Economic Assessment of the Engineering + Design Services Industry

2024



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2024 ECONOMIC ASSESSMENT OF THE ENGINEERING AND DESIGN SERVICES INDUSTRY

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INTRODUCTION

This is the fifth annual release of the Engineering and Design Services industry assessment and forecast. The ACEC Research Institute first launched the Industry Impact Series in 2020 to analyze the performance of the Engineering and Design Services industry (A/E Services). This updated study continues that effort, highlighting the economic significance of engineering, architecture, and design services in shaping the U.S. built environment–everything from buildings to infrastructure.

Conducted by Rockport Analytics, the study uses a mix of public, private, and proprietary data to track industry performance, analyze current market trends, and model future revenue scenarios. The research aims to provide valuable insights for ACEC members to aid in planning, advocacy, and education.

The overarching goals of this research are to:

- Build on the previously defined Engineering and Design Services sector by updating published recurring data and tracking performance for ACEC's many constituencies.
- Provide a comprehensive view of the size, growth, and composition of the engineering and related professional services sector using the most current and comprehensive data available.
- Measure the economic contribution of the Engineering and Design Services industry using established metrics found in virtually all industry economic impact analyses.
- Analyze the current market for the Engineering and Design Services sector, focusing on key challenges, opportunities, and drivers. This includes forecasting industry revenue and evaluating scenarios related to policy, geopolitical, and other future conditions.

This research is intended to be of value to ACEC members and their constituents by providing industry insight to members and can be leveraged as a planning and educational resource. It will also assist ACEC advocacy, communications, and other outreach efforts.



KEY FINDINGS AND DECISION POINTS

• Steady Growth:

- The Engineering and Design Services industry grew by 5.5 percent in 2023, driven by public infrastructure projects. This marked a return to pre-pandemic growth patterns.
- Adjusted for inflation, real growth was 1.3 percent.
- Key contributing sectors included manufacturing (recovered by over 50 percent), lodging, education, and communication projects.
- Construction growth in 2024 is expected to remain near 6 percent, with a slowdown in non-residential/non-building construction but a recovery in residential construction.

• Economic and Fiscal Impact:

- In 2023, the industry added \$656 billion to the U.S. GDP and supported over 5.6 million jobs, directly and indirectly.
- Every dollar that the Engineering and Design Services industry produces results in \$1.50 added to U.S. GDP.
- In 2023, the industry generated a total of \$91.8 billion in federal tax receipts and an additional \$43.5 billion in state and local receipts.

Macroeconomic Environment:

- Inflation and rising interest rates have been a huge headwind to the industry over the last couple of years, but we have finally reached a tipping point with inflation rates approaching the Federal Reserve bank's two percent target allowing for the Federal Reserve rate cut cycle to begin (as of September 2024).
- Recessionary risks remain on the table for 2025 but the latest read on the economy shows continued strength in the labor market and solid prospects for GDP growth.

Labor Shortages and Skills Gap:

- The aging workforce and ongoing labor shortages, especially in skilled roles, continue to pose significant challenges.
- Industry employment grew by 3.4 percent in 2023, outpacing output growth, but shortages persist despite a slight decrease in job openings versus new hires.
- Wage growth slowed to 4.3 percent in 2023 (down from 4.6 percent in 2022), with early 2024 figures showing a 5.2 percent wage increase, though stabilization is expected.

• Artificial Intelligence (AI) Integration:

- Adopting AI can significantly improve efficiency and productivity. However, smaller firms may face cost barriers.
- Decision-makers need to balance the potential benefits of AI against the costs of implementation, especially considering the industry's talent shortages and skills gap driven by new technologies.

• Material Cost Stabilization:

- With construction material prices stabilizing, there are opportunities for increased activity in single-family housing and high-end manufacturing projects.

INDUSTRY PERFORMANCE IN 2023

The Engineering and Design Services industry grew 5.5 percent in 2023, returning to normal, pre-pandemic levels with 1.3 percent real growth after inflation. Manufacturing and construction are driving this recovery, with residential construction expected to grow in 2024. Employment is up 3.4 percent, but labor shortages and slower wage growth are concerns. Decision-makers should plan for more demand from Infrastructure Investment and Jobs Act (IIJA) spending while managing talent shortages and an aging workforce.



