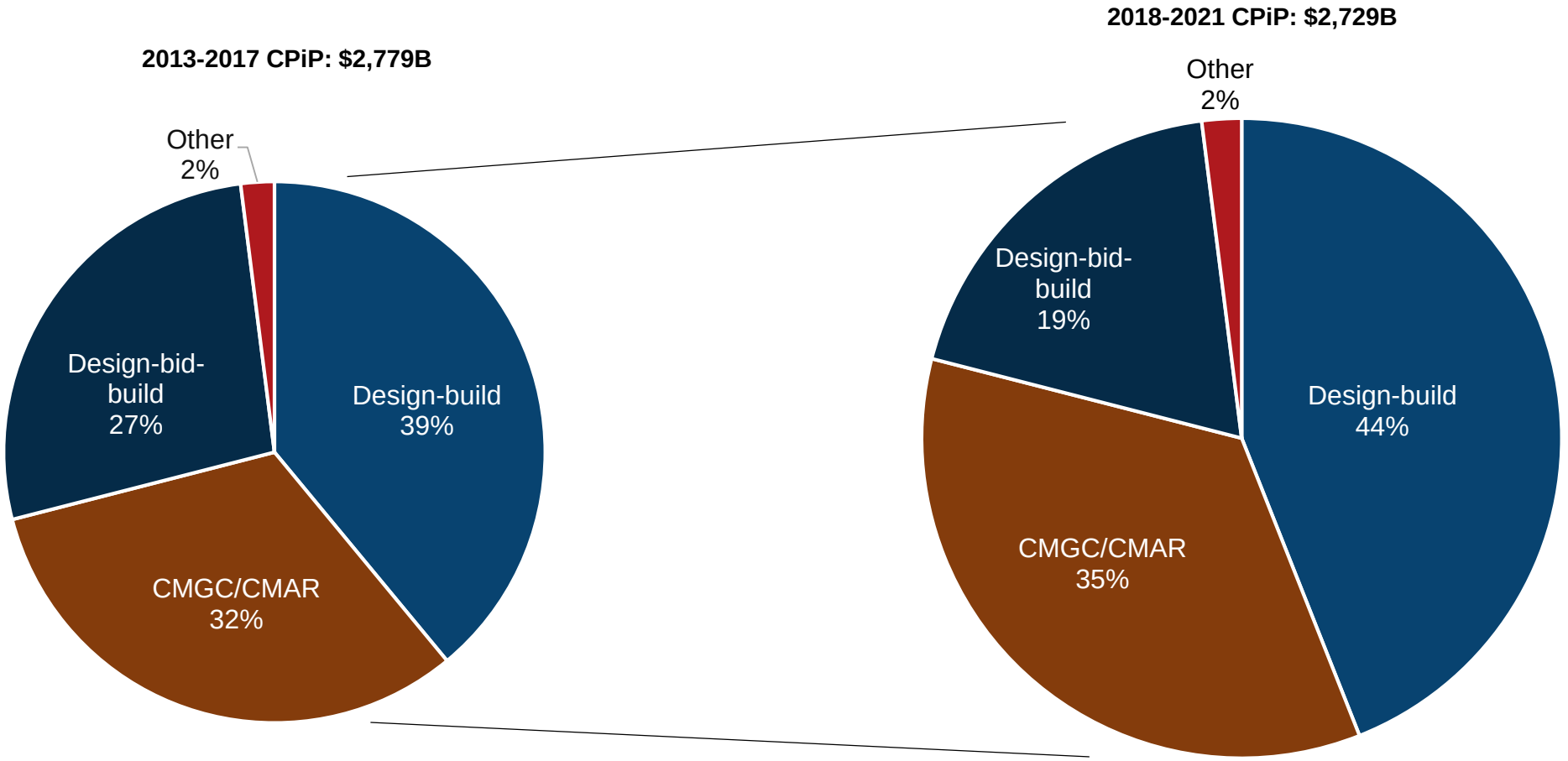
Distribution of market
CPiP spending, 2018, 2021
Source(s): FMI analysis of multiple sources



*Other includes: Public safety and religious

Design-build is anticipated to continue to gain market share over the 2018-2021 period.

Distribution of delivery method utilization
Source(s): FMI analysis of multiple sources



- Dissatisfaction with the adversarial nature and limitations of design-bid-build as well as increasingly challenging project characteristics and demands has resulted in greater interest in and use of design-build and other alternative delivery methods.
- Negative project owner experience and perceptions of design-bid-build are most influenced by limited opportunity for innovation, lack of a fast-track process and higher risk profile for the project owner.

**Other includes EPC and IPD*
***CMGC/CMAR, design-bid-build and Other percentages are based on estimated utilization across construction spending.*

Design-build construction spending is anticipated to account for $1.19 trillion over the 2018-2021 forecast period.

Forecast by Geography	Spend 2018-2021	CAGR 2018-2021	% of total design-build CPiP
South Atlantic	$240.0	6.2%	20.1%
Pacific	$199.5	6.1%	16.7%
ENC	$169.4	5.5%	14.2%
Mid Atlantic	$141.4	5.0%	11.8%
WSC	$136.3	5.5%	11.4%
WNC	$102.5	5.1%	8.6%
Mountain	$96.3	6.3%	8.1%
ESC	$59.2	5.6%	5.0%
New England	$49.4	4.8%	4.1%
Total	**$ 1,193.9**	**5.7%**	**100%**

Forecast by segment	Spend 2018-2021	CAGR 2018-2021	% of total design-build CPiP
Manufacturing	$192.9	6.6%	16.2%
Educational	$182.2	5.8%	15.3%
Highway/Street	$167.9	7.0%	14.1%
Commercial	$152.4	4.6%	12.8%
Office	$148.5	4.9%	12.4%
Transportation	$94.9	5.6%	8.0%
Health Care	$77.3	7.1%	6.5%
Lodging	$48.7	4.7%	4.1%
Amusement and Recreation	$40.4	3.9%	3.4%
Water/Wastewater	$33.6	3.9%	3.0%
Communication	$33.6	3.9%	2.8%
*Other	$5.1	4.0%	1.7%
Total	**$ 1,193.9**	**5.7%**	**100%**

FMI *Other includes: Public safety and religious

Nonresidential Market

Nonresidential segments include: religious, public safety, communication, amusement and recreation, lodging, health care, transportation, office, commercial, manufacturing, educational

Market Sizing

Total U.S. nonresidential construction spending is anticipated to reach over $550 billion by 2020.

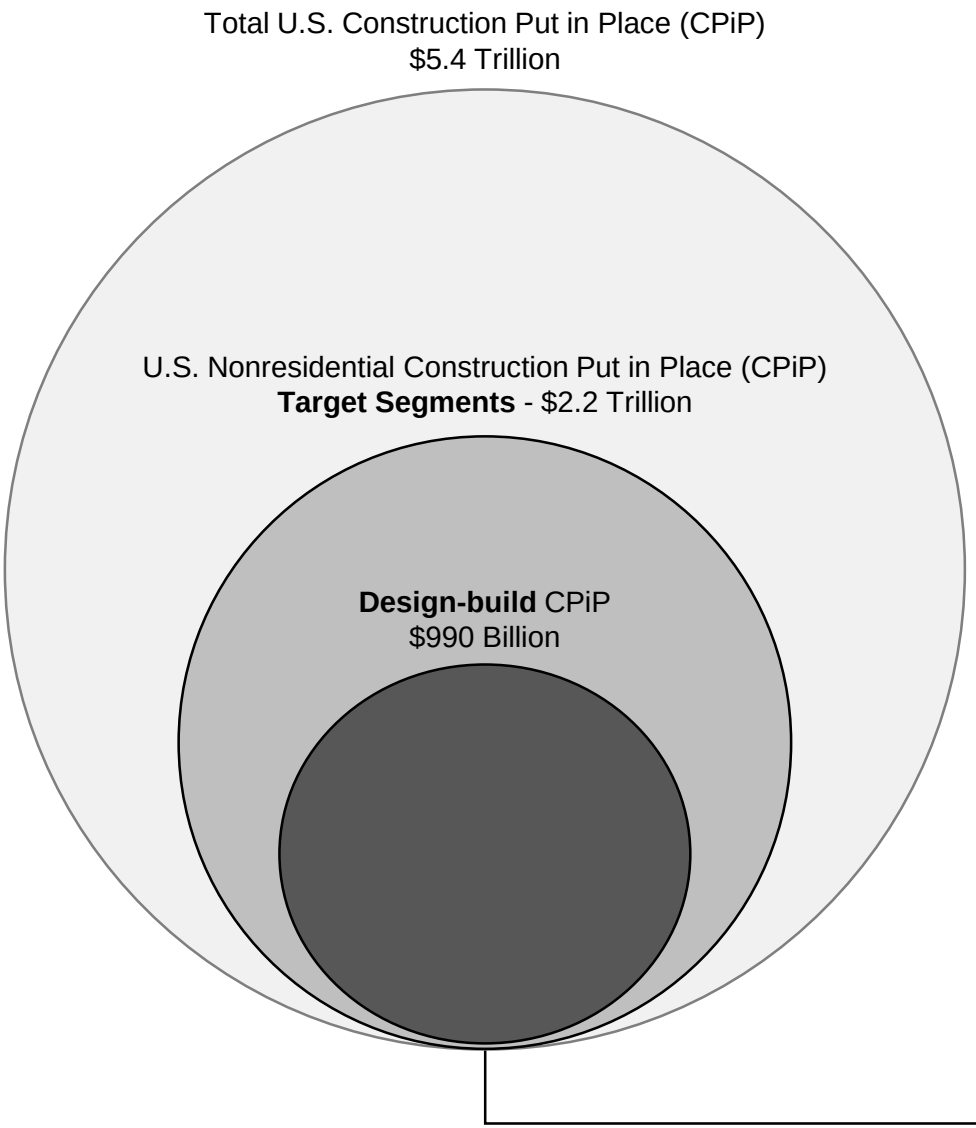
U.S. nonresidential construction put in place; 2013-2021

Billions of dollars

Source(s): FMI

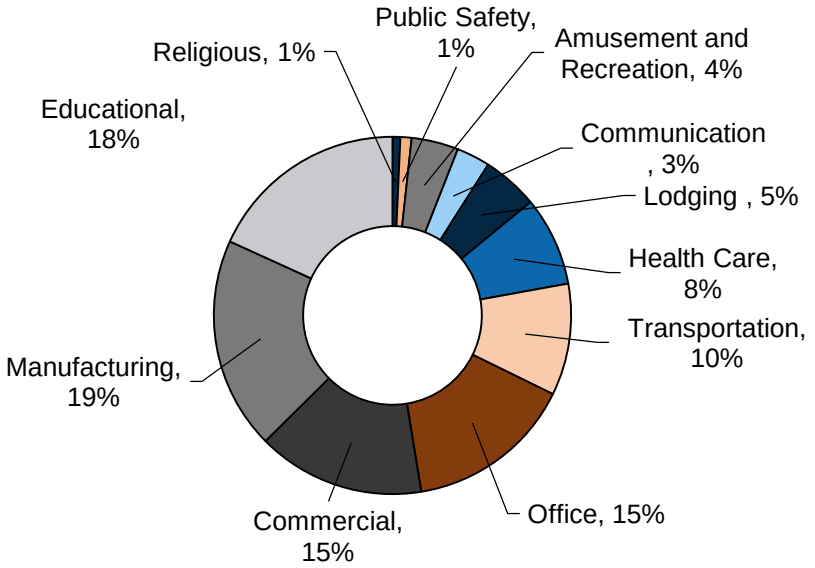
Overall, design-build is anticipated to account for 45% of nonresidential construction spending over the 2018-2021 forecast period.

Market size comparison
Total combined spend, Rollup, 2018-2021 US$

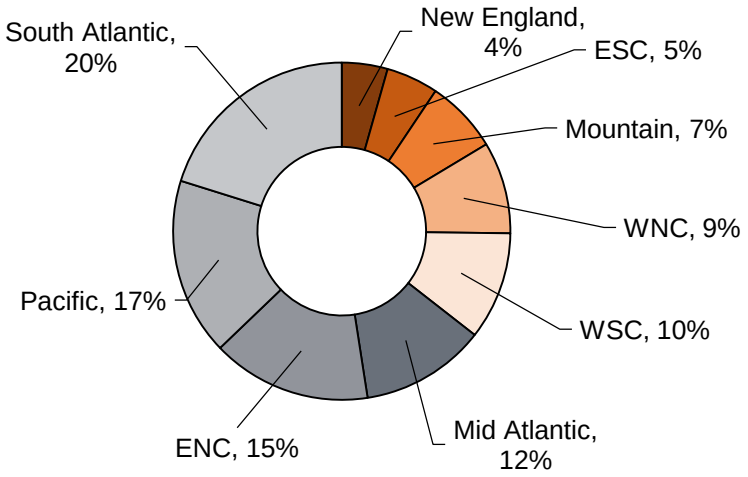


Distribution of market
CPiP spending, 2018-2021

Segment breakout

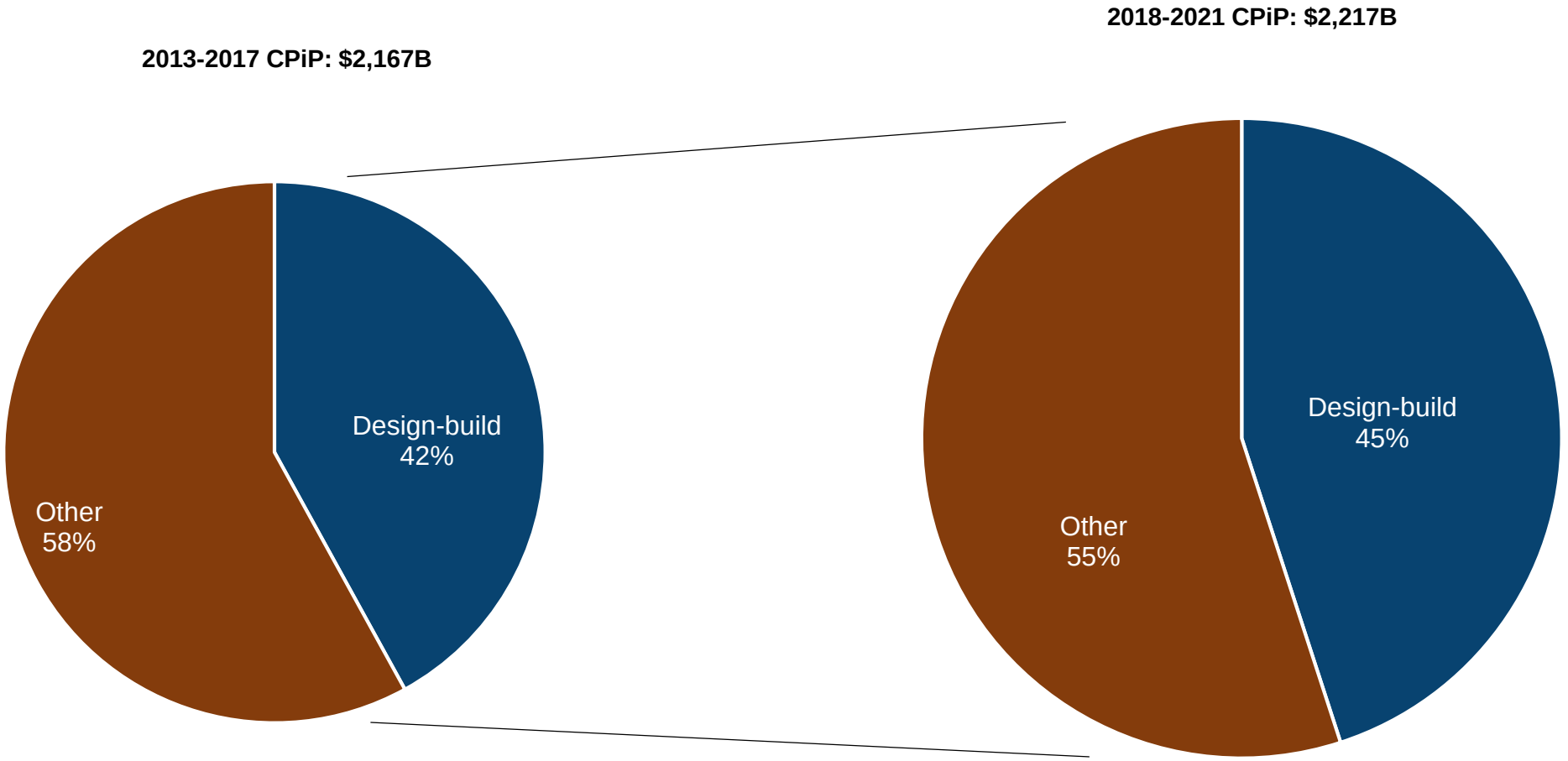


Market breakout



Design-build is anticipated to continue to gain market share over the 2018-2021 period.

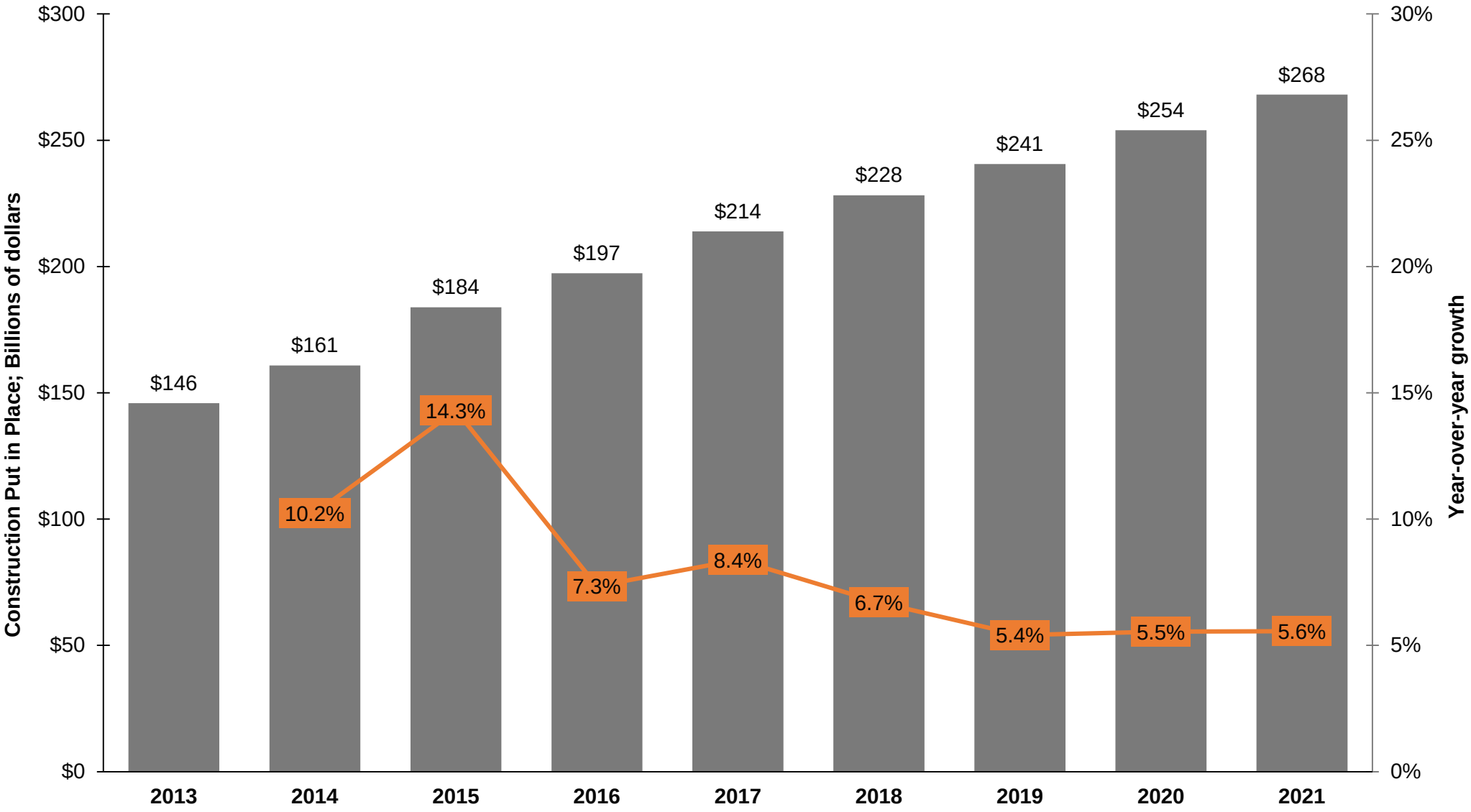
Distribution of delivery method utilization
Source(s): FMI analysis of multiple sources



*Other includes: CMAR/CMGC, Design-bid-Build, IPD, EPC

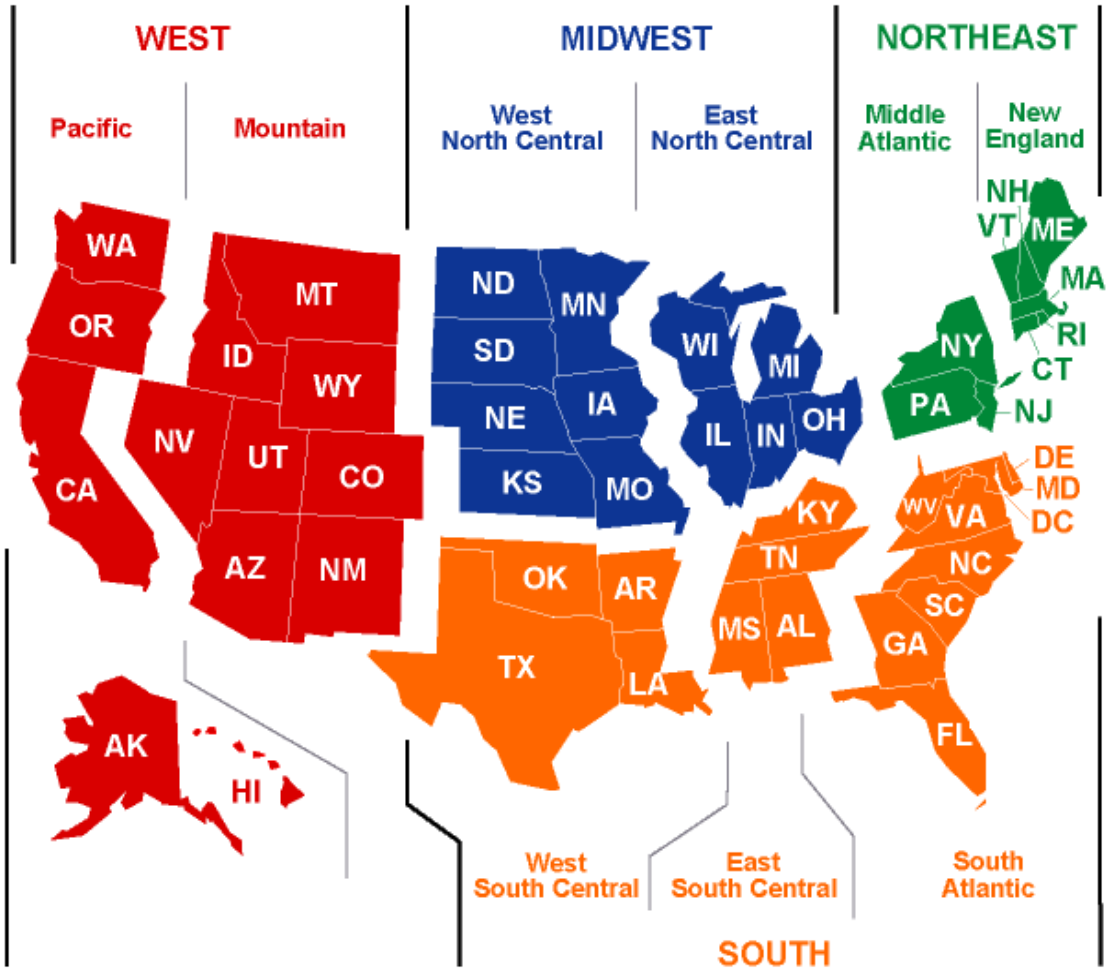
Design-build spending for nonresidential construction is anticipated to grow 17% from 2018 to 2021.