Engineering and Design Services Revenue

Source: Quarterly Census of Employment and Wages, Rockport Analytics

KEY TRENDS DRIVING THE INDUSTRY



Interest Rates

The Federal Reserve's aggressive rate hikes in 2023, aimed at curbing persistent inflation, inadvertently dampened the residential construction sector. Higher borrowing costs for builders and buyers alike led to a slowdown in new home construction. Despite this headwind, non-residential and non-building construction continued to thrive, bolstered by ongoing infrastructure investments and government incentives like the IIJA and Inflation Reduction Act. As a result, Engineering and Design Revenues remained on an upward trajectory.



Capital for Growth

The bulk of IIJA funds remain unspent, with most public investments focused on strengthening infrastructure sectors such as transportation, energy, and water. Additionally, the CHIPS and Science Act will play a critical role in driving future infrastructure projects, as private firms have already announced over \$900 billion in investments in key industries like semiconductors, clean energy, and heavy manufacturing. A significant portion of these funds is being funneled into states like California, Texas, and New York, while Alaska, North Dakota, and Montana are seeing the highest per capita investments.



Sustainability Initiatives

Federal policies, including the Inflation Reduction Act, coupled with a significant rise in venture capital investment in green construction, accelerated the development of clean energy projects across both the private and public sectors. The convergence of government support and private funding drove substantial growth in power projects, water supply, manufacturing, and conservation and development.



Technology Advancements

Artificial Intelligence (AI) is rapidly gaining traction among Engineering and Design firms due to its potential to significantly enhance productivity, optimize designs, and drive innovation. According to ACEC Research Institute's 2024 Q1 Engineering Business Sentiment Survey, half (52 percent) of firms have an AI strategy in place or are working on one and 63 percent of firms believe that AI will have a positive impact on their firm in the coming year. There have been advancements in AI-powered tools for design and planning, as well as machine learning for improvements in project management, such as mitigating cost excess, delays, and streamlining resource allocation.

ENGINEERING AND DESIGN SERVICES: BY THE NUMBERS

2022	Y/Y Growth	2023
Industry Revenue \$413B	5.5%	Industry Revenue \$436B
Direct Annual Full & Part-Time Jobs 1.60M	3.4%	Direct Annual Full & Part-Time Jobs 1.65M
Total Establishments 159,100	5.1%	Total Establishments 167,200
Average Wages \$104,800	4.3%	Average Wages \$109,300
Direct Economic Contribution \$240B	4.7%	Direct Economic Contribution \$251B
Federal, State, & Local Tax Collections \$128B	6.0%	Federal, State, & Local Tax Collections \$135B

Source: Bureau of Economic Analysis, Quarterly Census of Employment and Wages, Bureau of Labor Statistics, IMPLAN, Rockport Analytics

THE BOTTOM LINE: ENGINEERING AND DESIGN SERVICES CONTRIBUTION TO THE U.S. ECONOMY

Typically, an industry's economic significance is measured by how much it sells of its product or service, how much it buys from other sectors, the number of jobs it directly and indirectly supports, and how much tax revenue it generates. This approach, and the economic contribution metrics derived from it, are universal across all industries, facilitating comparison and contrast. While A/E Services play a big role in the Construction industry, the figures here don't include the value of the built environment they support–that's counted under Construction. Instead, these numbers focus only on the specific economic impact of the Engineering and Design Services industry.



Source: Bureau of Economic Analysis, Quarterly Census of Employment and Wages, Bureau of Labor Statistics, IMPLAN, Rockport Analytics

Engineering and Design Services revenue climbed 5.5 percent in 2023, reaching \$436 billion. This growth was driven by sales to various sectors, including construction, business services, mining, manufacturing, exports, and others.

The industry contributed \$656 billion to the U.S. GDP in 2023, a 4.7 percent increase from the previous year. The components of total economic contribution include direct, indirect, and induced value-added. Direct A/E (\$251 billion) refers to the value-added of businesses engaged in engineering, architectural, and surveying services (NAICS Code 5413). Indirect refers to A/E's supply chain businesses. Induced contributions arise from the re-spent wages of direct and indirect employees. Indirect and induced (\$405 billion) comprise upstream and downstream effects. **Engineering and Design Services contributed \$91.8 billion in federal taxes in 2023**. Federal taxes include corporate and personal income taxes, social security, and various excise fees. **The industry contributed another \$43.5 billion in state and local taxes.** State and local taxes include sales, income, property, excise, and other licenses/fees.

Engineering and Design Services Industry Initiated Taxes				
	2023 Tax Collections (in millions \$)	2023 % of Total		
Federal - U.S.				
Corporate Income	\$3,777	2.8%		
Personal Income	\$35,154	26.0%		
Excise & Fees	\$3,872	2.9%		
Social Security & Other Taxes	\$48,964	36.2%		
Federal Tax Total	\$91,767	67.9%		
State & Local				
Corporate Income	\$1,654	1.2%		
Personal Income	\$9,133	6.8%		
Social Insurance Taxes	\$817	0.6%		
Business Taxes	\$16,458	12.2%		
Household Taxes	\$2,310	1.7%		
Property Taxes	\$13,083	9.7%		
State & Local Tax Total	\$43,453	32.1%		
Total A/E-Initiated Taxes	\$135,220	100.0%		





Sources: Rockport Analytics, IMPLAN, Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau

Engineering and Design Services directly employed over 1.6 million Americans. When factoring in both upstream and downstream activities, **the A/E industry supported nearly 5.6 million full- and part-time jobs.** The industry contributed \$379.8 billion to payrolls in 2023.

2023 Engineering and Design Services Industry Bottom Line

For the U.S. Economy	Direct	Indirect	Induced	Total	% ve 2022	
in billions of \$ unless otherwise noted	Direct	(Supply Chain)	(Ripple Effect)	TOLAI	/0 43 2022	
Total Industry Revenue				\$436.1	5.5%	
Total Economic Contribution						
A/E Contribution to GDP	\$250.9	\$147.6	\$257.8	\$656.3	4.7%	
Jobs Supported (Full & Part-Time, in thousands)	1,654	1,435	2,481	5,570	3.4%	
Contribution to Payrolls	\$173.3	\$84.6	\$121.9	\$379.8	3.3%	
Total Tax Receipts (in billions)	\$49.6	\$29.7	\$56.0	\$135.2	6.0%	
Federal	\$40.2	\$20.2	\$31.4	\$91.8	6.0%	
State & Local	\$9.4	\$9.5	\$24.5	\$43.5	6.0%	

Source: Bureau of Economic Analysis, Bureau of Labor Statistics, IMPLAN, Rockport Analytics

ECONOMIC CONTRIBUTION BY SECTOR AND STATE

Understanding the economic impact of Engineering and Design Services requires examining the interrelationships between A/E activities and its connected industries. This analysis can be conducted at both national and state levels.

• On a national scale, in 2023, the Engineering and Design Services industry supported around 5.6 million jobs. Direct A/E industry employment totaled over 1.6 million, representing about one-third of the industry's total impact. The remaining two-thirds can be attributed to jobs supported by the industry's supply chain (1.4 million) and jobs created through the spending of A/E workers and those in the A/E supply chain (2.5 million).

A/E Contribution to U.S.	Employm	ent by Inc	lustry Sect	tor
Industry (NAICS) ¹	Direct	Indirect	Induced	Total
54 Professional, Scientific & Tech Services	1,653,860	379,120	132,447	2,178,117
56 Administrative & Waste Services	0	384,420	148,338	545,621
72 Accommodation & Food Services	0	131,720	442,772	442,793
62 Health & Social Services	0	20	297,266	433,395
44-45 Retail Trade	0	7,230	317,090	324,565
81 Other Services	0	34,890	243,374	279,435
53 Real Estate & Rental	0	100,970	122,576	226,928
52 Finance & Insurance	0	45,450	176,528	223,495
31-33 Manufacturing	0	71,920	107,891	182,220
48-49 Transportation & Warehousing	0	67,540	108,928	178,730
42 Wholesale Trade	0	35,710	65,782	102,686
71 Arts, Entertainment & Recreation	0	21,210	74,549	96,472
55 Management of Companies	0	47,180	31,827	80,585
51 Information	0	32,090	43,164	76,328
61 Educational Services	0	1,500	73,170	74,722
11 Agriculture, Forestry, Fish & Hunting	0	5,480	44,748	50,415
23 Construction	0	7,450	18,689	26,392
92 Government	0	3,520	14,459	18,101
22 Utilities	0	5,440	10,642	16,264
21 Mining	0	6,090	6,322	12,616
Total	1,653,860	1,435,459	2,480,562	5,569,881