U.S. nonresidential design-build construction put in place; 2013-2021
Billions of dollars
Source(s): FMI analysis of multiple sources



The Mountain census division is anticipated to yield the highest growth rate over the 2018-2021 period.

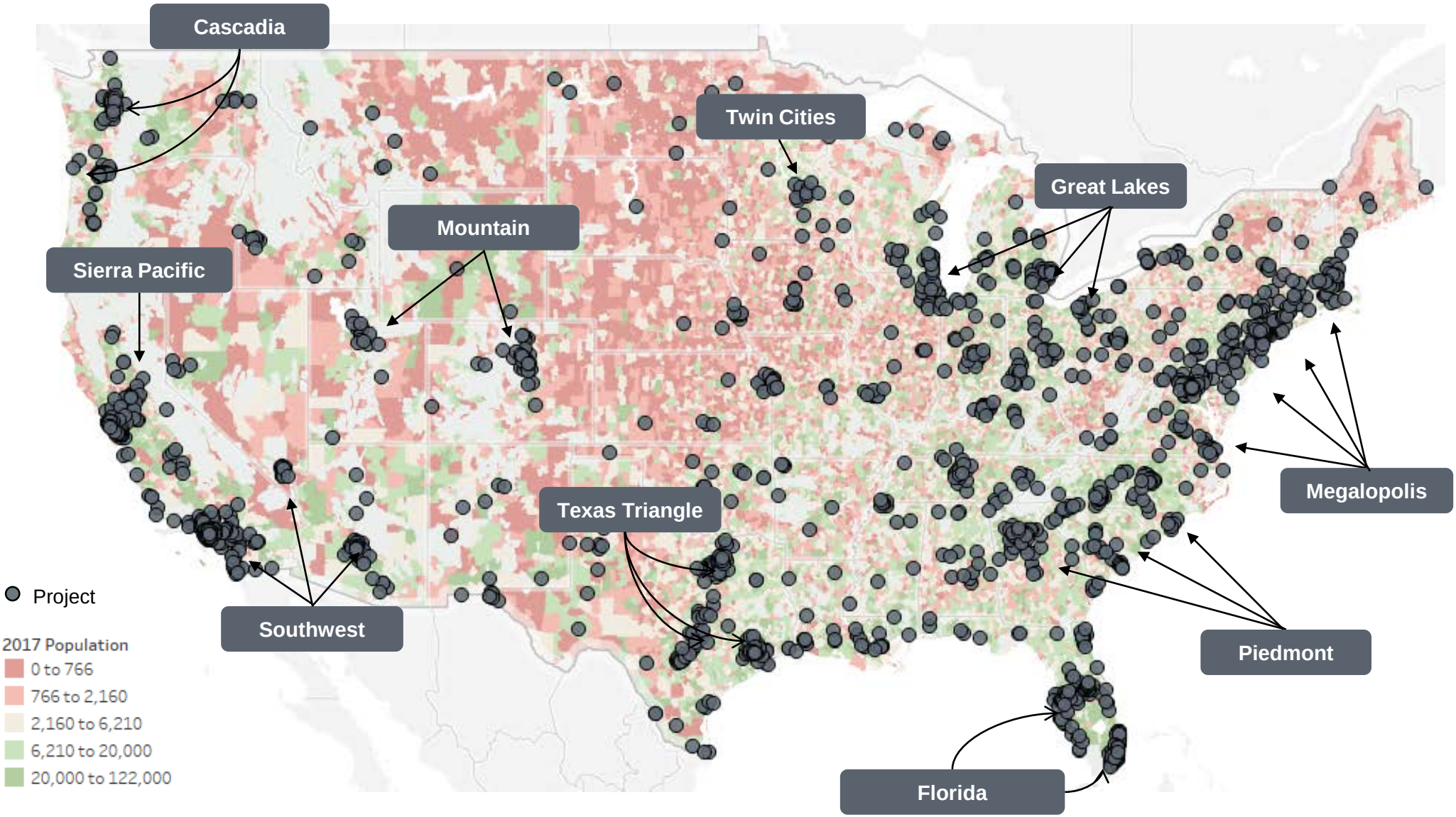
U.S. nonresidential design-build construction put in place by census division
Billions of dollars
Source(s): FMI analysis of multiple sources



	Billions of current dollars	2018e	2021f	CAGR (18-21)
WEST	Mountain	$16.8	$20.1	6.1%
	Pacific	$38.4	$45.6	5.9%
MIDWEST	East North Central	$34.1	$39.8	5.2%
	West North Central	$19.8	$22.8	4.8%
NORTHEAST	New England	$10.1	$11.6	4.7%
	Middle Atlantic	$27.9	$32.4	5.0%
SOUTH	South Atlantic	$45.9	$54.6	5.9%
	East South Central	$11.5	$13.5	5.4%
	West South Central	$23.7	$27.8	5.6%
U.S. Total		$228.2	$268.0	5.5%

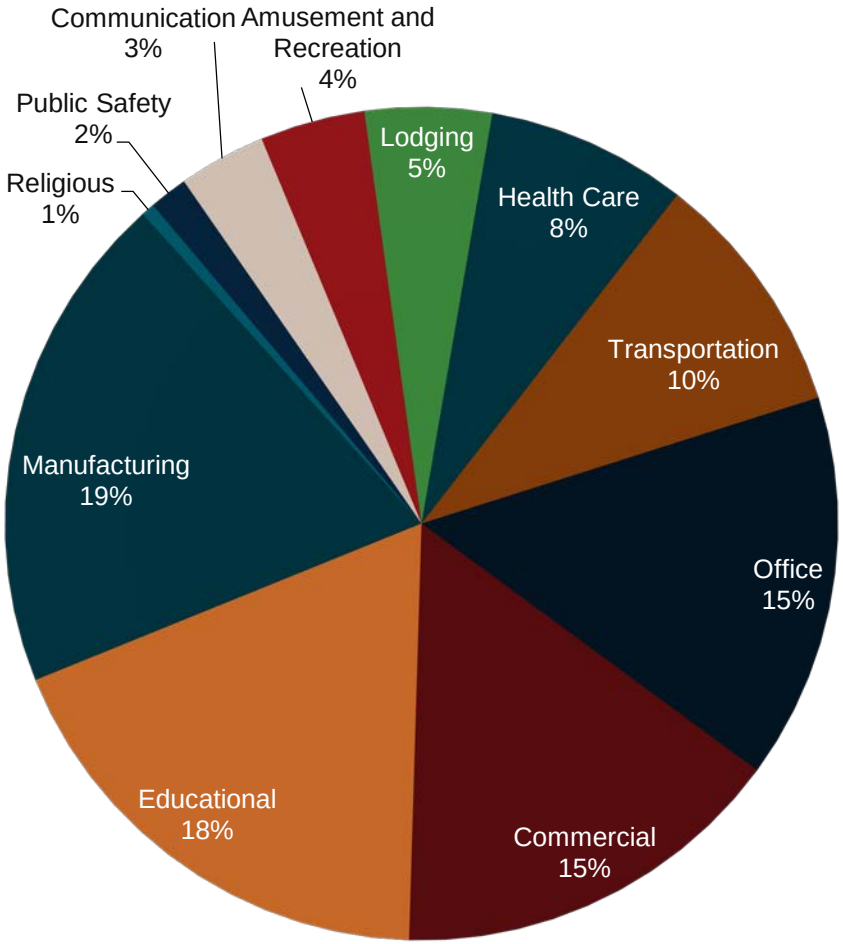
Construction activity is increasingly concentrated in a limited number of markets.

Nonresidential project locations across U.S. megapolitans
Projects completed, under construction or planned in past 12 months
Source(s): FMI analysis of multiple sources



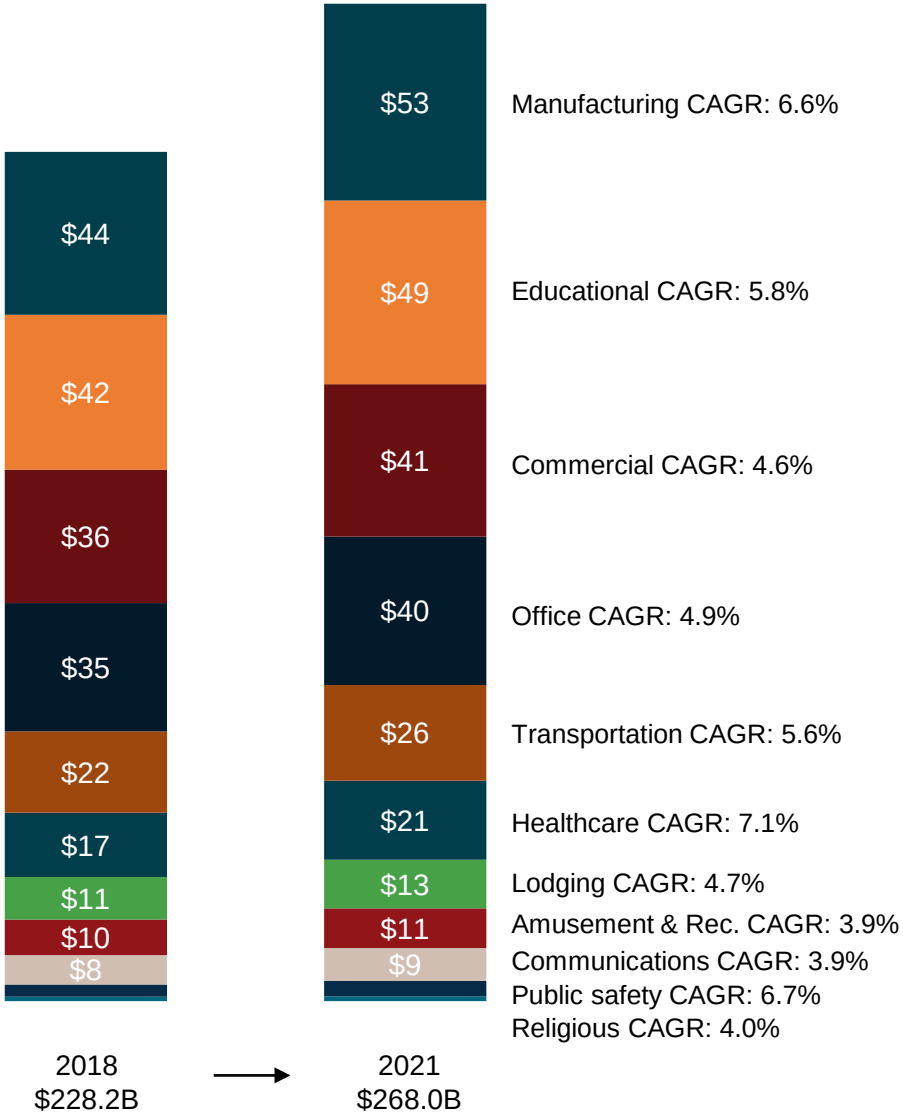
At 19%, manufacturing holds the largest share of design-build spending through 2021.

Distribution of forecast spending by segment
Combined CPiP spending, 2018-2021
Source(s): FMI analysis of multiple sources



Total spend 2018-2021: $990B

Distribution of market
CPiP spending, 2018, 2021
Source(s): FMI analysis of multiple sources



Nonresidential design-build construction spending is anticipated to account for $990 billion over the 2018-2021 forecast period.

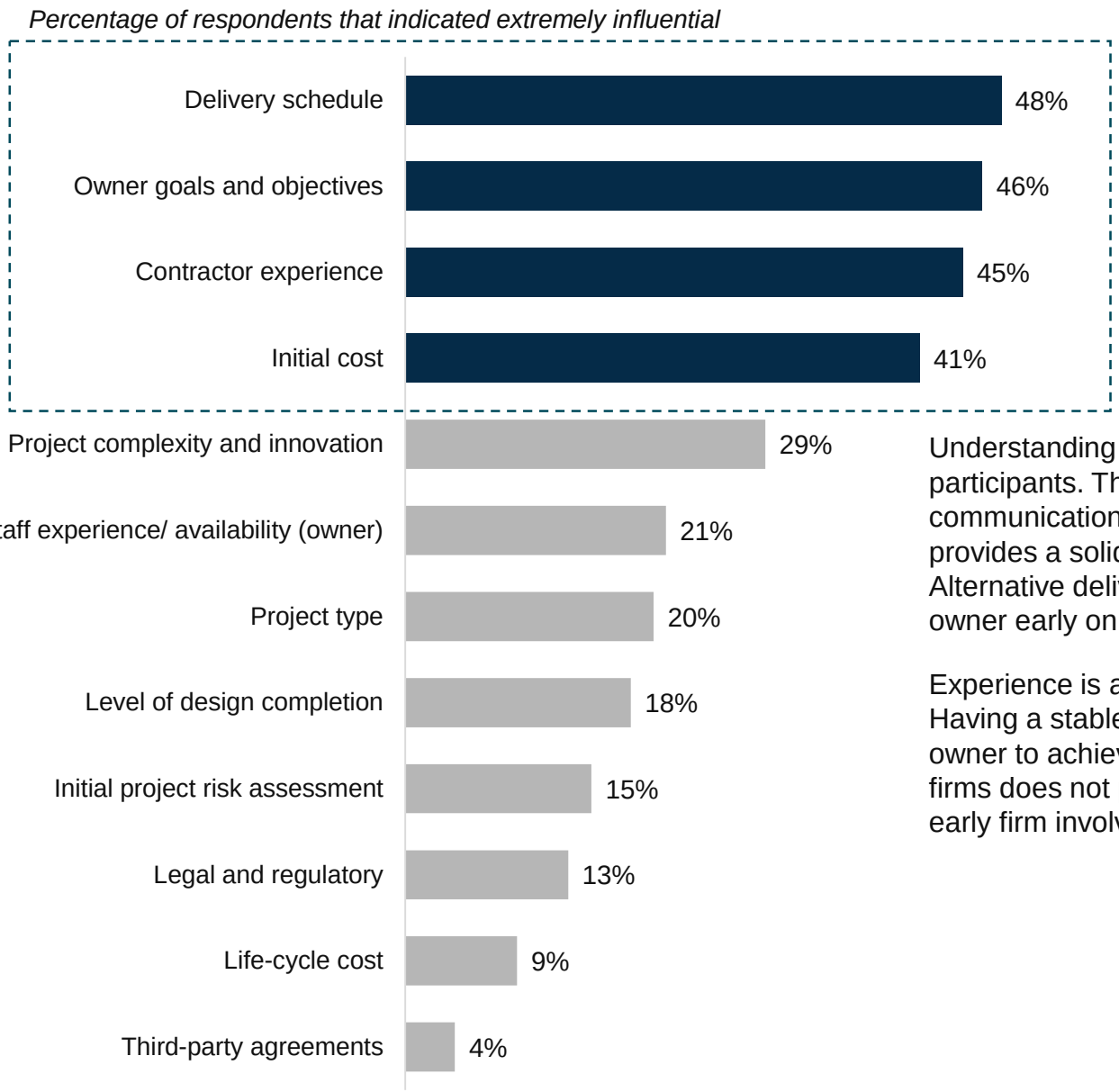
Forecast by Geography	Spend 2018-2021	CAGR 2018-2021	% of total design-build CPiP
South Atlantic	$200.5	5.9%	20.2%
Pacific	$166.9	5.9%	16.8%
ENC	$147.1	5.2%	14.8%
Mid Atlantic	$121.1	5.0%	12.2%
WSC	$103.0	5.6%	10.4%
WNC	$85.2	4.8%	8.6%
Mountain	$79.6	6.1%	7.4%
ESC	$49.7	5.4%	5.0%
New England	$43.5	4.7%	4.4%
Total	**$ 990.8**	**5.5%**	**100%**

Forecast by segment	Spend 2018-2021	CAGR 2018-2021	% of total design-build CPiP
Manufacturing	$192.9	6.6%	19.5%
Educational	$182.2	5.8%	18.4%
Commercial	$152.4	4.6%	15.4%
Office	$148.5	4.9%	15.0%
Transportation	$94.9	5.6%	9.6%
Health Care	$77.3	7.1%	7.8%
Lodging	$48.7	4.7%	4.9%
Amusement and Recreation	$40.4	3.9%	4.1%
Communication	$33.6	3.9%	3.4%
Public Safety	$14.8	6.7%	1.5%
Religious	$5.1	4.0%	0.5%
Total	**$ 990.8**	**5.5%**	**100%**

Trends and Drivers

Delivery schedule, owner goals and objectives, contractor experience and initial cost were indicated to be extremely influential in the selection of a project delivery method.

Characteristics that were indicated to be extremely influential in the selection of a project delivery method.
Questions were answered on a 1 to 5 scale (1=not influential, 5=extremely influential)
Source(s): FMI Survey



The critical nature of the project has a major impact to selection, and owner's want to ensure that a timely delivery schedule is understood and provides adequate time to successfully deliver the project.

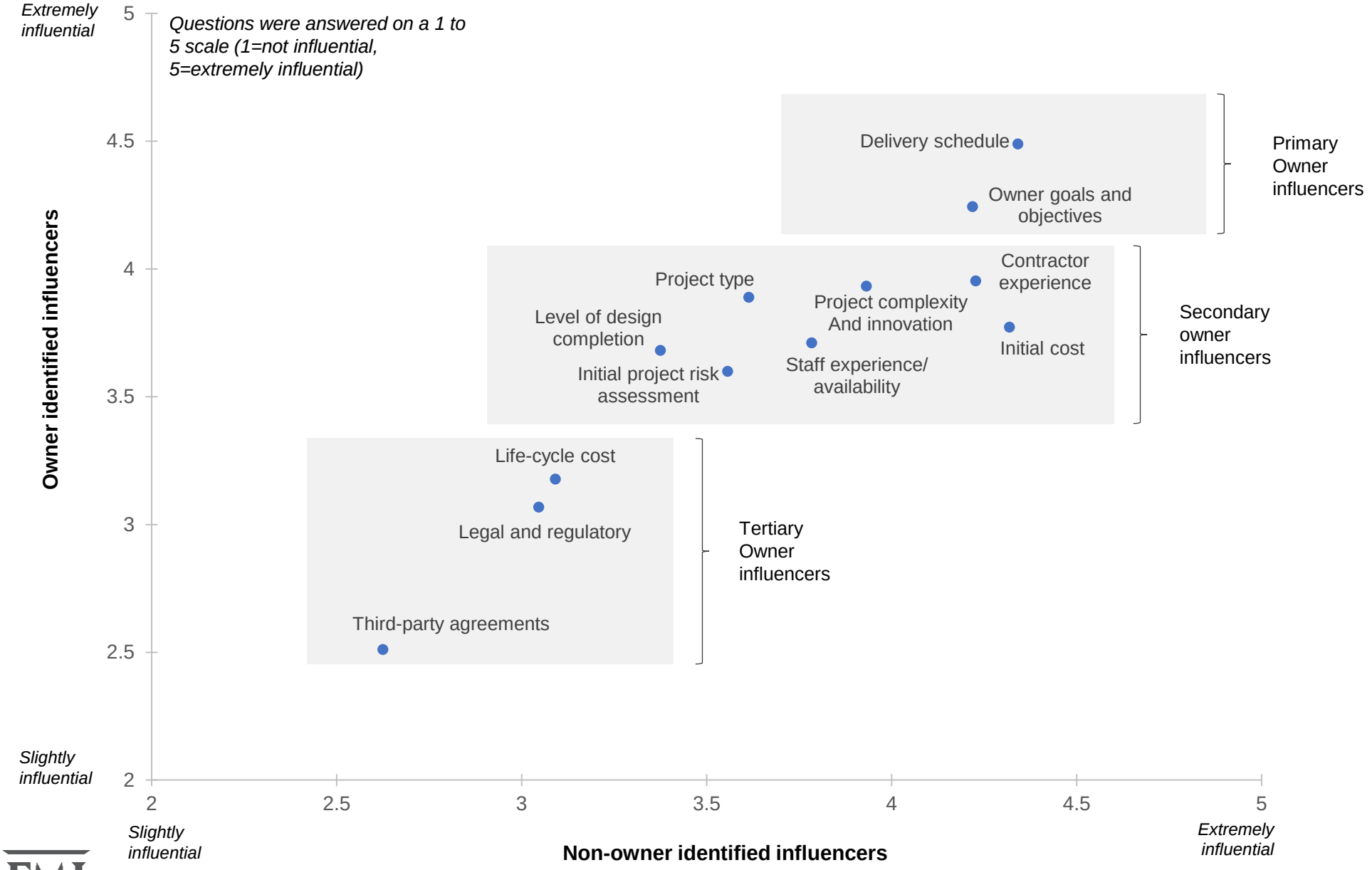
Initial cost is always a key factor in project delivery selection. The use of alternative delivery methods was indicated to provide the best avenue to achieve the originally identified cost.