Source: Rockport Analytics, IMPLAN

1 North American Industrial Classification System (NAICS). For specific industry definitions, see www.census.gov

Impact by State

- California and Texas remained the top contributors in the industry in 2023, with \$77 billion and \$75 billion, respectively. However, this year Michigan climbed a spot in the rankings, landing in third place over last year's third place, Florida, with a contribution of \$32.6 billion despite having a lower number of total jobs supported than Florida.
- California supported fewer total jobs than Texas but paid more in wages, given a significantly higher average wage per employee. In fact, California had the third highest average Engineering and Design wages in the nation in 2023, with an average annual wage of \$123,000, behind only Massachusetts at \$125,000 and the District of Columbia at \$130,000.
- California and Texas are the two largest contributors to the industry for both economic contribution and jobs. California employs approximately 644,000 workers in the Engineering and Design Services industry, while Texas employs approximately 720,000.

Engineering & Design Services Industry Total Economic Contribution							
States in 2023							
Rank	State	Total Value- Added (GDP, in bils \$)	% of Total Value Added by the Industry	Cumulative %	Total Jobs Supported (x1000)	% of U.S.	Total Paid Wages (in mils \$)
1	California	\$76.9	13.7%	13.7%	644	11.4%	\$69
2	Texas	\$75.2	13.4%	27.1%	720	12.8%	\$64
3	Michigan	\$32.6	5.8%	32.9%	317	5.6%	\$30
4	Florida	\$32.4	5.8%	38.7%	360	6.4%	\$29
5	New York	\$25.6	4.6%	43.3%	256	4.5%	\$24
6	Colorado	\$22.5	4.0%	47.3%	206	3.7%	\$20
7	Virginia	\$21.4	3.8%	51.1%	211	3.7%	\$20
8	Pennsylvania	\$19.4	3.5%	54.6%	206	3.7%	\$18
9	Massachusetts	\$17.4	3.1%	57.7%	145	2.6%	\$16
10	Georgia	\$17.2	3.1%	60.8%	178	3.2%	\$15
11	Illinois	\$17.0	3.0%	63.8%	182	3.2%	\$15
12	New Jersey	\$15.4	2.7%	66.5%	149	2.6%	\$14
13	North Carolina	\$15.2	2.7%	69.2%	160	2.8%	\$13
14	Ohio	\$13.6	2.4%	71.6%	158	2.8%	\$12
15	Maryland	\$13.4	2.4%	74.0%	142	2.5%	\$12
16	Washington	\$13.0	2.3%	76.3%	126	2.2%	\$12
17	Arizona	\$10.1	1.8%	78.1%	105	1.9%	\$9
18	Alabama	\$10.0	1.8%	79.9%	107	1.9%	\$9
19	Tennessee	\$8.8	1.6%	81.5%	94	1.7%	\$8
20	Minnesota	\$8.1	1.4%	82.9%	84	1.5%	\$7

Source: Rockport Analytics, IMPLAN



2023 State-by-State Total Supported Jobs

The table below shows Engineering and Design Services industry revenue for the top 20 states, ranked by 2023 growth over the previous year.

Ranked By 2023 Growth in A/E Revenue (in mils\$)				
State	2022	2023	Annual Growth	
Wyoming	\$463	\$535	15.4%	
Idaho	\$1,715	\$1,917	11.8%	
Delaware	\$822	\$919	11.8%	
Utah	\$4,089	\$4,559	11.5%	
Kansas	\$3,527	\$3,922	11.2%	
Vermont	\$643	\$715	11.2%	
North Dakota	\$934	\$1,034	10.7%	
South Dakota	\$730	\$806	10.5%	
North Carolina	\$10,295	\$11,367	10.4%	
Nebraska	\$1,780	\$1,949	9.5%	
Kentucky	\$2,894	\$3,167	9.4%	
West Virginia	\$876	\$957	9.2%	
Louisiana	\$5,190	\$5,651	8.9%	
lowa	\$2,047	\$2,227	8.8%	
Maine	\$1,304	\$1,418	8.7%	
Ohio	\$9,922	\$10,783	8.7%	
Montana	\$1,265	\$1,372	8.5%	
Alaska	\$1.016	\$1,102	8.4%	
Florida	\$22.741	\$24.621	8.3%	
Arkansas	\$1,408	\$1,521	8.0%	
Other States	\$339,710	\$355,558	4.7%	
Total U.S.	\$413,373	\$436,099	5.5%	

Engineering and Design Services Revenue by State: Top 20

Source: Rockport Analytics, U.S. Census Bureau

- Three states stand out as opportunities due to a high annual growth level and total industry revenue: North Carolina, Ohio, and Florida. While North Carolina and Florida remained near the top of the list from last year, Ohio saw significant improvement, jumping from 34th to 16th place thanks to robust revenue growth this year.
- The South Atlantic region had the highest average Engineering and Design Services job and wage growth in 2023, with jobs growing 6.6 percent and wages growing 11.8 percent, bolstered by strong growth in Delaware, South Carolina, and Maryland.
- In terms of post-pandemic A/E job recovery, the Mountain states have had the strongest comeback, and on average have reached over 118 percent of their 2019 job levels. The Mountain region has also witnessed the strongest growth in terms of average wages, which sit 42 percent above 2019 levels.
- The individual states with the highest A/E job growth in 2023 were Connecticut (20.2 percent), Wyoming (10.1 percent), and Vermont (8.1 percent). In terms of wage growth, the leading states were Delaware (23.3 percent), Wyoming (18.0 percent), and Idaho (14.1 percent).
- Detailed tables showing Engineering and Design Services industry contribution for each state across all metrics are available in Appendix I on page 25 of this report.



Annual Percentage Growth in Engineering and Design Services Jobs and Wages by Region (2023)

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

ENGINEERING AND DESIGN SERVICES INDUSTRY IN 2024 AND BEYOND

Industry Revenue Growth Slows as Higher Interest Rates and a Slowing U.S. Economy Challenge Performance

The Engineering and Design Services industry continued its post-pandemic recovery in 2023, though at a slower pace compared to the rapid rebound of the past two years. Average Output Growth moderated to 8.7 percent from 2021 to 2023, down from 10.3 percent between 2021 and 2022. Economic Output in the industry is now 20 percent above pre-pandemic levels. Growth is expected to cool in 2024 and 2025 as the construction industry feels the impact of higher interest rates, before gradually picking up the pace through the forecast horizon.

- Industry revenue rose by 5.5 percent in 2023, reaching \$436 billion.
- We had previously projected higher revenues for 2023 but projections fell short, mainly the result of interest rate hikes and persistent inflation.
- A 12 percent decline in single-family residential construction, which accounts for about 20 percent of total construction value was the biggest drag on industry revenue.
- We expect industry output to reach \$539 billion by 2029, with an average annual growth of 3.6 percent over the period.



A/E Nominal Economic Output in the United States: History & Forecast (2017-2029)

Source: Rockport Analytics, IMPLAN, Moody's Analytics, Bureau of Economic Analysis, Quarterly Census of Employment and Wages

2024 Forecast	2024	2025	2026	2027	2028	2029
Nominal Output Growth	4.4%	2.9%	3.3%	3.5%	3.7%	3.8%
Real Output Growth	1.3%	0.4%	0.9%	1.2%	1.4%	1.5%

Source: Rockport Analytics, IMPLAN, Moody's Analytics, Bureau of Economic Analysis, Quarterly Census of Employment and Wages

The U.S. Federal Reserve Bank Enters a New Rate Cut Cycle, Renewing Industry Prospects

Inflation and rising interest rates have been major headwinds for both the Construction and Engineering and Design Services industries over the last couple of years. Pandemic-era stimulus and supply chain bottlenecks led to price surges of 4.7 percent in 2021 and 8.0 percent in 2022. The Federal Reserve combatted this inflation through aggressive hikes of the federal funds rate. The target rate rose by over 500 basis points in a period of only 18 months, as highlighted in the figure below.