Understanding the needs of owners is highly important for industry participants. The ability to get in early and develop strong communication and understanding of what the owner values provides a solid foundation for successful project delivery. Alternative delivery methods provide the ability to work with the owner early on and identify key areas of importance.

Experience is also a key factor in project delivery method selection. Having a stable of available firms to perform the work allows the owner to achieve the greatest results. A limited pool of experienced firms does not provide the owner with the added advantages of early firm involvement.

Delivery schedule was the most influencing factor for owners when selecting a project delivery method.

Project delivery method influencing characteristics
Weighted average of responses
Source(s): FMI Survey



The majority of project delivery methods are selected during project programming.

When does your organization typically make its project delivery method decision?
Source(s): FMI Survey

Project development
13% of selections

- During this phase few decisions are made regarding which project delivery method will be used.
- Typically during this phase owners define the projects goals and objectives. In addition, owners will identify potential constraints/issues associated with the project. This process allows owners to review the project delivery methods available for their specific project type.

Project programming
74% of selections

- During this phase the majority of project delivery methods are selected.
- Owners can conduct a thorough assessment of the risks associated with the project and the resulting advantages/disadvantages of each project delivery method.
- The challenge is that a minority of owners have a formal risk management process, and most do not demonstrate a strong commitment to conducting a formal risk assessment. This is often due to the complexity of conducting a formal risk assessment.

End of final design
3% of selections

- Owners do not typically select a project delivery method at the end of final design. If they are aiming to utilize an alternative delivery method they will involve other stakeholders earlier in the process.

Other
12% of selections

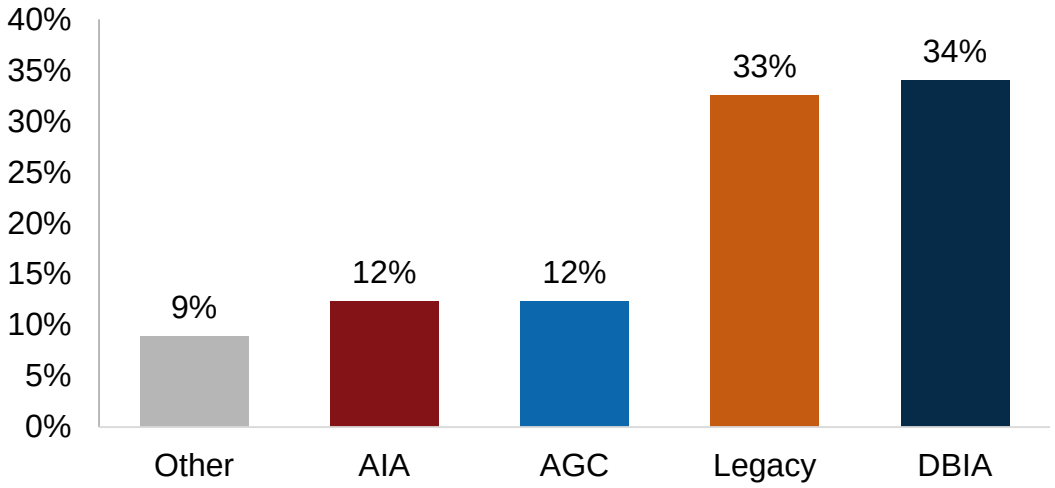
- Depending on the needs and circumstances an owner faces, project delivery method selection may take place outside of the above mentioned times.

Familiarity with design-build is increasing as owners have become more knowledgeable on the process.

Design-build education process

- The education process for design-build has continued to expand. However, the lack in owner knowledge and understanding of the design-build process is a limiting factor for greater utilization.
- Once owners get a full understanding of the process and benefits associated with design-build they are more likely to continue to employ it as a preferred delivery method.
- DBIA is recognized as pushing the industry and increasing overall awareness of the process. It was stated that in the past five years there has been significant improvement in the push towards greater design-build utilization.

  "DBIA has done a good job at getting all stakeholders involved for the industry."
- Although DBIA is pushing the industry in the right direction, one-third of respondents identified DBIA as the source for project delivery methods and one-third of respondents rely on legacy information.



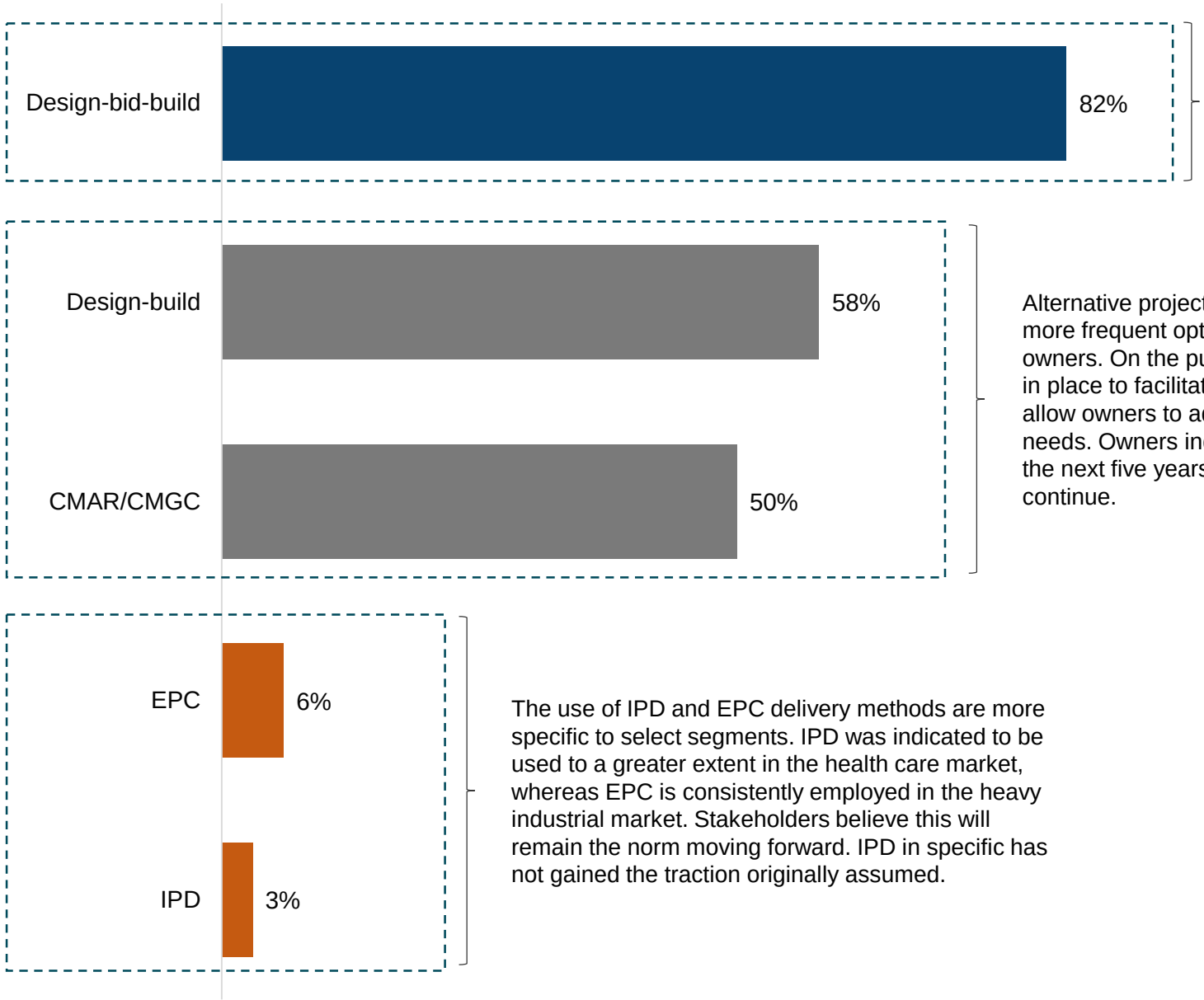
Market commentary

- *"It seems that some of the user community has design-bid-build engrained in their delivery method selection."*
- *"We are seeing design-build used more frequently across public projects. It is nice to see this flexibility."*
- *"There are challenges with having owners that are in the education process. They need to learn to trust the process."*
- *"We don't see a lot of the small municipalities taking advantage of design-build, but they might not be the best fit for that delivery method."*
- *"Once you have lived through the low bid environment, it is not hard to see the benefits of design-build."*
- *"Firms that are arguing for design-bid-build are the ones that don't understand the process and the benefits of other methods."*
- *"Design-build is not for everyone. If there is an owner that doesn't understand it they should think twice before using it."*
- *"Design-build is a great tool to use. I don't think the construction community at large understands it or realizes how often it is used."*

FMI

Over half of owners indicated using or anticipate using design-build in the next five years.

Which of the following project delivery methods has your organization used, or anticipates using in the next five years?
Owner respondents
Source(s): FMI Survey



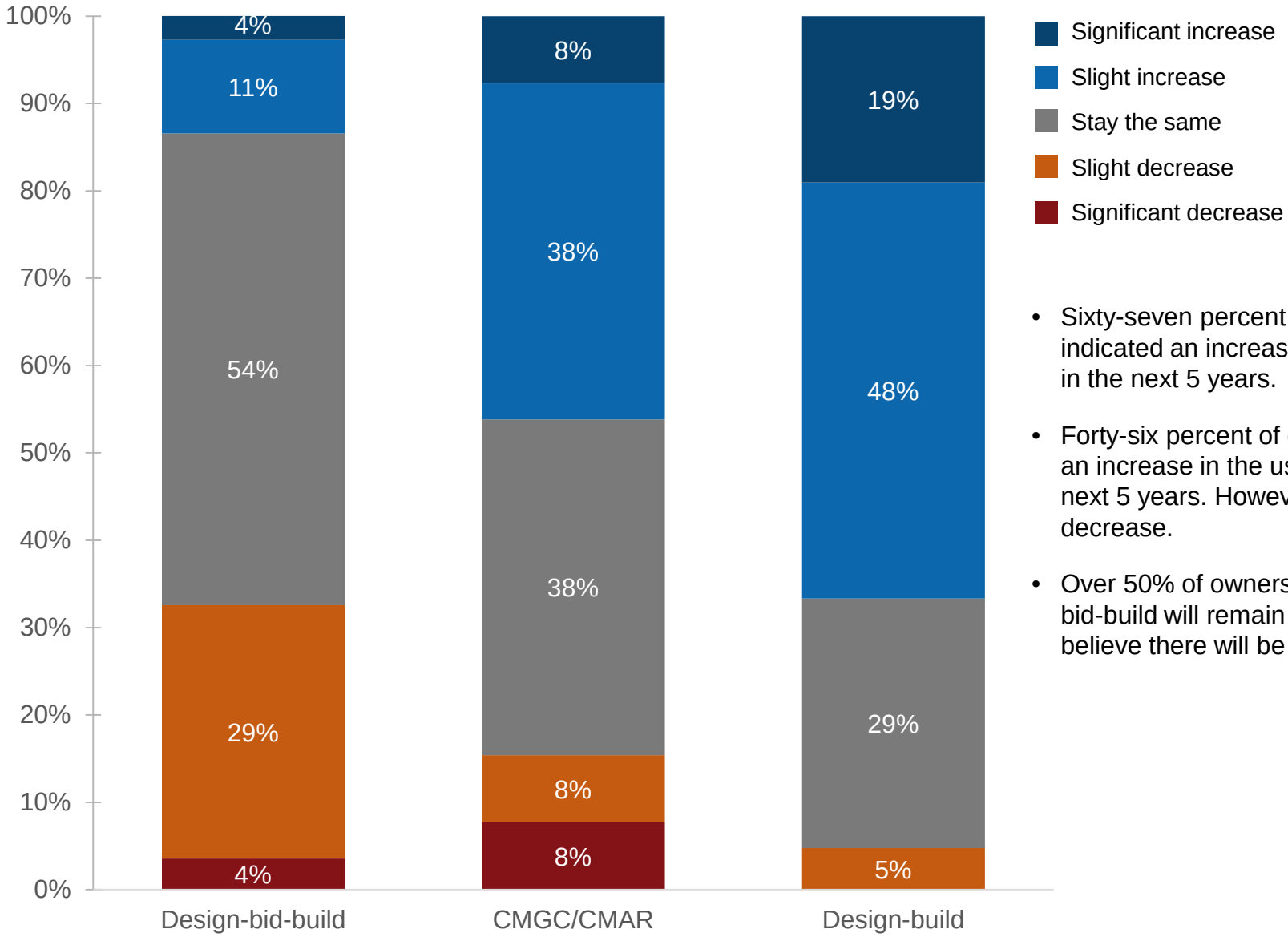
Owner's have traditionally employed design-bid-build as the project delivery method of choice. As owner needs and project demands have changed, owners have become increasingly likely to employ an alternative delivery method.

Alternative project delivery methods have become a more frequent option for both public and private owners. On the public side, legislation has been put in place to facilitate increased use. These methods allow owners to address specific project/program needs. Owners indicated that moving forward over the next five years their use of these methods will continue.

The use of IPD and EPC delivery methods are more specific to select segments. IPD was indicated to be used to a greater extent in the health care market, whereas EPC is consistently employed in the heavy industrial market. Stakeholders believe this will remain the norm moving forward. IPD in specific has not gained the traction originally assumed.

The majority of owners indicated design-build utilization will increase in the next 5 years.

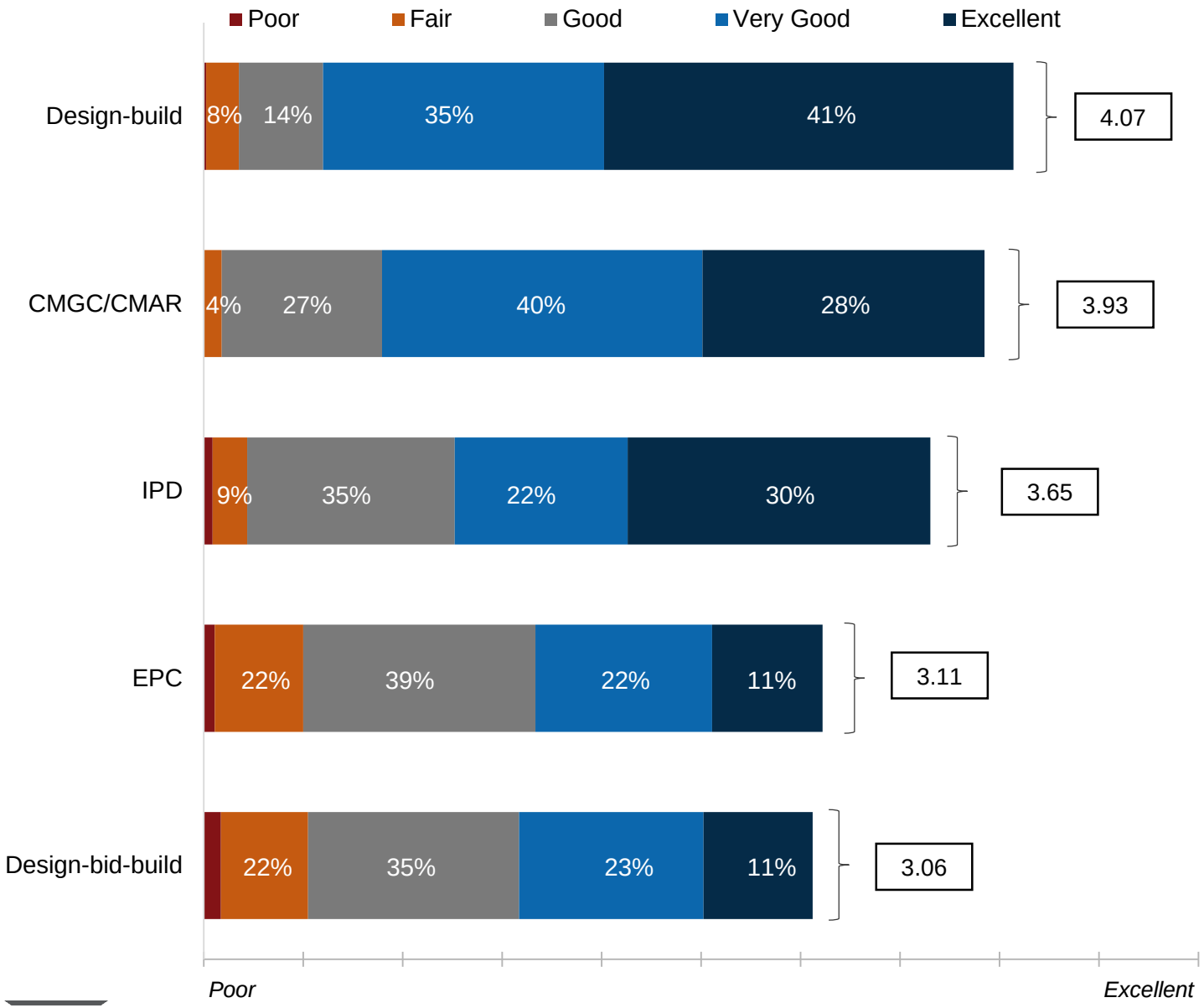
From an industry perspective, how will the use of the following delivery methods change in the next 5 years?
Owner respondents; (1=significant decrease, 5=significant increase)
Source(s): FMI Survey



- Sixty-seven percent of owner respondents indicated an increase in the use of design-build in the next 5 years.
- Forty-six percent of owner respondents indicated an increase in the use of CMGC/CMAR in the next 5 years. However, 16% of owners see a decrease.
- Over 50% of owners believe the use of design-bid-build will remain the same. However, 32% believe there will be a decrease in use.

Experience with design-build was rated highest across all project delivery methods.

Experience with various delivery methods
Weighted average of responses; (1=poor, 5=excellent)
Source(s): FMI Survey

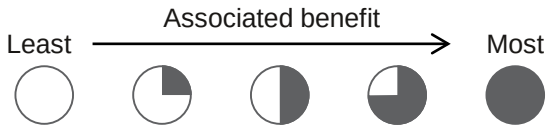


Market commentary:

- *"We've found the use of design-build to be a good experience. It reduces our risk and the issues can be defined to the design-build team."*
- *"CMAR seems to be less challenging from a legislative point of view. It doesn't have the requirements that design-build does."*
- *"In the Northeast CMAR is the dominant delivery method. Every once in a while we will have a design-build project come along."*
- *"CMAR is beneficial when we want to have more oversight of the project. We can reach out directly to the architect."*
- *"IPD doesn't seem to have picked up or caught on outside of a few healthcare projects."*

Opportunities to innovate and the ability to fast track a project were identified as top benefits associated with design-build.

Which project delivery method do you most associate the following benefits with?
Source(s): FMI Survey



	More collaborative process for the owner	Fewer disputes	Final cost closest to budget	Greater project/ design control	Highest quality	Least project risk (for the owner)	More opportunities to innovate	More predictable/ manageable schedule	Most qualified service providers	Shorter procurement period	Ability to achieve design excellence	Early knowledge of cost	Ability to fast track project
Design-bid-build	○	○	◔	◕	○	◔	○	◑	◔	◔	◔	◔	○
Design-build	◕	◑	◕	◔	◕	◕	●	◕	◕	◕	◑	◕	●
CMGC/CMAR	◑	◔	◑	◑	◑	◕	◑	◕	●	◑	◑	◑	◑
Other (EPC, IPD)	◑	◔	◔	◔	◑	◑	◕	◑	◕	◑	◑	◑	◔
***Progressive Design-build**	◕	◑	◕	◑	◕	◕	●	◕	●	◕	◑	◕	●

**Progressive Design-build: Analysis of benefits associated with progressive design-build were collected through stakeholder interviews. Its benefits were indicated to include the best attributes from design-build and CMAR.*

Progressive design-build is steadily growing in use.

Progressive design-build

- The progressive design-build process was seen favorably by stakeholders due to its qualifications-based selection process.
- Selection for progressive design-build is driven by contractor qualifications and fee. The limited design component during selection was indicated to significantly reduce the cost of pursuit.
  - Although limiting design during the pursuit phase reduces cost for pursuing teams, it also leaves the owner with less certainty around design. To address this, some owners have employed a hybrid approach that incorporates a preliminary design component in the selection process.
- Once a team is selected for the project the design component is pushed forward. The design-build team meets with the owner after they are selected and begins the design process. This was indicated to facilitate greater involvement from all parties involved on the project.
- Although progressive design-build is growing in use, there is limited legislation addressing the selection of design-build teams strictly on qualifications.

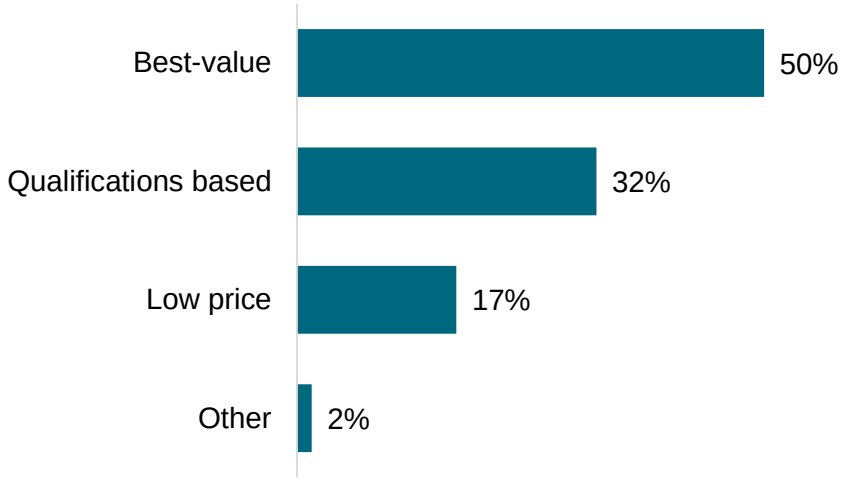
Traditional design-build

- Compared to progressive design-build, design-build was indicated to be more cost intense for pursuing teams due to the design component.
- However, the selection of a design-build team was indicated to be on a best value or qualifications basis over 80% of the time.
- Various agencies provide a stipend to teams not selected on a design-build pursuit. The stipend aims to alleviate the cost burden of pursuit for teams that are not successful.

Market commentary

- *"We've seen more projects using the collaborative design-build model."*
- *"During the design phase on a progressive design-build project you are not designing in a vacuum. You are designing with the owner at the table."*
- *"We've seen a couple different ways that the contract process is done. One was a qualification based selection, one was purely negotiated, and others have been a mix."*
- *"It is difficult to justify picking a team in a fair competitive way when you are dealing with public money."*
- *"Progressive design-build is the natural next step for owners using CM/GC."*
- *"We see more and more owners trying to wrap their heads around progressive design-build. Water/wastewater owners are a little further down the road on this."*

Design-build selection process

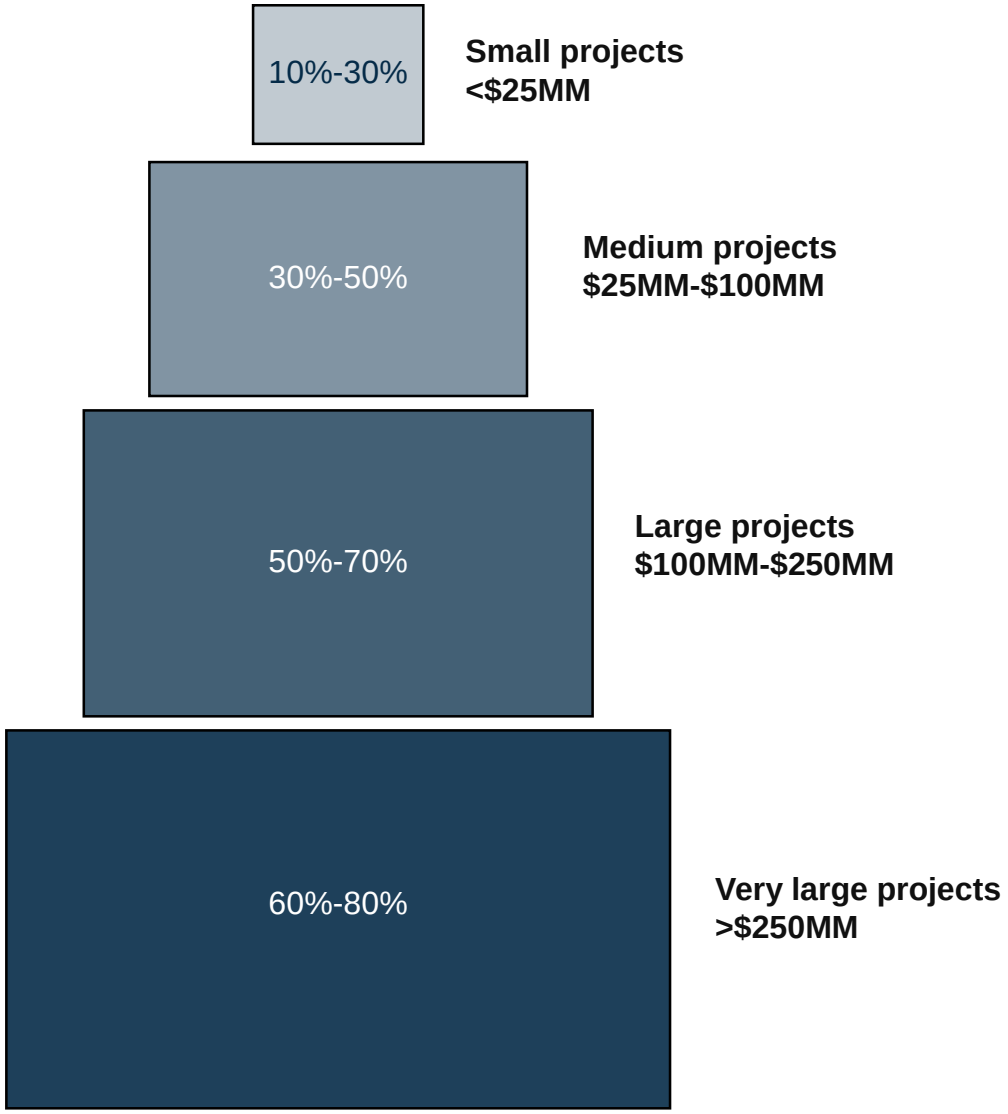


Progressive design-build is particularly interesting to us. We see this as a continued trend moving forward.”

-Public Owner

Design-build utilization continues to expand into project sizes <$25 million as owners continue to gain exposure to benefits of design-build.

Likelihood of projects utilizing design-build by project size
Source(s): FMI analysis of multiple sources



"Historically, design-build has been used on large projects. Recently, we have seen a growing use of design-build on smaller projects. "

"When we have a multimillion-dollar project we look towards design-build. Generally, we believe that we get a better value for the investment with design-build."

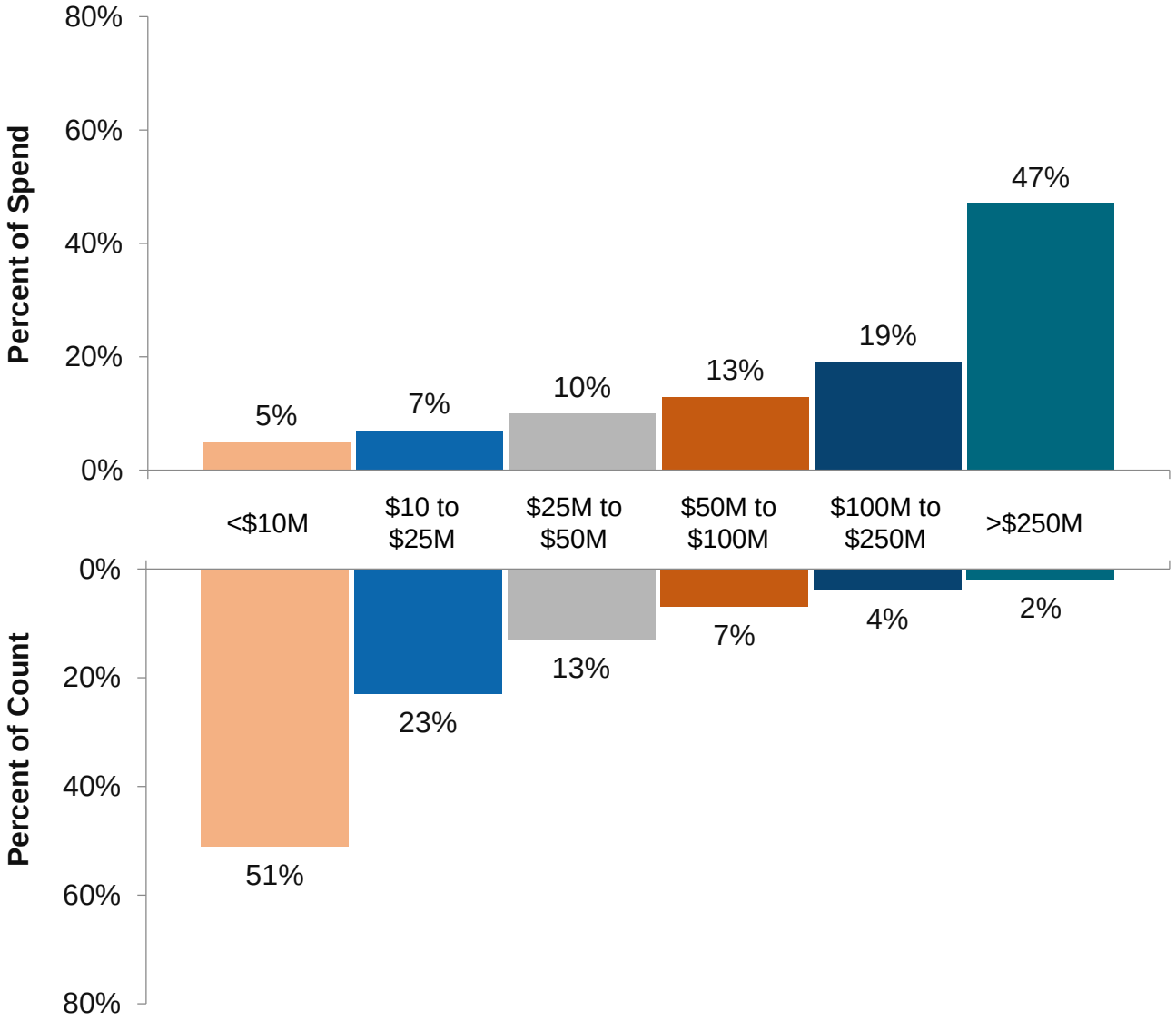
"We will continue to see bigger projects going design-build."

A significant percentage of project spending aligns well with project size characteristics suited for design-build.

Distribution of nonresidential projects by count and spend

Projects completed, under construction or planned in past 12 months; not representative of yearly spending

Source: FMI Analysis of multiple sources



- Forty-nine percent of project spending is on projects >$250M, where design-build was identified to have a 60%-80% of being employed. However, this only represents 2% of project count.

  "A lot of times projects under $10 million don't have the complexity or rigorous time commitment that would drive them towards design-build."

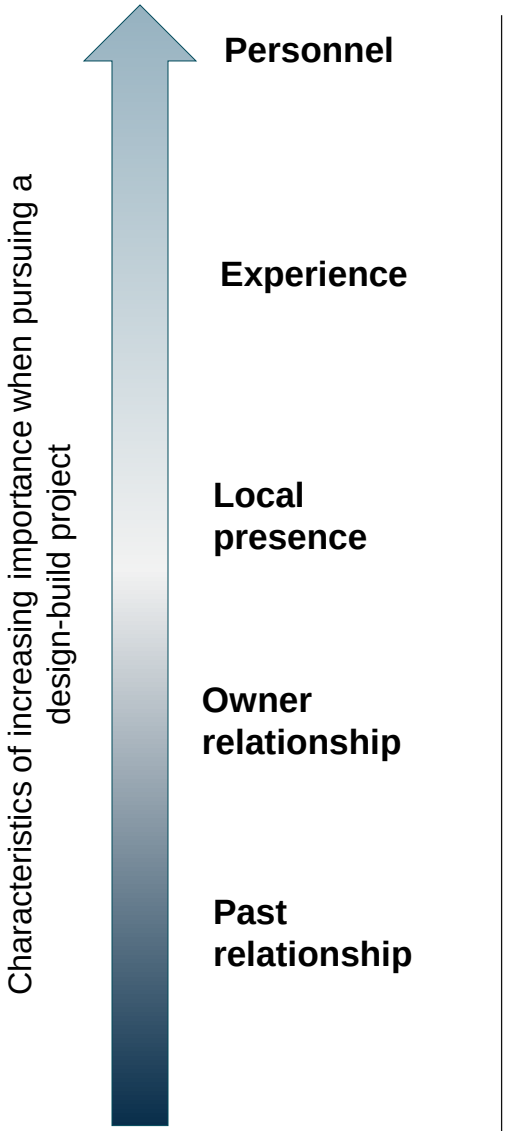
- Other delivery methods (e.g., CMAR) are more common due to a consistent use on projects <$50 million.

- These projects represent a significant percentage of project count which can create a perception that these delivery methods represent a greater percentage of the market.

  "CMAR seems to be used most by volume of projects. Design-build is a more complex delivery method and some owners are not comfortable with it."

Five factors were identified as being important when assessing a design-build project pursuit.

Design-build project pursuit factors
Source(s): FMI analysis of multiple sources



Personnel

- Continuously stated by design-build market participants was the importance of key individuals involved on the project pursuit. One of the greatest challenges was said to be the availability of the right team with the needed capabilities and experience to align most successfully with the owner's needs.

Experience

- Proven past experience successfully delivering design-build projects and the ability of the team to bring their collective knowledge to the current project was indicated as a vital component in selecting a potential partner.

Local presence

- Depending on the political environment of the agency and community, local presence can play a significant contributing factor to successful project pursuits. Establishing local offices that are strategically aligned with community stakeholders and invested in educating the public on the benefits of the project are important factors in partner selection.

Owner relationship

- Extensive experience and a strong relationship with a particular owner can provide tremendous value. Having an understanding of the owner’s knowledge and sophistication of the design-build process will assist in shaping the project approach.

Past relationship

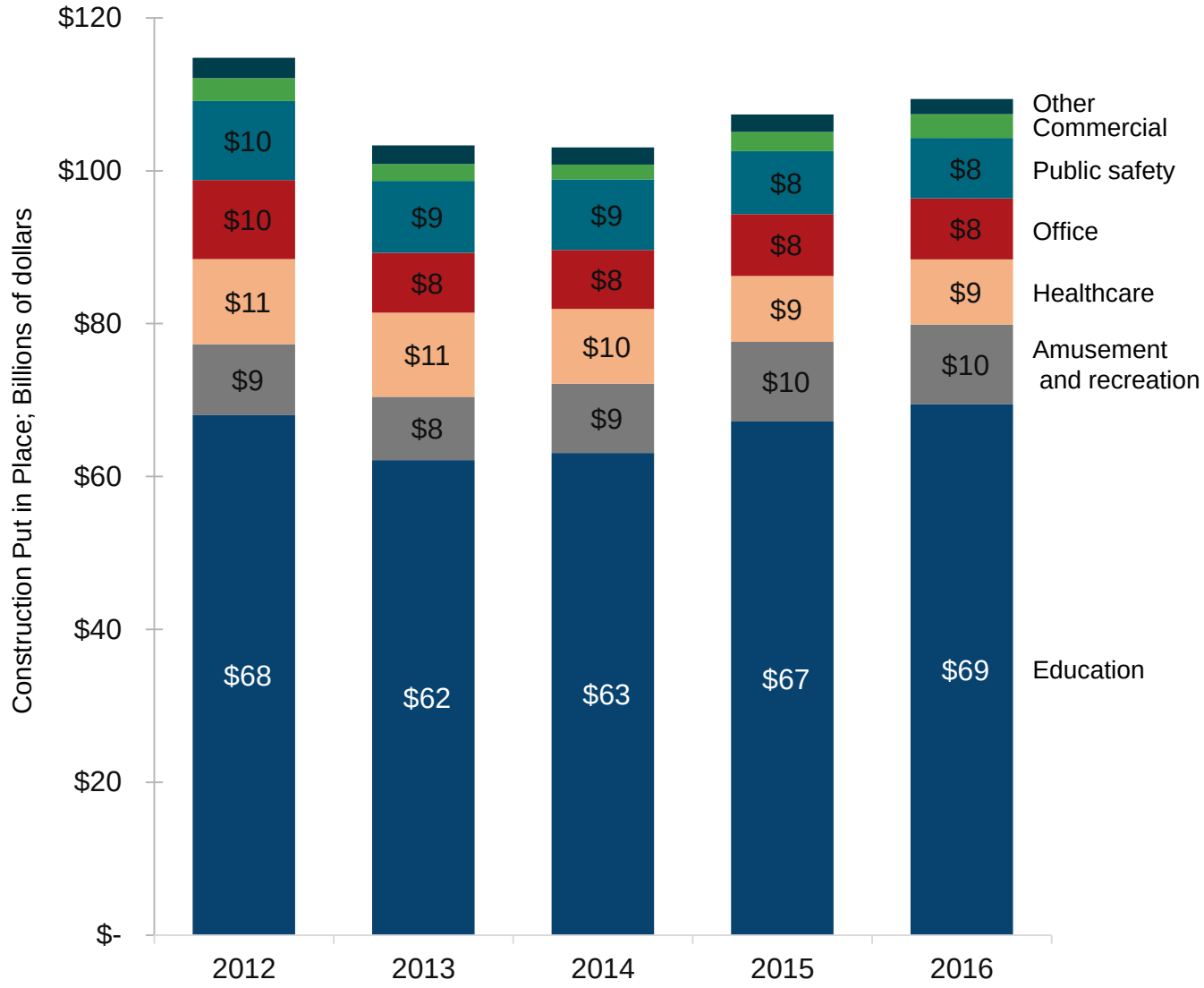
- Participants prefer to team with partners they have a high level of comfort with and feel there is a symbiotic relationship that offers complimentary skills. It is increasingly important for owners to know there has been a successful relationship between team members and not necessarily on design-build projects.

Despite limited construction growth, the nonresidential public construction market continues to increase its utilization of design-build.

Historical public construction spending

Billions of dollars

Source(s): FMI analysis of multiple sources



- Public projects were indicated to be increasing utilization of design-build. The education market in particular is experience greater utilization of design-build.

  "Recently, we've been involved on more large public institutional projects utilizing design-build."

- In the federal market, utilization of design-build allows agencies to capture dollars in the current year rather than needing to wait a full budget year to receive funding for a project.

  "On the federal side, we have seen a significant trend in the shift toward design-build."

  "NAVFAC and the Army Corp are the two largest DOD builders that utilize design-build."

Highway/Street and Water/Wastewater Market

Market Sizing

Construction spending in highway/street and water/wastewater is anticipated to grow at an annual growth of 4% over the forecast period.

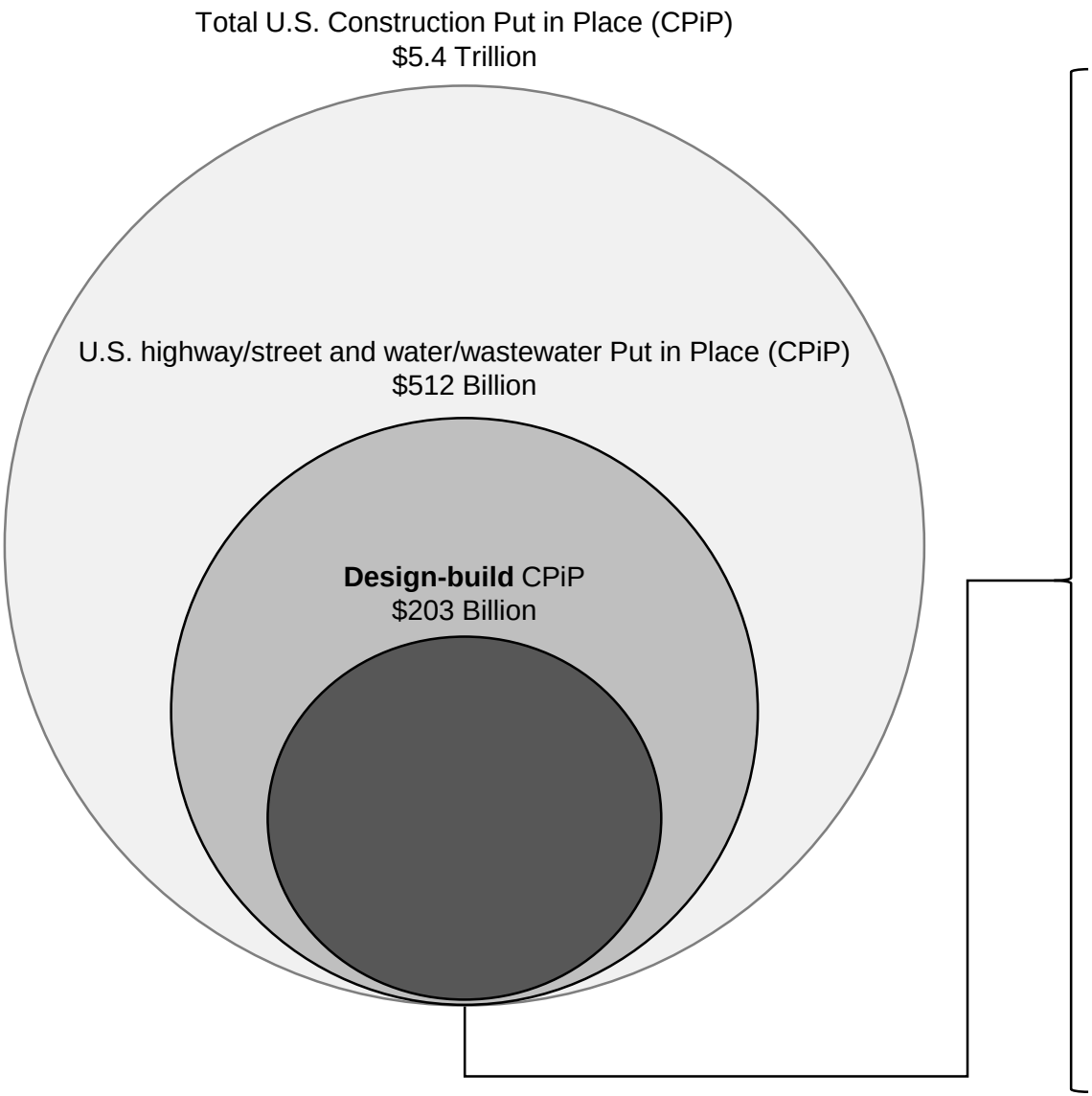
Total U.S. highway/street and water/wastewater construction put in place

Billions of dollars

Source(s): FMI

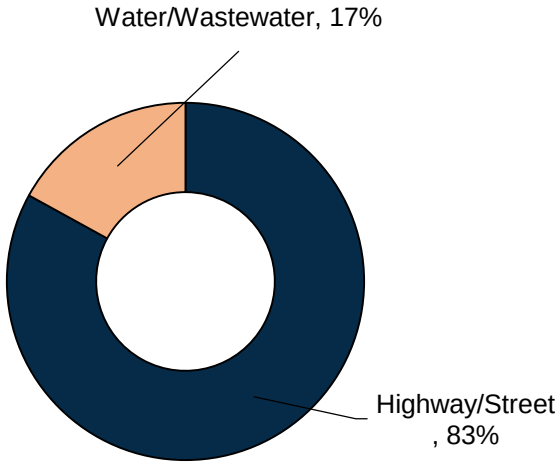
Design-build construction spending in the highway/street segment will account for the majority of spending over the forecast period.