The aggressive rise in rates has been a significant headwind for both the U.S. economy and construction activity in 2023 and the first half of 2024 (more detail on page 15). Fortunately, these higher rates have also taken their toll on inflation with price growth slowing to four percent in 2023 and to three percent on a year-to-date (YTD) basis in 2024. This deceleration prompted the Federal Reserve to reduce the federal funds rate by half a percentage point during their September 2024 Federal Open Market Committee (FOMC) meeting to a range of 4.75 percent to five percent. As illustrated in the chart below, we expect rates will continue to normalize as inflation falls back towards the Federal Reserve's two percent target.

This shift in policy bodes well for the industry, as falling rates will be stimulative to construction activity and the U.S. economy. While interest rate declines are likely to take time and not fall all the way back to pre-pandemic levels, a more favorable rate environment will instill confidence in future market conditions, stimulate new economic activity, and help to revive previously shelved projects.

The risk of a recession in 2025 persists, however, with economists estimating the probability at between 25 percent and 45 percent.² However, this probability may be overstated as recent reads on employment and GDP have indicated a healthy labor market and relatively strong domestic demand. Non-residential construction is particularly vulnerable, with spending projected to decline from over seven percent in 2024 to two percent in 2025. Institutional construction is also expected to slow, from a 10 percent gain to four percent in the same period.



Annual Average Federal Funds Rate, 2010-2027

Source: Federal Reserve Bank of St. Louis, Rockport Analytics

The interest rate environment took its toll on the industry's relative performance in late 2023.

Engineering and Design Services revenue grew at an average rate of 6.1 percent in 2023, down from an average of 10.9 percent in 2022. Industry revenue growth dipped below the broader all-industry rate in the third quarter of 2023, but it has since surpassed it and has rebounded to a rate of 4.0 percent in the first quarter of 2024.



Source: U.S. Census Bureau, Quarterly Services Survey, Rockport Analytics

Architectural services has been more sensitive to higher rates and the slowing U.S. economy.

Engineering services consistently outperformed architectural services in terms of revenue growth throughout 2023, averaging 6.1 percent compared to 1.0 percent. While architectural and related services experienced a temporary decline in revenue going into the third quarter of 2023, they have since rebounded, reaching a growth rate of 3.5 percent in the first quarter of 2024. In contrast, engineering services have continued to exhibit strong momentum, climbing to 6.9 percent over the same period.



Engineering and Architectural Services: Quarterly Revenue Growth with 4-Quarter Moving Average

Source: U.S. Census Bureau, Quarterly Services Survey, Rockport Analytics

Construction Industry Landscape: A/E End Markets, Challenges and Growth Potential

The construction industry faces a complex landscape with declining residential construction, a shift towards public projects, and a persistent shortage of skilled workers. Despite these challenges, a substantial backlog of housing projects and falling material prices present significant opportunities for growth in the coming years.

Despite a general slowdown in growth compared to the previous year, the total value of U.S. construction in 2024 still expanded by 6.1 percent, surpassing \$2.1 billion. This deceleration is primarily due to increased volatility and a downturn in single-family construction.



Non-residential and commercial construction grew 26.1 percent in 2023, primarily due to a 68.7 percent jump in Manufacturing. The Manufacturing sector maintained this strength into the first half of 2024, showing a 21.6 percent increase. Meanwhile, non-residential and commercial construction rose 4.9 percent in the first half of 2024.



In 2023, non-building construction rose 22.5 percent, driven by a 33.3 percent increase in Conservation and Development projects. During the first half of 2024, growth in non-building construction moderated to 6.6 percent, led by Water Supply Systems (11.6 percent).



The residential sector has experienced fluctuating growth rates. 2022 = 14.9% 2023 = -4.4% H1 2024 = 7.1%

The 2024 figures clearly suggest a rebound compared to last year's decline.