Market size comparison
Total combined spend, Rollup, 2018-2021 US$
Source(s): FMI analysis of multiple sources

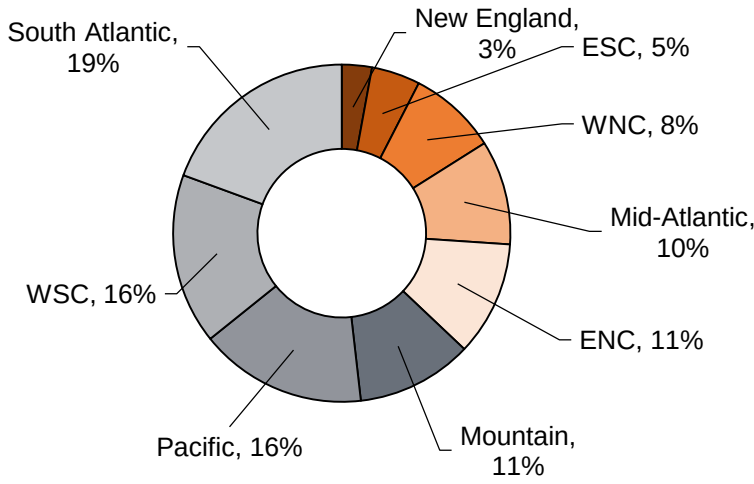


Distribution of market
CPiP spending, 2018-2021
Source(s): FMI analysis of multiple sources

Segment breakout



Market breakout

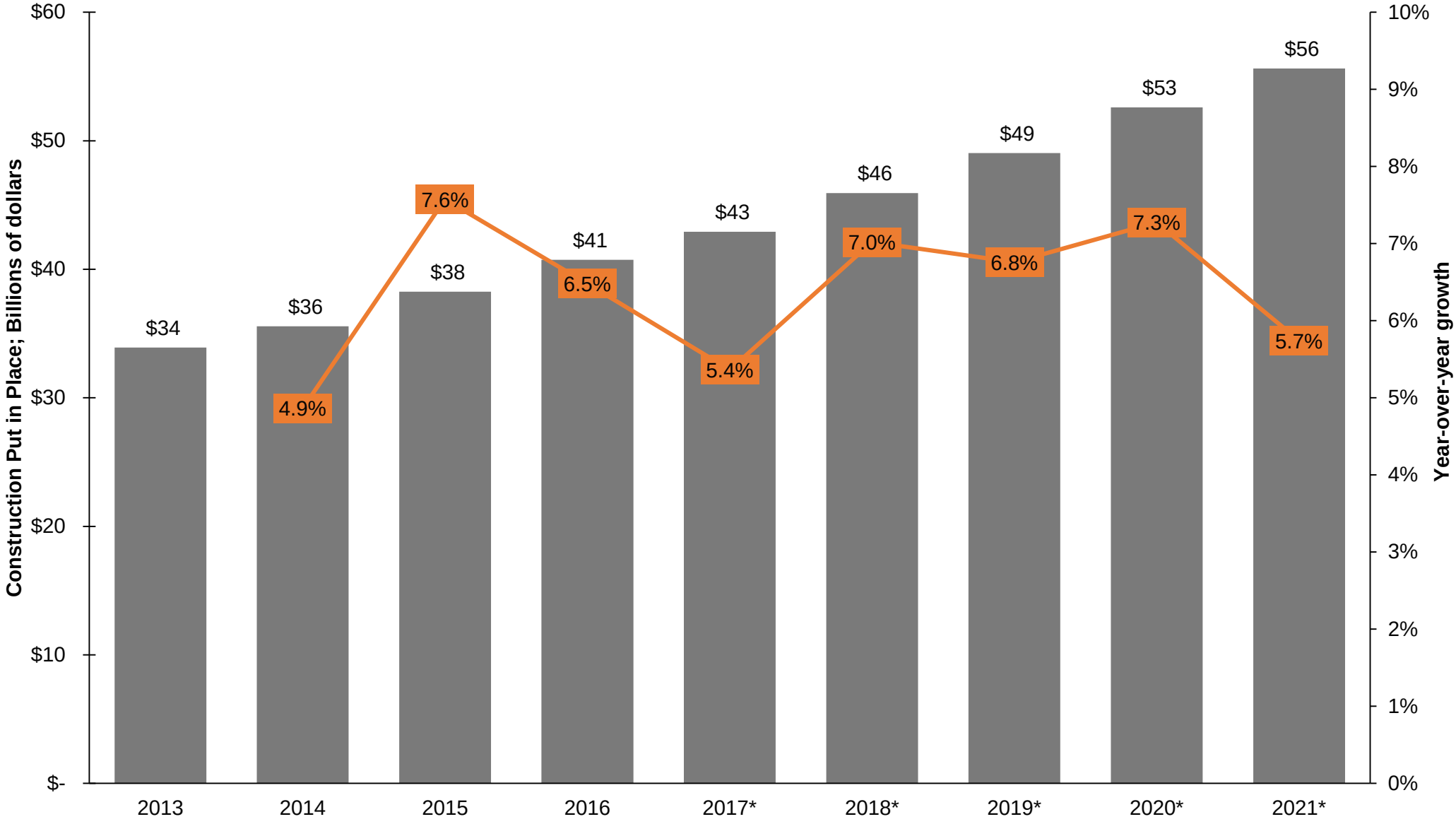


Design-build spending in highway/street and water/wastewater is anticipated to grow 21% from 2018 to 2021.

Design-build highway/street and water/wastewater construction put in place

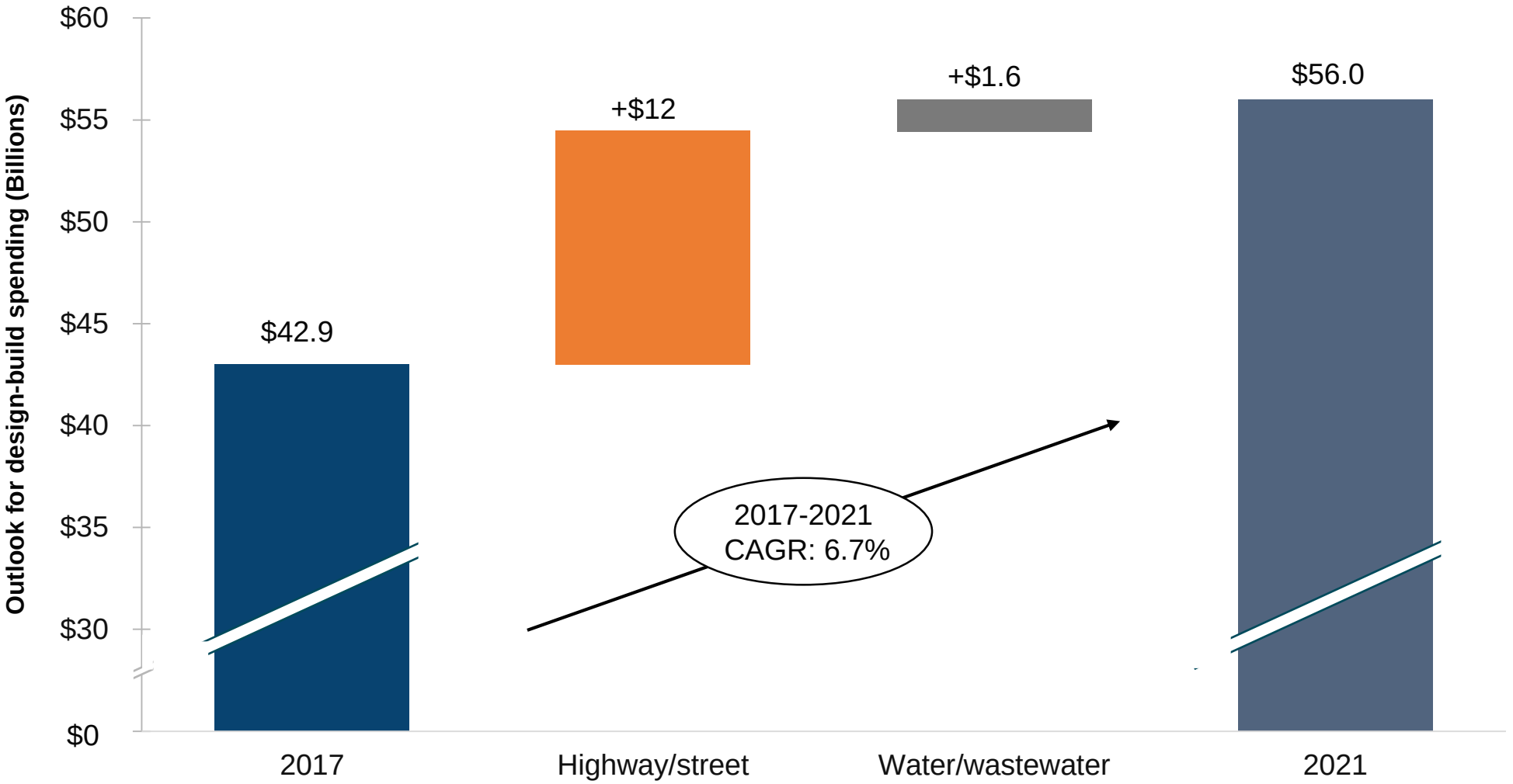
Billions of dollars

Source(s): FMI analysis of multiple sources



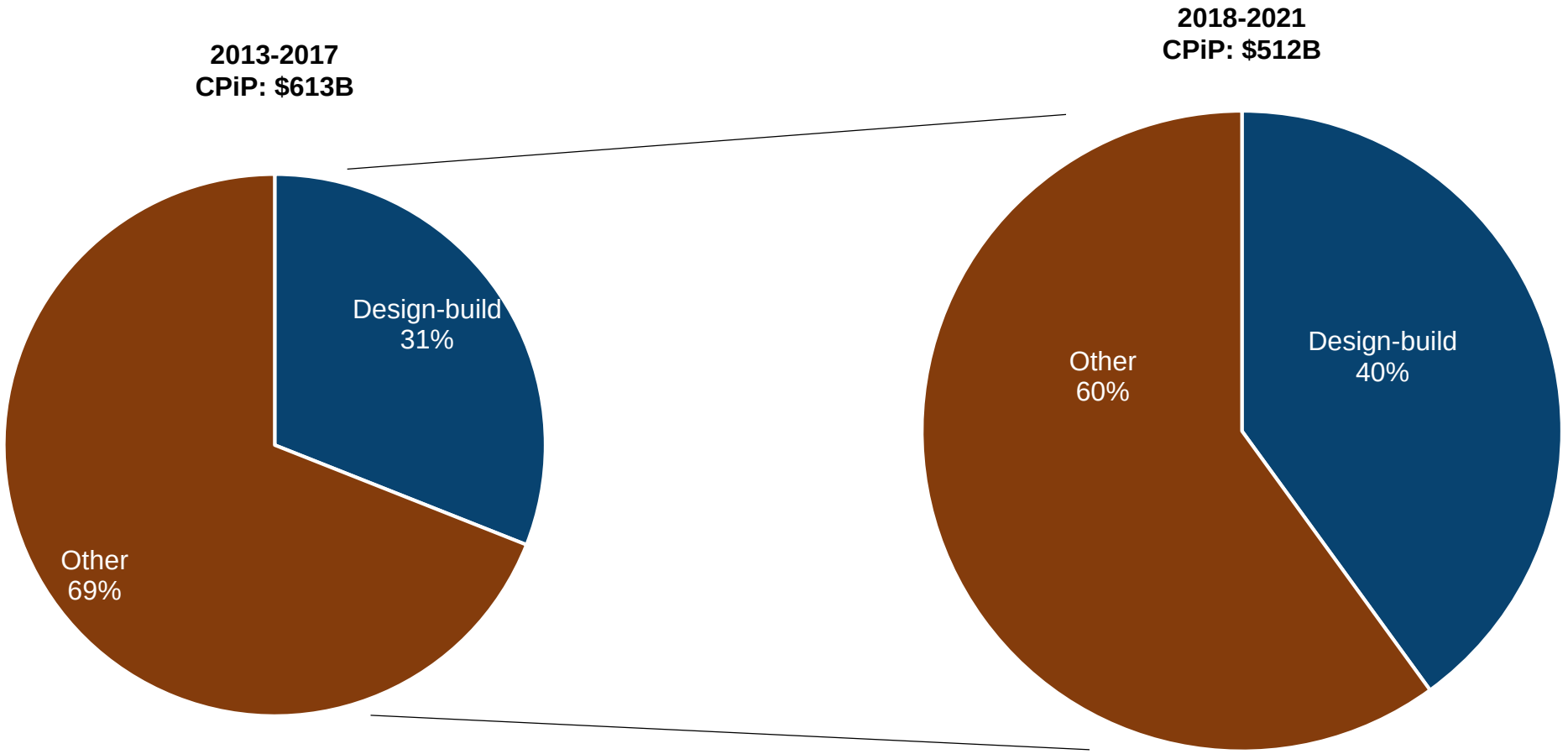
Design-build is anticipated to yield a compound annual growth rate (CAGR) of 6.7% over the 2017 to 2021 period.

Distribution of spending over forecast period
Billions of dollars
Source(s): FMI analysis of multiple sources



Design-build continues to gain share as a delivery method of choice in the highway/street and water/wastewater segments.

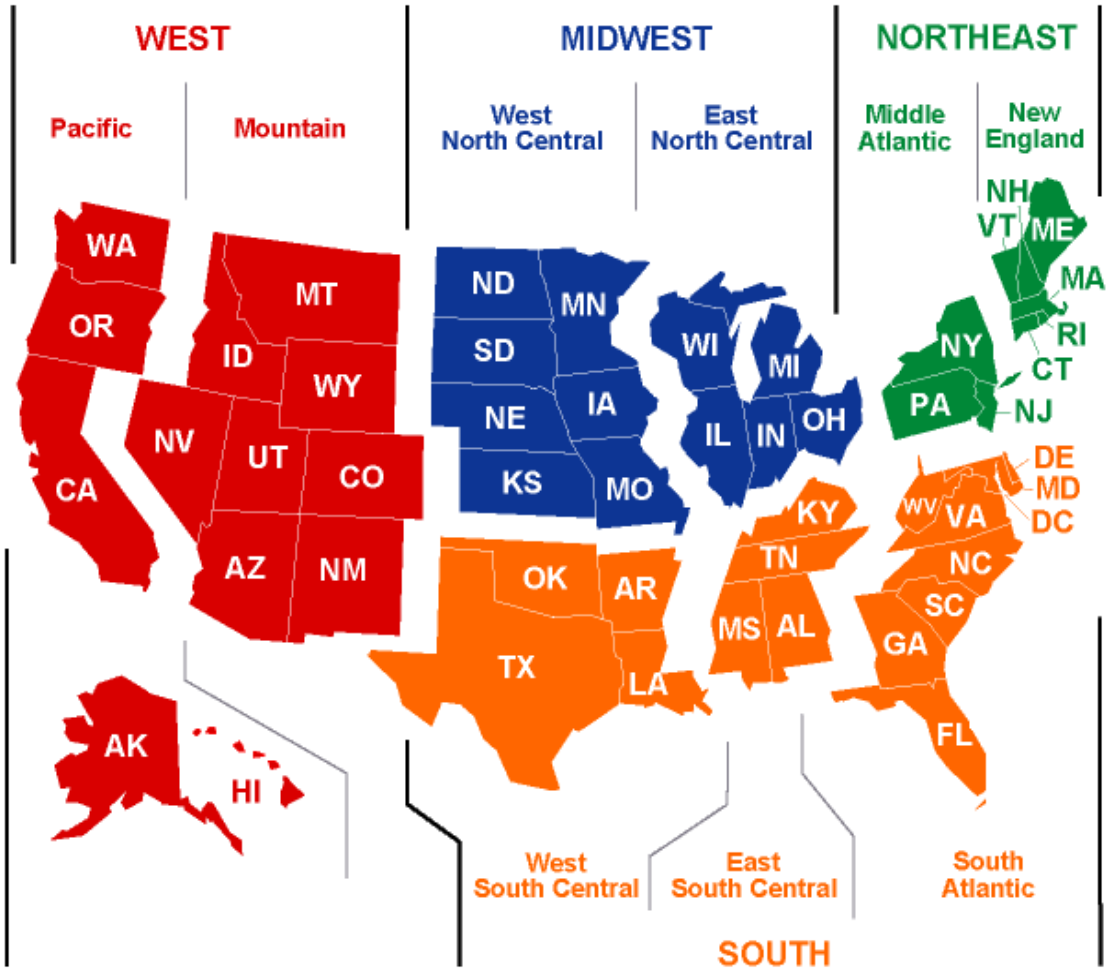
Design-build as a percentage of total highway/street and water/wastewater construction spending
Billions of dollars
Source(s): FMI analysis of multiple sources



*Other includes CMGC/CMAR, design-bid-build
**Please see appendix for specific segment breakout

The South Atlantic census division is anticipated to yield the highest growth rate over the 2018-2021 period.

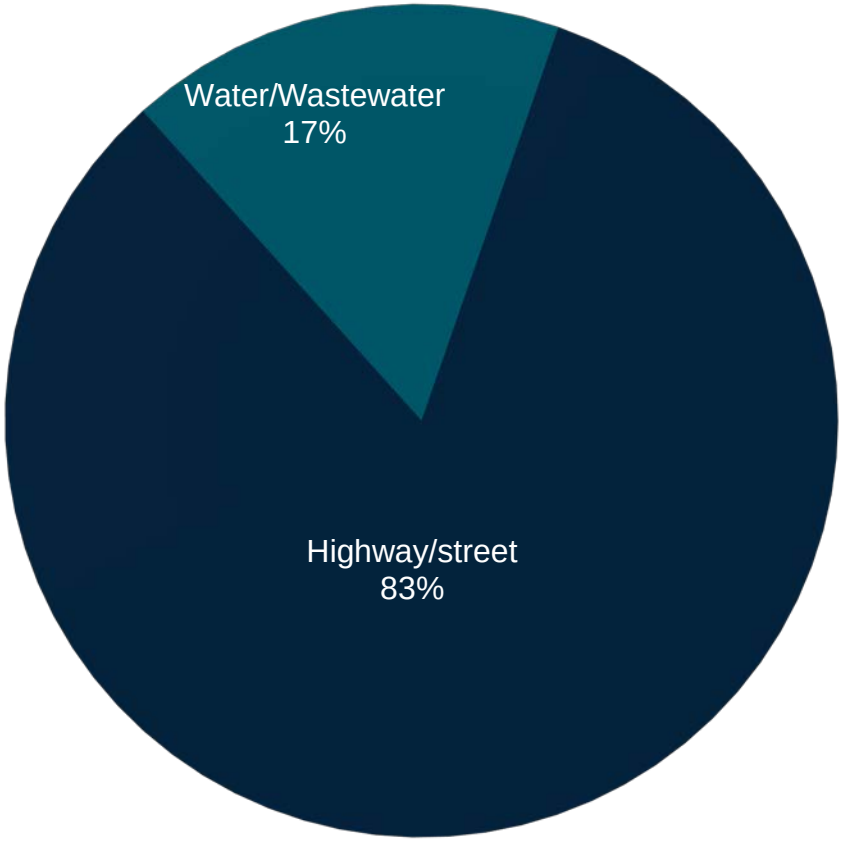
U.S. highway/street and water/wastewater design-build construction put in place by census division
Billions of dollars
Source(s): FMI analysis of multiple sources



	Billions of current dollars	2018e	2021f	CAGR (18-21)
WEST	Mountain	$5.19	$6.29	6.6%
	Pacific	$7.31	$8.98	7.1%
MIDWEST	East North Central	$4.97	$6.13	7.2%
	West North Central	$3.92	$4.77	6.7%
NORTHEAST	New England	$1.34	$1.59	5.9%
	Middle Atlantic	$4.74	$5.43	4.6%
SOUTH	South Atlantic	$8.78	$10.99	7.8%
	East South Central	$2.13	$2.60	6.9%
	West South Central	$7.54	$8.84	5.4%
U.S. Total		$45.93	$55.62	6.6%

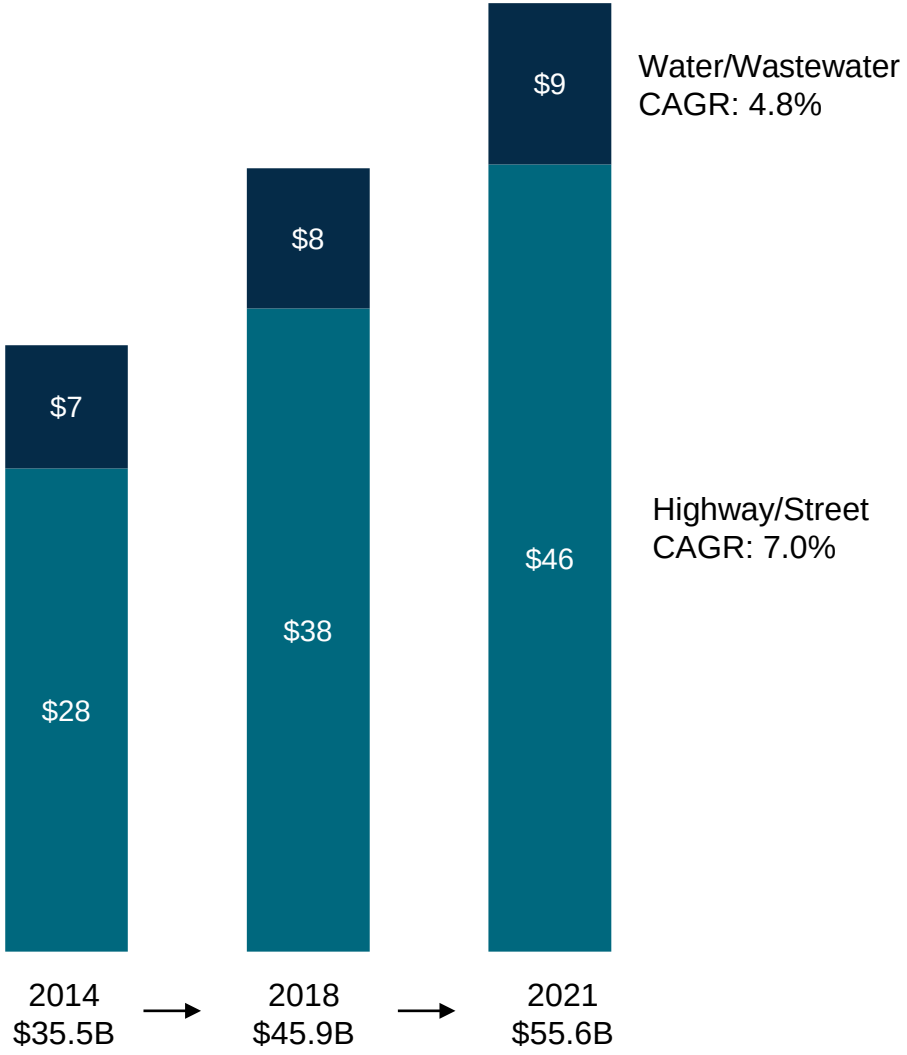
Design-build construction spending in the highway/street and water/wastewater is anticipated to yield favorable annual growth rates over the forecast period.

Distribution of forecast spending by segment
Combined CPiP spending, 2018-2021
Source(s): FMI analysis of multiple sources



Total spend 2018-2021: $203B

Distribution of market
CPiP spending, 2018, 2021
Source(s): FMI analysis of multiple sources



Trends and Drivers

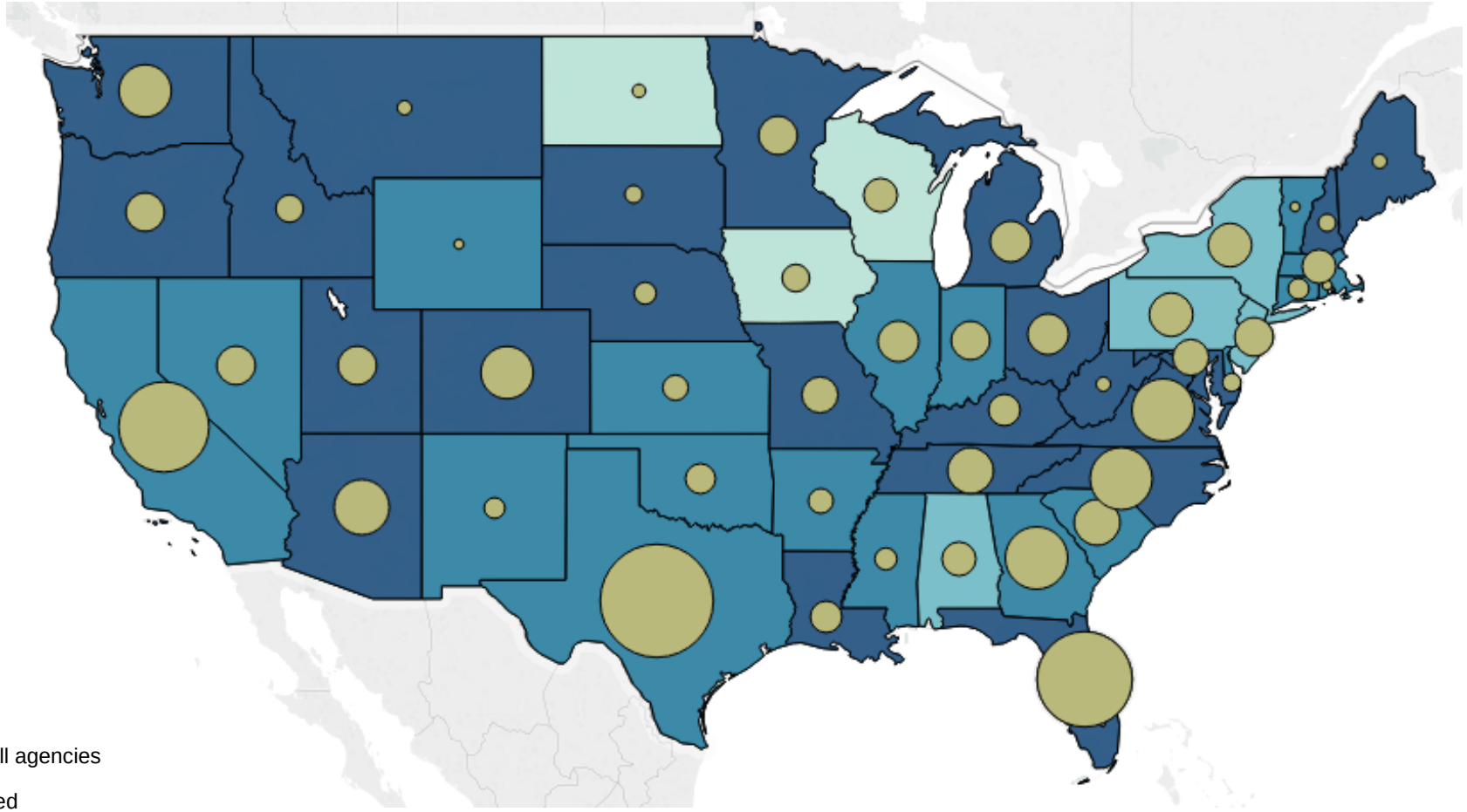
Design-build is no longer an alterative method. It is a main part of how we delivery our program."

-Public Owner

Forty-three states have full or widely permitted authorization to utilize design-build for public agency projects.

Design-build authorization and construction spending by state
Combined spending for highway/street and water/wastewater
Source(s): FMI analysis of multiple sources

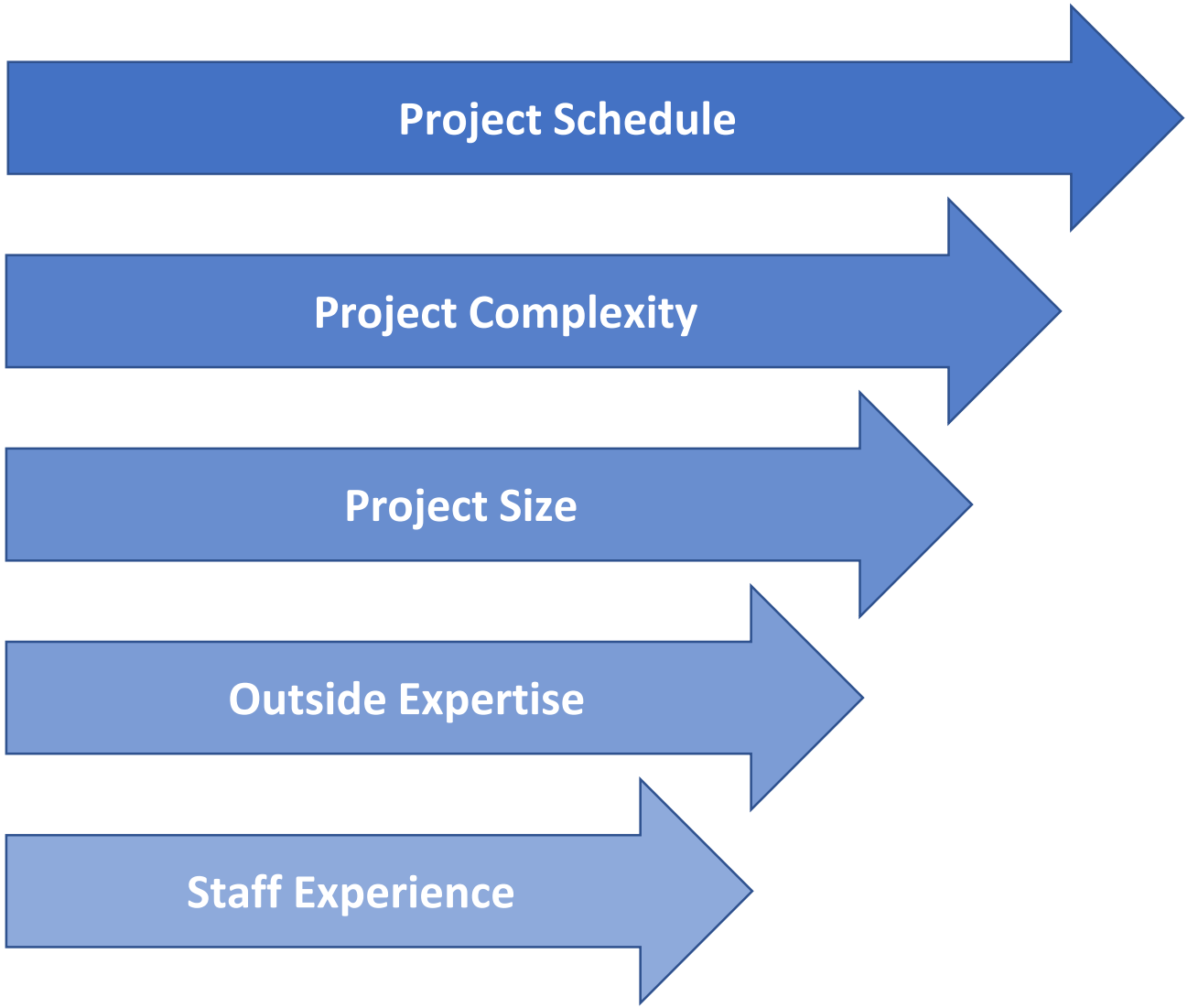
- Forecast highway/street and water/wastewater construction spending through 2021 is concentrated in states permitted to utilize design-build.
- Three states indicated limited use of design-build for construction project delivery.



- Design-build is permitted by all agencies
- Design-build is widely permitted
- Design-build is a limited option
- Design-build is limited to one political subdivision, agency or project

Five factors were identified as significant drivers of design-build utilization for highway/street and water/wastewater projects.

Factors influencing design-build utilization
Source(s): FMI analysis of multiple sources



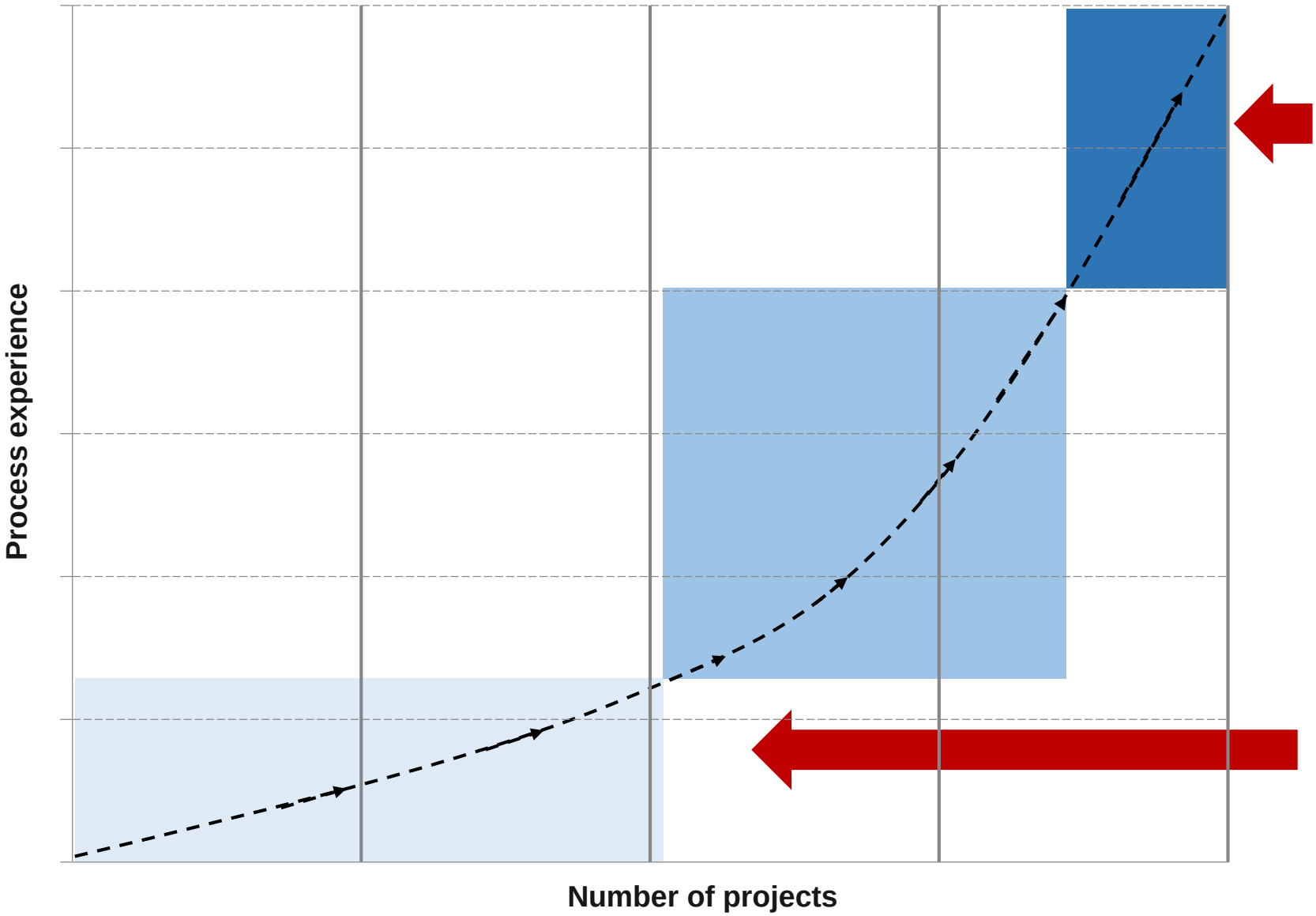
"Acceleration is one of the more governing factors for selecting design-build. We want to get the work out on the street fast and create jobs."

"Design-build projects are typically larger and more complex, which requires risk management."

"New construction for design-build is more challenging and requires greater risk. They tend to be bigger cost projects."

Owners consistently employing design-build are more likely to select project teams based on value and innovation.

Design-build experience/learning curve
Source(s): FMI analysis of multiple sources



Consistent use of design-build

- Alignment on critical success factors.
- Strong understanding of what risks can be transferred and which can be internally managed.
- Internal champion of the design-build process.

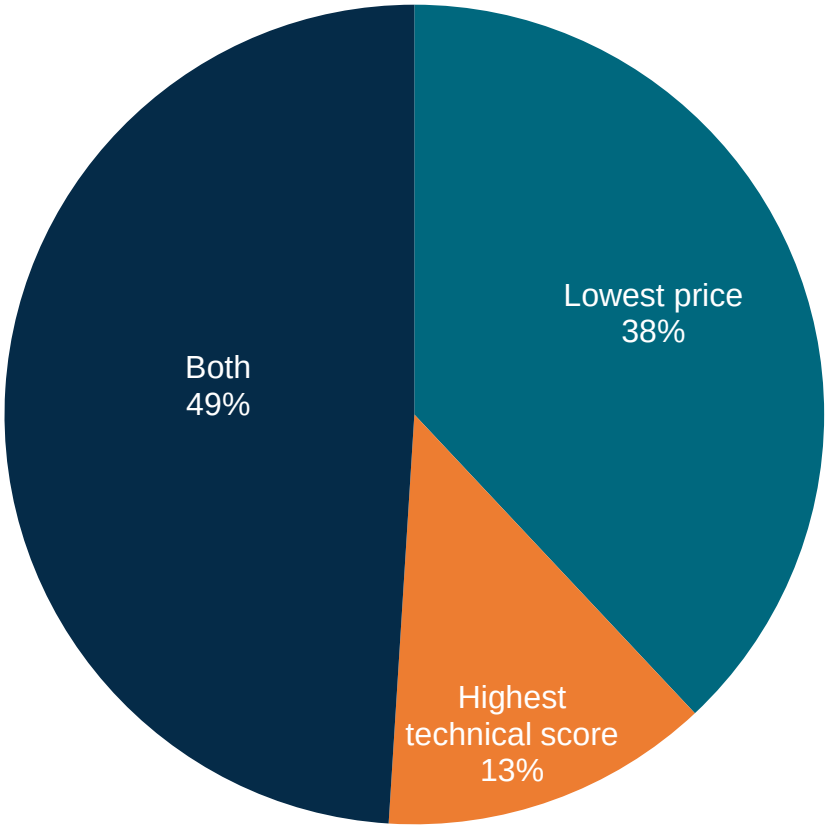
First time user of design-build

- Require guidance and education on the benefits and values associated with the process.
- Illustrating the appropriate level of risk to be transferred and managed is important for these owners to understand.

Despite frequent QBS practices for design-build projects, state highway/street agencies make the majority of their selection on price.

Distribution of successful pursuits by price and technical score
Highway/street projects: 115 projects
Source(s): FMI analysis of multiple sources

Eighty-seven percent of projects that won had the lowest price



Interviewee comments

"Price is still a main driver on the selection and you have to be able to sell why you are paying more for a project. ATCs help the design-build team lower their cost and helps them win the project."

"There are very few things that can be written differently compared to competitors, that will offset the 85% price component."

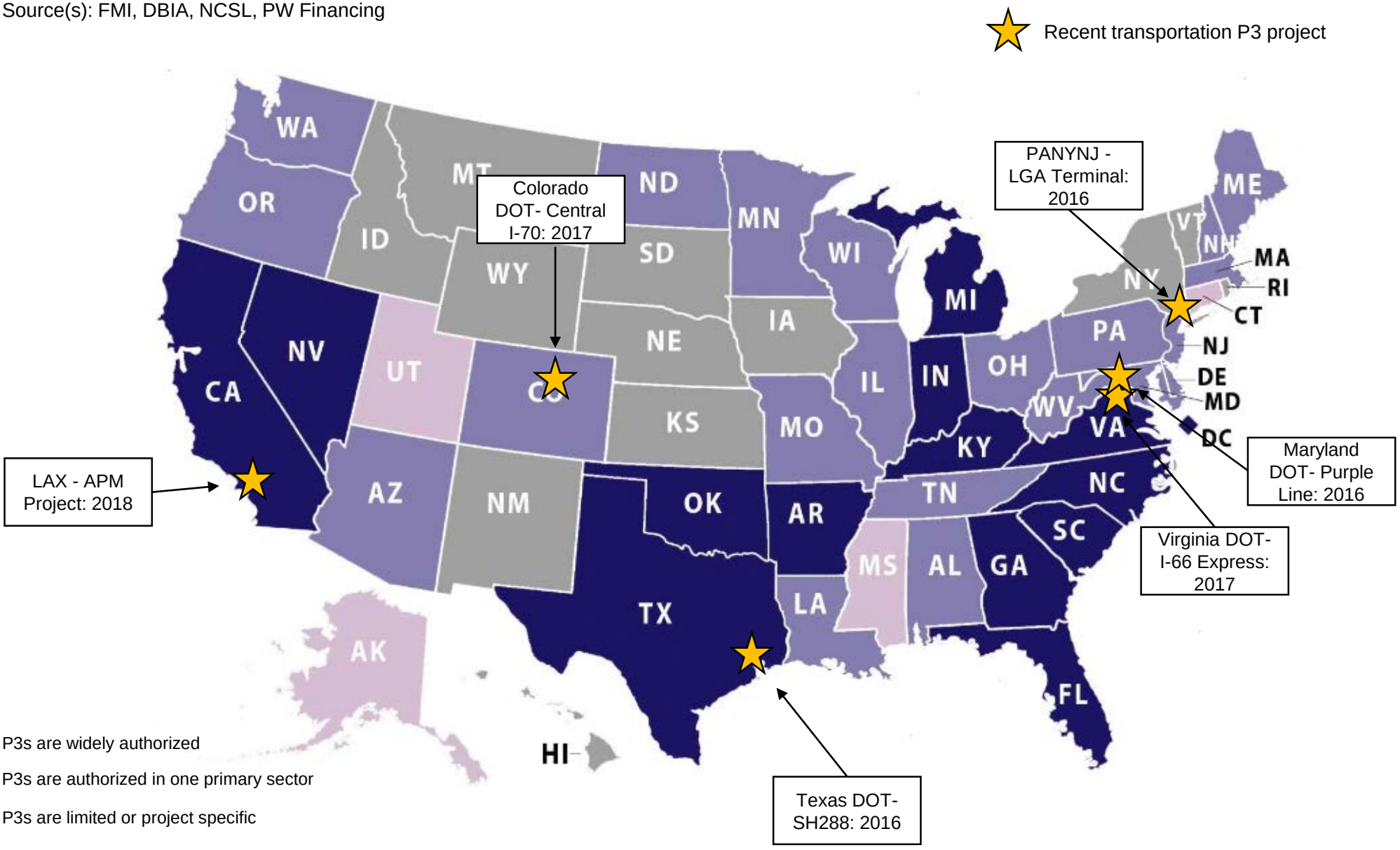
"The teams either bring innovations that drive down the price or the team has a shorter schedule than the others."

"More often than not it is price that is driving these. If the price is fairly close the technical score will win."

"The team we selected had the lowest price and best technical score. It's the best outcome we can ask for."