Source: FMI 2024Q3 North American Engineering and Construction Outlook, U.S. Census Value of Construction Put in Place Survey, Rockport Analytics



2023 Performance

- The residential construction sector experienced a 4.4 percent decline in 2023, primarily due to a 12 percent drop in single-family home construction. Rising home prices and interest rates deterred buyers, with price-to-median household income ratios reaching 7.7, far above the long-run average of around 5X. Declines in affordability drove potential buyers to seek out renting instead, further spurring growth in multi-family development.
- The Manufacturing sector remained the top performer in non-residential and commercial construction, mirroring last year's trend, as U.S. firms continued massive onshoring efforts.
- Worker shortages in the construction industry may serve as a bottleneck for the flow of projects and for capitalizing on the existing construction backlog. A 2023 survey by the Associated General Contractors of America found that 85 percent of firms have open positions they are looking to fill, and 88 percent are having problems filling those positions.³ The research cites a lack of qualified candidates as the main reason for these shortages, which are in turn leading to project delays and cancelations.

	GROWTH (PREVIOUS VS.	I RATES CURRENT YTD)	RAW	YEARLY VAI	LUE
Billions(\$)	2023-2022 Y/Y%	2024-2023 YTD Y/Y%	2022	2023	2024 YTD*
Non-Residential & Commercial	26.1%	4.9%	\$628	\$792	\$832
Public Safety	16.7%	30.8%	\$12	\$14	\$19
Manufacturing	68.7%	21.6%	\$115	\$194	\$236
Amusement and Recreation	20.0%	6.2%	\$30	\$36	\$38
Educational	17.6%	4.9%	\$102	\$120	\$126
Transportation	10.2%	2.9%	\$59	\$65	\$67
Religious	33.3%	2.8%	\$3	\$4	\$4
Health Care	18.2%	1.3%	\$55	\$65	\$66
Communication	16.7%	1.3%	\$24	\$28	\$28
Office	7.6%	-0.5%	\$92	\$99	\$98
Lodging	25.0%	-5.6%	\$20	\$25	\$23
Commercial	21.4%	-11.7%	\$117	[′] \$142	\$125
Non-Building	22.5%	6.6%	\$289	\$354	\$377
Water Supply Systems	21.7%	11.6%	\$23	\$28	\$31
Sewage and Waste Disposal	27.3%	8.0%	\$33	\$42	\$45
Power Plants/Pipeline/Communications	21.8%	7.4%	\$110	\$134	\$144
Streets and Highways	21.1%	4.6%	\$114	\$138	\$144
Conservation and Development	33.3%	4.1%	\$9	\$12	\$12
Residential	-4.4%	7.1%	\$918	\$878	\$940
Total Construction	9.5%	6.1%	\$1,849	\$2,024	\$2,148
Total Public Construction	19.9%	7.3%	\$376	\$451	\$484
Total Private Construction	6.9%	5.8%	\$1,472	\$1,573	\$1,665

Value of Construction Put in Place: Non-Residential & Commercial, Non-Building, and Residential 2022-2024

*2024 is only January - June, and June is preliminary data

3 Associated General Contractors of America, "2023 Workforce Survey Analysis".

Looking Forward

- The chart and table on the following page provide a forward-looking outlook for A/E end markets through 2027. In the bubble chart, markets positioned higher are expected to see the most growth in the coming years, with the bubble size representing the construction value in each industry. Single-family construction and transportation stand out as the sectors with the strongest growth potential for the upcoming years, with projections showing 6.6 percent and 7.5 percent growth, respectively. Markets furthest to the right reflect the highest growth in 2023, with manufacturing leading the way, growing 54.9 percent.
- We expect that the shift from private to public construction will persist over the next five years, with utilities and public facilities reaping the benefits of funds from the IIJA and the Inflation Reduction Act. We expect this will drive outperformance in non-building end markets like transportation, streets and highways, power, and water and sewage.
- Estimates from Zillow show that there is a housing shortage of over 4.5 million homes in the U.S. With construction material prices dropping, the industry stands poised to reap the gains of a substantial backlog of housing projects, with single-family housing having some of the highest levels of market opportunity over the coming years.
- Multifamily development is likely to face headwinds through a combination of factors, including increased supply and a more favorable environment for single family home purchases. The influx of new units may outpace rental demand, while economic conditions and regulatory changes could limit investment opportunities.
- Commercial construction may also encounter challenges as increased financial strain on consumers could strain demand for retail and office space, impacting new development projects. The slowdown in multifamily and mixed-use development could further limit opportunities for commercial construction, as these projects often include retail or office components.