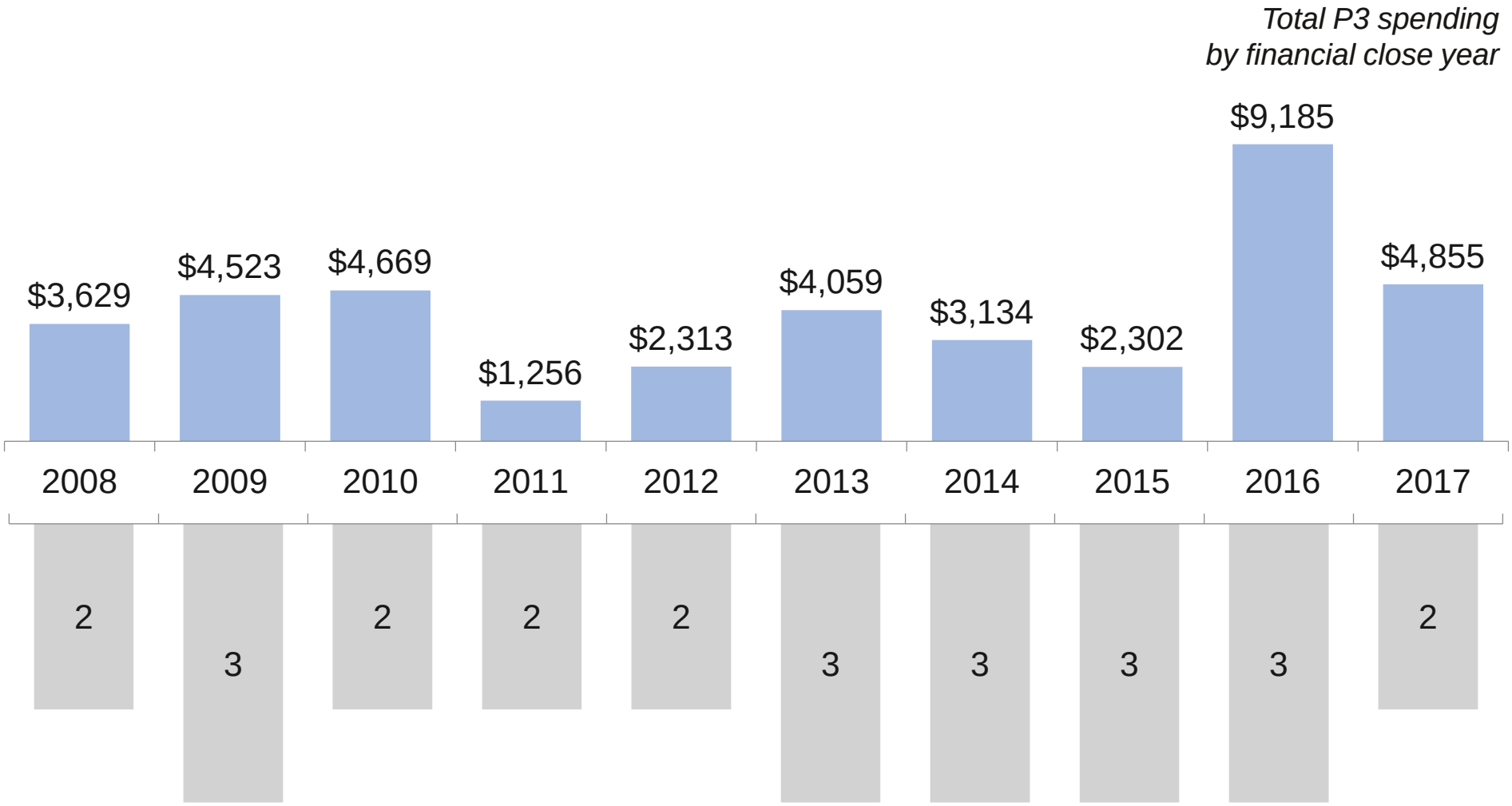
Thirty-eight states have legislation enabling the use of Public-Private-Partnerships.

Public-Private-Partnership (P3) State Laws
Incudes vertical and horizontal construction segments
Source(s): FMI, DBIA, NCSL, PW Financing



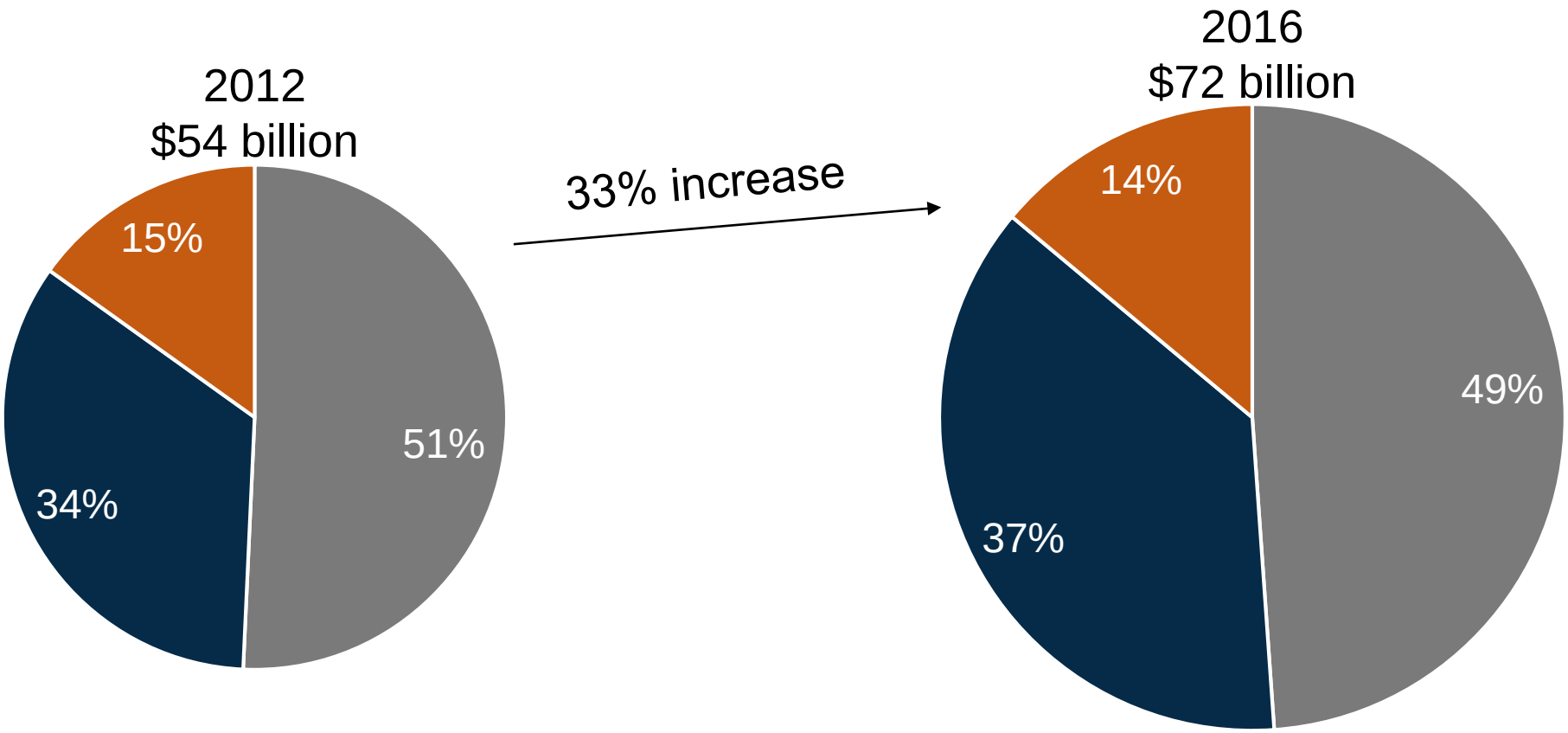
The use of Public Private Partnerships is a unique driver of design-build projects.

Public Private Partnership (P3) project spending and count by year
Includes only transportation DBFOM projects
Source(s): FMI analysis of multiple sources



Total design-build firm revenue increased 33% from 2012 to 2016.

Top-100 design-build firm revenue
Domestic design-build revenue
Source(s): FMI, ENR



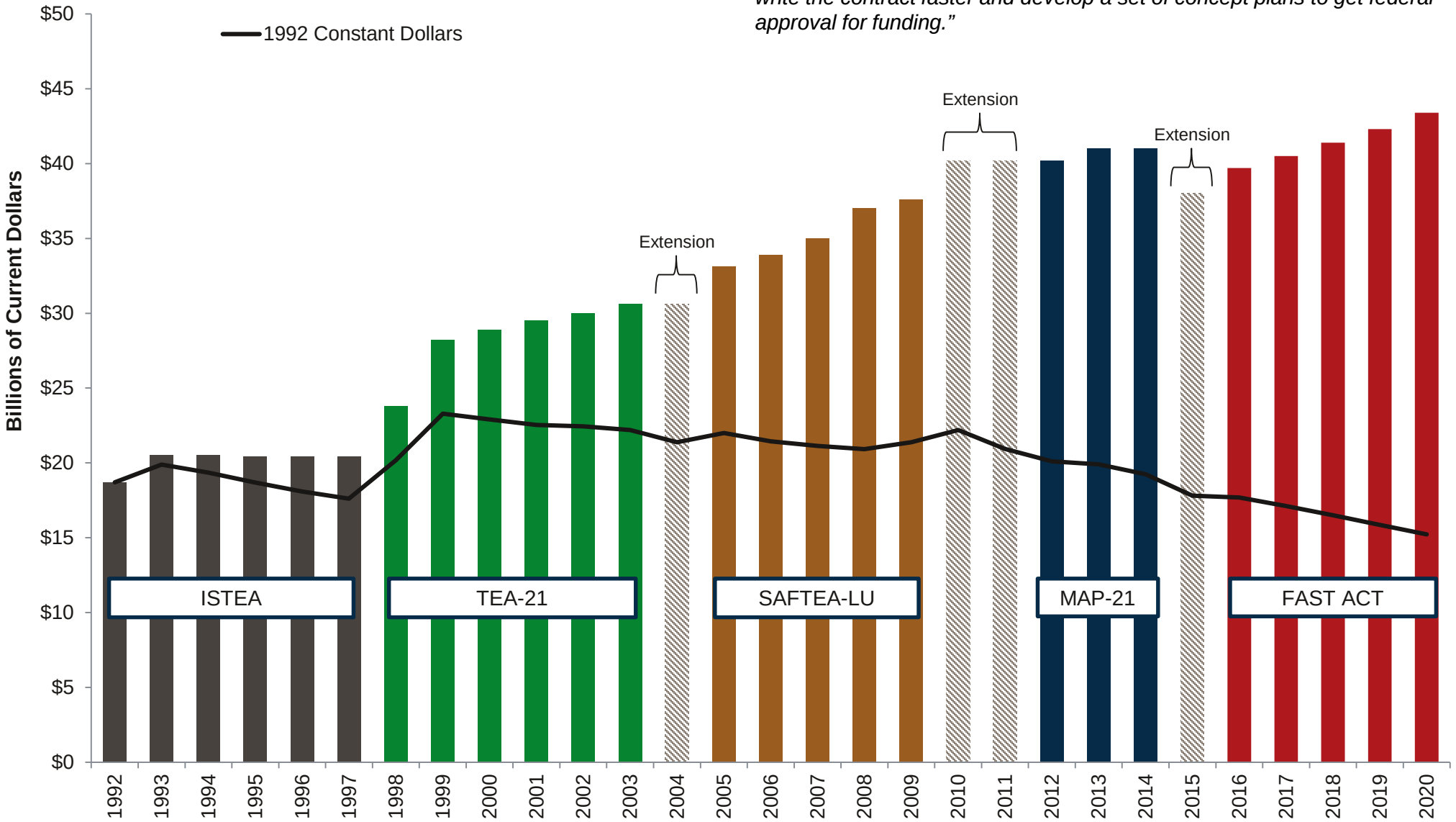
	Top-10 firm revenue	Firms 11-50 revenue	Firms 51-100 revenue
Growth 2012-2016	28%	45%	24%
Market share change	-1%	3%	-2%

Although the FAST Act provides highway transportation funding through 2020, in comparison with 1992 dollars, funding levels are not properly adjusted for sufficient growth.

Federal highway spending

Source(s): FMI, FHWA

"Design-build allows for us [DOT] to capture federal dollars sooner. On a typically job we get federal approval once we have packaged the whole set of plans and specifications. On design-build we can write an RFP and write the contract faster and develop a set of concept plans to get federal approval for funding."



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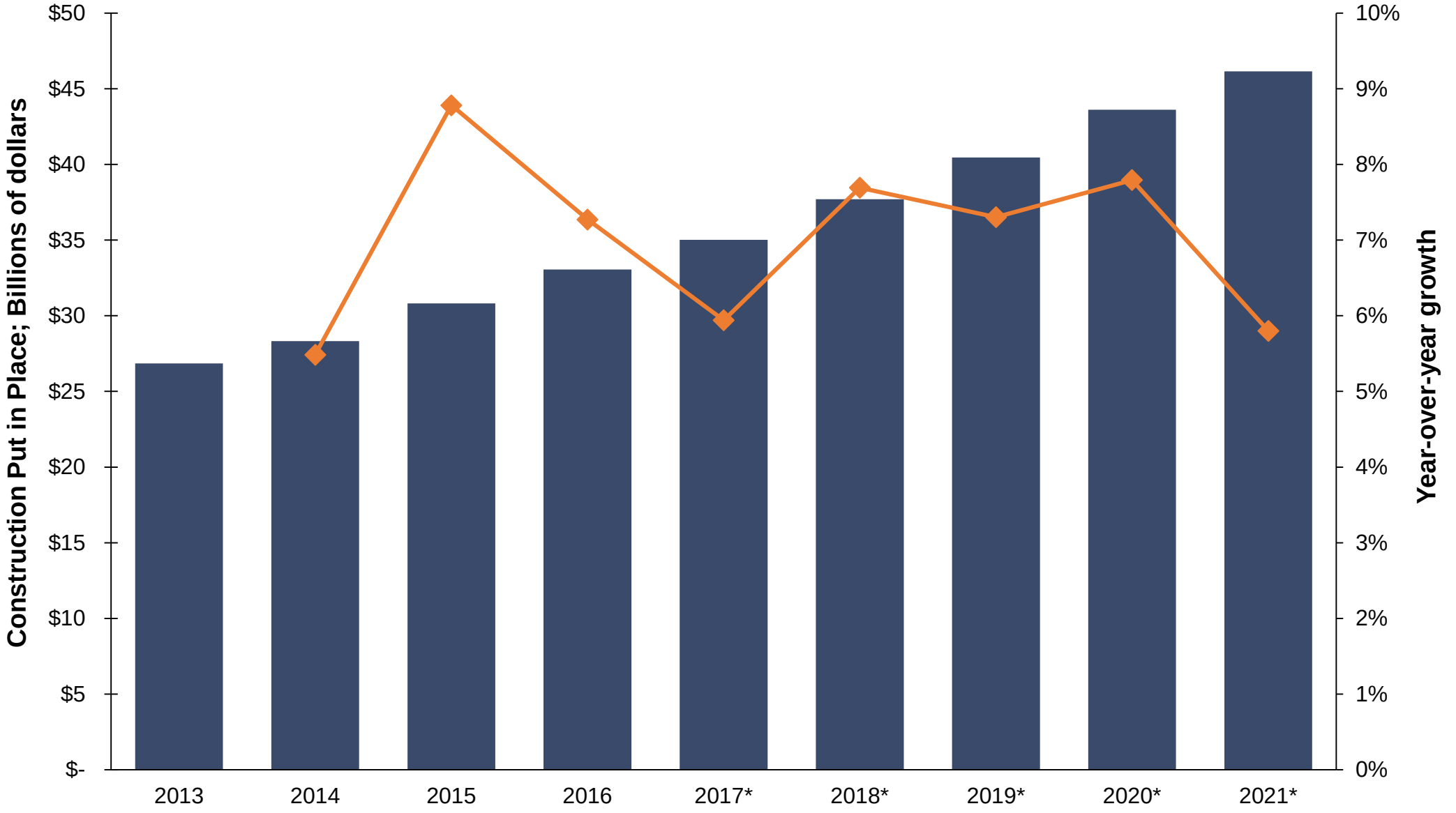
Appendix

Design-build spending in highway/street and water/wastewater is anticipated to grow at an annual growth of 6.6% over the forecast period.

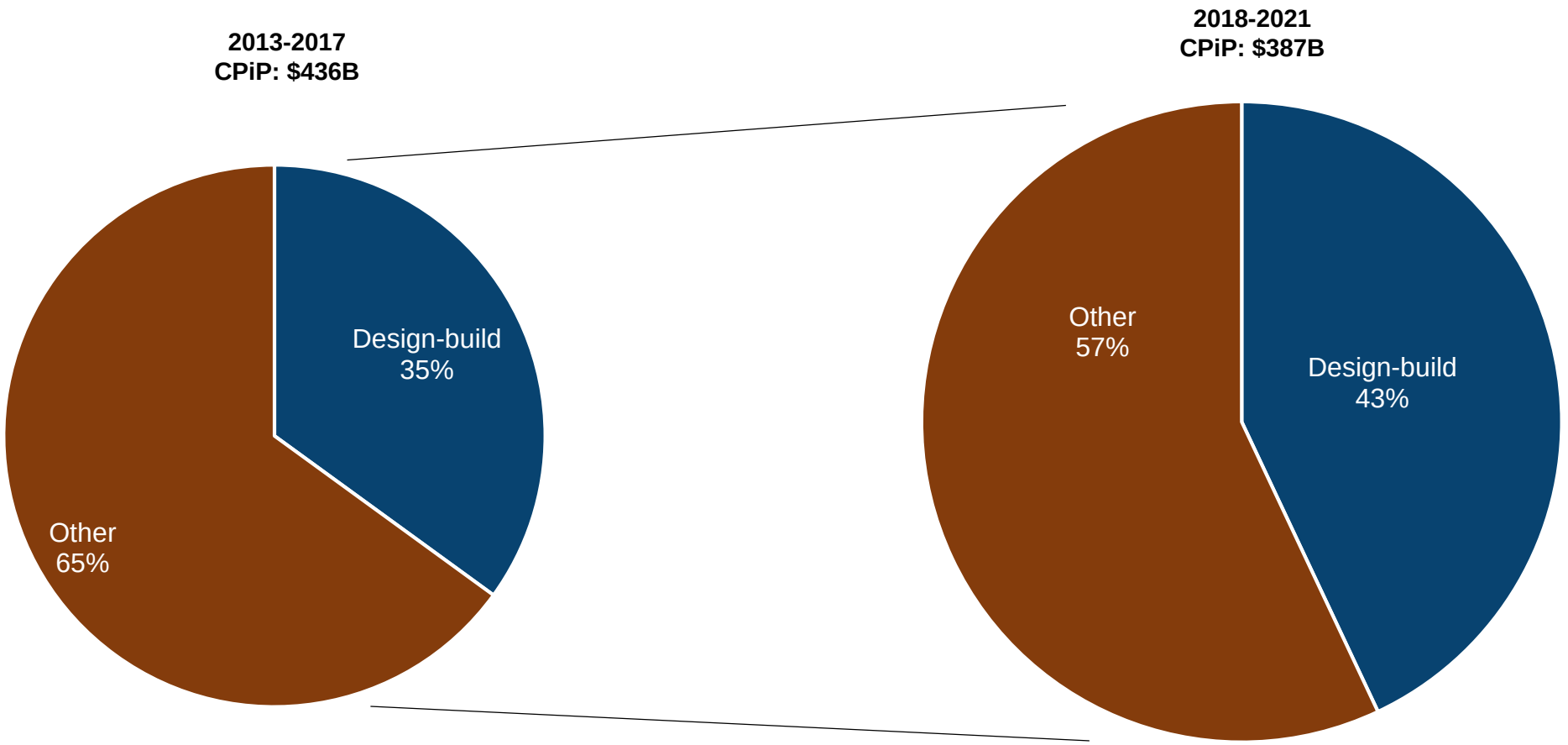
Design-build highway/street Put in Place

Source(s): FMI analysis of multiple sources



Highway/street breakout

Highway/Street distribution of delivery method utilization
Billions of dollars
Source(s): FMI analysis of multiple sources

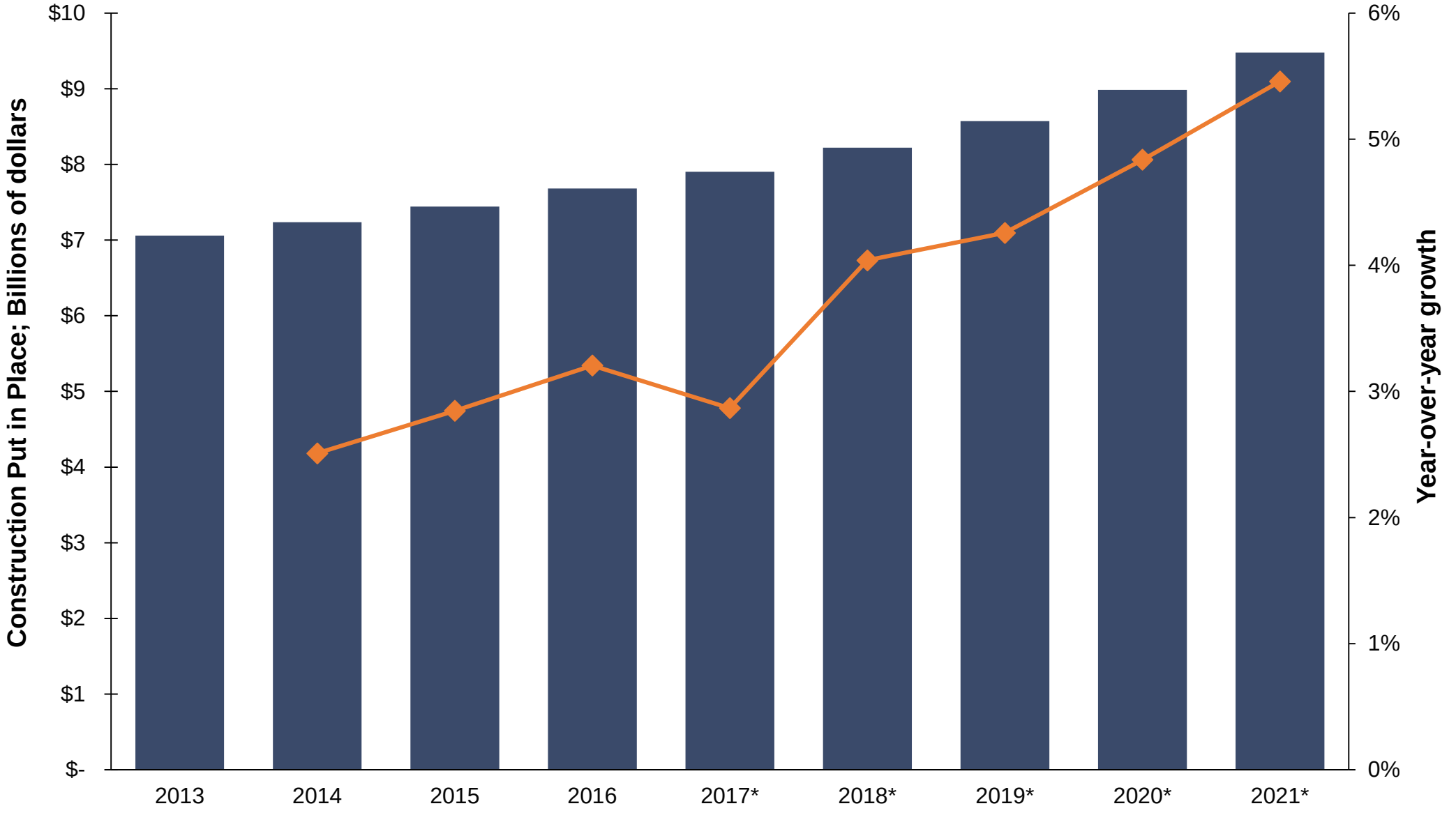


*Other includes CMGC/CMAR, design-bid-build

Design-build spending in highway/street and water/wastewater is anticipated to grow at an annual growth of 6.6% over the forecast period.

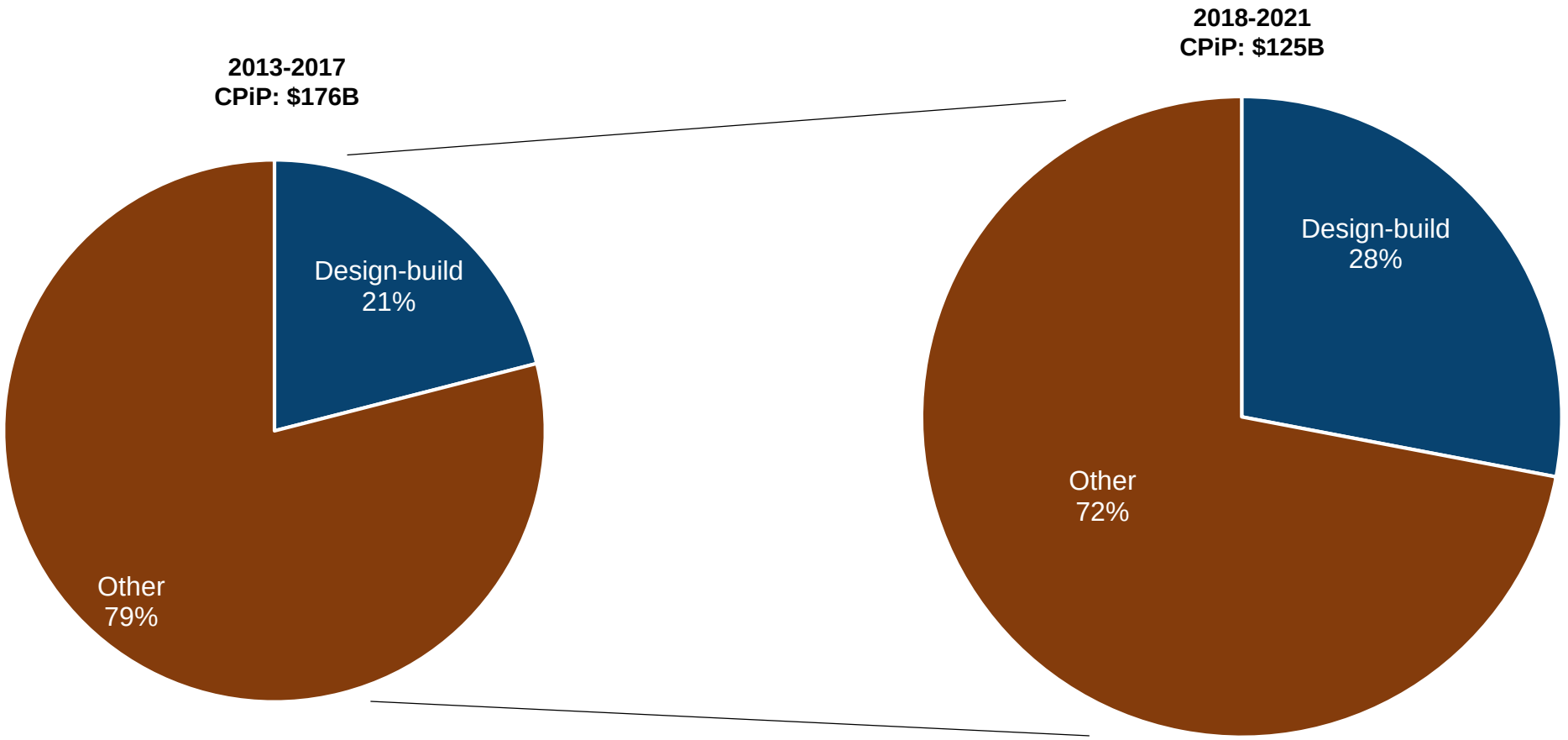
Design-build water/wastewater Put in Place

Source(s): FMI analysis of multiple sources



Water/wastewater breakout

Water/Wastewater distribution of delivery method utilization
Billions of dollars
Source(s): FMI analysis of multiple sources



*Other includes CMGC/CMAR, design-bid-build

Definitions and terminology

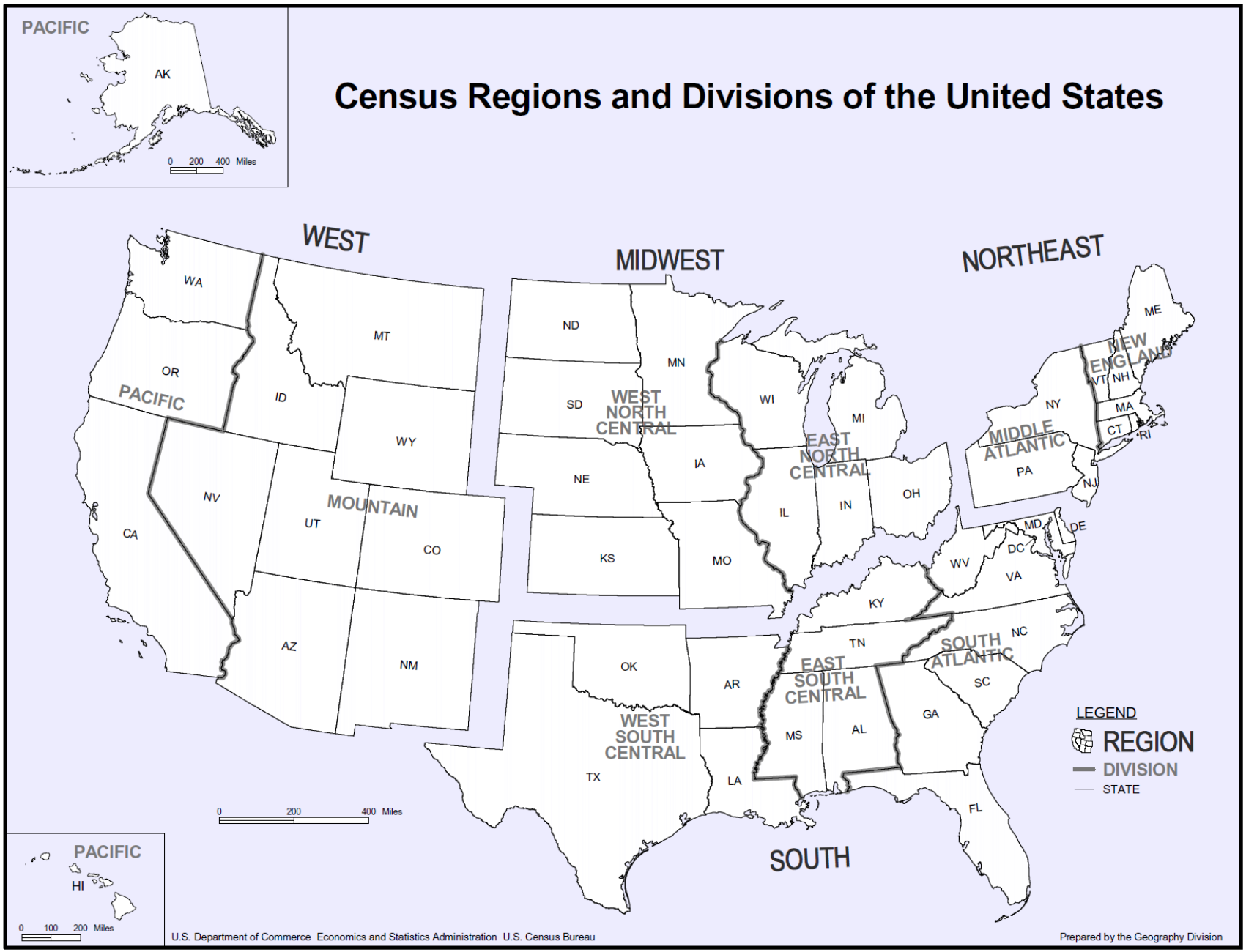
Construction Put in Place (CPiP): Dollar value of construction spending. CPiP reports the portion of the construction installed or erected at the site during a given period. The total value-in-place for a given period is the sum of the value of work done on all projects underway during this period, regardless of when work on each individual project was started or when payment was made to the contractors.

Construction spending includes the following:

- New buildings and structures.
- Additions, alterations, conversions, expansions, reconstruction, renovations, rehabilitations, and major replacements (such as the complete replacement of a roof or heating system).
- Mechanical and electrical installations such as plumbing, heating, electrical work, elevators, escalators, central air-conditioning, and other similar building services.
- Site preparation and outside construction of fixed structures or facilities such as sidewalks, highways and streets, parking lots, utility connections, outdoor lighting, railroad tracks, airfields, piers, wharves and docks, telephone lines, radio and television towers, water supply lines, sewers, water and signal towers, electric light and power distribution and transmission lines, petroleum and gas pipelines, and similar facilities that are built into or fixed to the land.
- Installation of the following types of equipment: boilers, overhead hoists and cranes and blast furnaces.
- Fixed, largely site-fabricated equipment not housed in a building, primarily for petroleum refineries and chemical plants, but also including storage tanks, refrigeration systems, etc.
- Cost and installation of construction materials placed inside a building and used to support production machinery; for example, concrete platforms, overhead steel girders, and pipes to carry paint, etc., from storage tanks.

Compound Annual Growth Rate (CAGR): Average annual growth rate over multiple time periods.

United States Census Regions and Divisions



Segment definitions: Commercial, office, lodging

Segments

1. Commercial
    1. Includes buildings and structures used by the retail, wholesale and selected service industries.
    2. Automotive retail
        1. Includes the following:
        2. "Sales – includes auto dealerships, motorcycle dealerships, auto showrooms, and truck dealerships. Service/parts – includes auto service centers, auto parts centers, auto repair centers, tire service centers, car washes, car rental centers, gas stations and emissions testing centers. Parking – includes commercial parking lots and garages. "
    3. Food/beverage
        1. Includes the following:
        2. "Food – includes supermarkets, bakeries, dairies, markets, convenience stores and delicatessens. Dining/drinking – includes liquor stores, bars, nightclubs, cafés, diners, restaurants, cafeterias, taverns, inns (eat & drink only), and bistros. Fast food – includes drive-in restaurants and fast food restaurants. "
    4. Multi-retail
        1. In addition to the types of multi-retail establishments listed below, it also includes warehouse-type retail stores.
        2. "General merchandise – includes department stores and variety stores. Shopping center – includes shopping centers, shopping plazas and town centers. Shopping mall – includes shopping malls. "
    5. Other commercial
        1. In addition to the types of stores listed below, it also includes beauty salons, nail shops, crematories, funeral homes, animal shelters, kennels, veterinary clinics, florists, nurseries, pawnshops, photo shops, dance schools, dry cleaners, laundromats, and post offices.
        2. "Drug store – includes drug stores and pharmacies. Building supply store – includes hardware stores and lumberyards. Other stores – includes clothing stores, jewelry stores, salesrooms (non-auto), furniture stores, office supply stores, storerooms, and electronics stores. "
        3. Warehouse
    6. Warehouses and storage buildings, cold storage plants, grain elevators, and silos located at manufacturing sites are included in the manufacturing category.
        1. In addition to the types of warehouses listed below, it also includes grain elevators and greenhouses.
        2. "General commercial – includes commercial warehouses, storage warehouses and distribution buildings. Mini-storage – includes mini-storage centers and self-storage centers. "
2. Office
    1. In addition to the types of offices listed below, it also includes motion picture, television, and radio offices.
    2. Office buildings at manufacturing sites are classified as "manufacturing"; however, an office building owned by a manufacturing company and not located at a manufacturing site is classified as "office."
    3. Includes administration buildings, computer centers, office buildings and professional buildings.
    4. State and local and federal also includes city halls, borough halls, municipal buildings, courthouses, and state capitol buildings.
    5. Includes banks, financial institutions, building & loans, saving & loans and credit unions.
3. Lodging
    1. Includes hotels, motels, resort lodging, tourist courts and cabins and similar facilities.

Segment definitions: Healthcare, educational

Segments

1. Healthcare
    1. Hospital
        1. Includes hospitals, mental hospitals, infirmaries and infrastructure.
    2. Medical building
        1. Includes clinics, medical offices, medical labs, doctor & dentist offices, outpatient clinics, and research labs (non-manufacturing, non-educational, or non-hospital).
    3. Special care
        1. Includes nursing homes, hospices, orphan homes, sanatoriums, drug clinics, rehabilitation centers, rest homes and adult day-care centers.
2. Educational
    1. In addition to the types of educational facilities listed below, it also includes nursing schools, cosmetology and beauty schools, trade schools, military training facilities, schools for the handicapped, and modeling schools.
    2. Schools on Indian reservations are included in federal construction.
    3. Preschool
        1. Includes childcare and day-care centers, nurseries and preschools.
    4. Primary/secondary
        1. In addition to the types of primary and secondary schools listed below, it also includes academies, parochial schools and vocational schools.
        2. "Elementary – includes elementary schools. Middle/junior high – includes middle and junior high schools. High – includes high schools. "
    5. Higher Education
        1. In addition to the types of higher education facilities listed below, it also includes health centers and clinics located at colleges (including junior and community colleges) and universities.
        2. Instructional – includes instructional buildings and laboratories.
        3. Parking – includes parking lots and garages.
        4. Administration – includes administration buildings.
        5. Dormitory – includes dormitories, living/learning centers and residence halls.
        6. Library – includes libraries (school).
        7. Student union/cafeteria – includes student union buildings and cafeterias.
        8. Sports/recreation – includes gymnasiums and athletic field houses, arenas, coliseums and stadiums, outdoor courts or fields, racquetball courts, rinks, tennis courts, and swimming pools.
        9. Infrastructure – includes power plants, water supply facilities, sewage and other infrastructure.
    6. Other educational
        1. In addition to the types of facilities listed below, it also includes zoos, arboreta, botanical gardens, planetariums and observatories.
        2. Gallery/museum – includes art galleries, cultural centers and museums.
        3. Library/archive – includes libraries (nonschool) and archives.

Segment definitions: Religious, manufacturing

Segments

1. Religious
    1. Certain buildings, although owned by religious organizations, are not included in this category. These include educational or charitable institutions, hospitals, and publishing houses.
    2. House of worship
        1. Includes churches, chapels, mosques, synagogues, tabernacles and temples.
    3. Other religious
        1. In addition to the types of facilities listed below, it also includes sanctuaries, abbeys, convents, novitiates, rectories, monasteries, missions, seminaries and parish houses.
        2. Auxiliary building – includes fellowship halls, life centers, camps and retreats, and Sunday schools.
2. Manufacturing
    1. Includes all buildings and structures at manufacturing sites. Office buildings and warehouses owned by manufacturing companies but not constructed at a manufacturing site are classified as "office" and "commercial" respectively.
    2. Food/beverage/tobacco
        1. Food industries transform livestock and agricultural products into products for intermediate or final consumption. These products are typically sold to wholesalers or retailers for distribution to consumers.
        2. Beverage industries include manufacturing of nonalcoholic and alcoholic beverages. Ice manufacturing is included with nonalcoholic beverage manufacturing.
        3. Tobacco industries include the re-drying and stemming of tobacco and the manufacturing of tobacco products, such as cigarettes and cigars.
    3. Textile/apparel/leather & allied
        1. Textile industries transform a basic fiber (natural or synthetic) into a product, such as yarn or fabric.
        2. Apparel industries purchase fabric to cut and sew to make a garment.
        3. Leather and allied industries transform hides into leather products. Also included are leather substitutes, such as rubber (ex. rubber footwear) and plastic (ex. plastic purses or wallets).
    4. Wood
        1. Wood industries manufacture wood products, such as lumber, plywood, veneers, wood containers, wood flooring, wood trusses, manufactured homes (i.e., mobile home), and prefabricated wood buildings.
    5. Paper
        1. Paper industries manufacture pulp, paper, or converted paper products.
    6. Print/publishing
        1. Print/publishing industries print products, such as newspapers, books, periodicals, business forms, greeting cards, and other materials, and perform support activities, such as bookbinding, platemaking services and data imaging.
    7. Petroleum/coal
        1. Petroleum/coal industries transform crude petroleum and coal into usable products.
    8. Chemical
        1. Chemical industries transform organic and inorganic raw materials by a chemical process and form products.
    9. Plastic/rubber
        1. Plastic/rubber industries make goods by processing plastics materials and raw rubber.

Segment definitions: Amusement and recreation, communication, public safety

Segments

1. Amusement and recreation
    1. In addition to the types of facilities listed below, it also includes racetracks, equestrian centers, riding academies, bowling alleys, rifle ranges, casinos, pool halls and driving ranges.
    2. Theme/amusement park
        1. Includes amusement buildings or rides, theme parks, and arcades.
    3. Sports
        1. Includes the following types of structures not located at schools or colleges: gymnasiums and athletic field houses, arenas, coliseums and stadiums, outdoor courts or fields, racquetball courts, rinks, tennis courts, and swimming pools.
    4. Fitness
        1. Includes fitness centers, health or athletic clubs, YMCAs, YWCAs, cabanas, saunas and spas.
    5. Performance/meeting center
        1. In addition to the types of facilities listed below, it also includes civic centers, concert halls, opera houses, theaters for the performing arts, amphitheaters, pavilions and auditoriums.
        2. Convention centers – includes convention and trade centers.
    6. Social center
        1. In addition to the types of facilities listed below, it also includes banquet halls, lodge buildings, golf courses, community houses, community centers, fraternal halls and country clubs.
        2. Neighborhood center – includes community houses, community centers and neighborhood centers.
    7. Park/camp
        1. Includes parks, seasonal camps and tourist camps.
    8. Movie theater/studio
        1. Includes movie theaters, drive-ins and movie, radio and television studios
2. Communication
    1. Includes telephone, television and radio, distribution and maintenance buildings and structures.
3. Public safety
    1. Correctional
        1. Includes the following:
        2. "Detention - includes cell blocks, detention centers, jails, penitentiaries, and prisons. Police/sheriff - includes police stations and sheriffs' offices. "
    2. Other public safety
        1. In addition to the types of facilities listed below, it also includes armories and military structures that could not be assigned to a specific type of construction.
        2. Fire/rescue – includes fire stations, rescue squads, dispatch and emergency centers.

Segment definitions: Transportation

Transportation

Air

In addition to the types of facilities listed below, it also includes pavement and lighting, hangars, air freight terminals, space facilities, air traffic towers, aircraft storage and maintenance buildings.

Passenger terminal – includes air passenger terminals.

Runway – includes airport runway pavement and lighting.

Land

In addition to the types of facilities listed below, it also includes maintenance facilities and freight terminals (bus, railroad or truck).

Passenger terminal – includes bus and railroad passenger terminals.

Mass transit – includes light rail, monorail, streetcar, and subway facilities.

Railroad – includes railroad track and bridges.

Water

Dock/marina – includes docks, piers, wharves and marinas.

Dry dock/marine terminal – includes dry docks, boatels and maritime freight terminals.

Segment definitions: Highway/Street

Highway and Street

Pavement
Includes highways, roads, streets, culverts, gutters and sidewalks.

Lighting
Includes traffic lights, signals and highway lighting systems.

Retaining wall
Includes retaining walls and fences.

Tunnel
Includes highway tunnels (vehicular or pedestrian).

Bridge
Includes bridges and overhead crossings (vehicular or pedestrian).

Toll/weigh
Includes toll facilities, weigh and inspection stations.

Federal includes border-crossing stations.

Maintenance building
Includes maintenance and storage buildings and salt domes.

Rest facility
Includes rest facilities, travel centers, median improvements, beautification projects and welcome centers.

Segment definitions: Water/Wastewater

Sewage and Waste Disposal

Sewage/dry waste

In addition to the types of facilities listed below, it also includes resource recovery and recycling centers and pond sewage systems.

Plant – includes solid waste disposals (incinerator or burial), sewage treatment plants and sewage disposal plants.
Line/pump station – includes sanitary sewers, sewage pipeline, interceptors and lift/pump stations.

Waste water

Plant – includes wastewater disposal plants.

Line/drain – includes water collection systems (nonpotable water) and storm drains.

Water Supply

Plant

Includes filtration, treatment, water supply, and water softening plants.

Well

Includes water wells.

Line

Includes culverts (water supply), water transmission pipelines, tunnels and water lines.

Pump station

Includes gatehouses and lift/pump stations.

Reservoir

Includes potable water supply reservoirs.

Tank/tower

Includes water storage tanks and towers.