Source: FMI 2024Q3 North American Engineering and Construction Outlook, U.S. Census Value of Construction Put in Place Survey, Rockport Analytics

Construction Segment	2023 Industry Size (\$ Billions)	CAGR 2023-2027	2023 Growth
Manufacturing	\$193,630	1.1%	54.9%
Sewage and Waste Disposal	\$41,912	4.3%	26.1%
Conservation and Development	\$11,719	2.8%	24.8%
Public Safety	\$14,395	2.2%	22.9%
Lodging	\$24,740	-0.3%	22.3%
Streets and Highways	\$138,060	4.0%	19.4%
Religious	\$3,801	-1.9%	19.3%
Multifamily	\$145,587	-5.5%	17.6%
Water Supply	\$27,999	4.2%	16.4%
Educational	\$120,226	4.6%	15.6%
Communication	\$28,004	4.0%	14.9%
Amusement and Recreation	\$36,203	-2.4%	14.8%
Health Care	\$65,429	1.8%	12.6%
Power	\$134,010	2.5%	10.2%
Commercial	\$141,702	-2.8%	7.8%
Transportation	\$65,246	7.5%	7.1%
Office	\$98,989	-0.2%	2.7%
Single-family	\$400,909	6.6%	-11.6%

Source: FMI 2024Q3 North American Engineering and Construction Outlook, U.S. Census Value of Construction Put in Place Survey, Rockport Analytics

Other Trends Driving the Outlook for Engineering and Design Services

Key Allocations and Regional Impacts of the IIJA

The Infrastructure Investment and Jobs Act (IIJA), passed in 2022, allocated \$1.2 trillion for transportation and infrastructure improvements, with 80 percent of the funds designated for transportation, broadband, water, sewer, and environmental projects. While states are actively pursuing IIJA initiatives, only \$454 billion has been announced as of mid-2024, with the pace of funding announcements accelerating but still behind schedule.⁴ Implementation has faced challenges, including complex grantee requirements, preferences for unionized labor, and strict Buy America provisions. Inflation and rising costs have also caused initial project estimates to fall short, leading to delays, pauses, and potential cancellations–such as the Houston Metro bus rapid transit line and New York's Second Avenue Subway extension.⁵

The destination of much of the remaining funds remains uncertain. The most populous states, like California, Texas, and New York, are expected to receive the largest amounts, while less-populated states such as Alaska, North Dakota, and Montana currently lead in per capita funding. The allocation of funds also varies by state: less populated states tend to receive a disproportionate share of federal highway aid, whereas the New England and Mid-Atlantic Corridor will benefit from a significant portion of public transportation funding. Notably, over \$6 billion of Amtrak's \$16 billion rail improvement allocation is earmarked for this region, boosting per capita spending from the South Atlantic to New England.



State-by-State per Capita IIJA Spending

Source: White House, Investing in America, and Brookings Institute, 2024

4 Julie Strupp, "\$720B in IIJA funds yet to be allocated". Construction Dive, 2024

5 Marc Joffe, "\$1.2 Trillion Bipartisan Infrastructure Bill Off to a Very Slow Start". Cato Institute, 2024

Material Pricing Stabilizes, Many Commodities in Correction Mode

Material costs have continued to decelerate, with many commodities seeing outright declines, while supply chain pressures remain under control. Over the last year, we have witnessed slowing growth in the Producer Price Index (PPI) of gypsum, concrete, and builder's hardware, and declines in the PPI of many other materials compared to 2022–specifically wood products. Throughout 2023 the growth in the PPI of construction materials (aggregated) remained below the level of Consumer Price Inflation (CPI) growth.

The significant drop in lumber prices, a key material needed in large quantities for framing homes, is especially beneficial for single-family residential construction, which has been a drag on overall construction Put in Place values.



Construction Materials PPI vs Consumer Inflation Year-over-Year Percent Change

Source: Federal Reserve Bank of St. Louis, Rockport Analytics

Strong Wage Growth Trends Continue Amid Challenges in Hiring and Retention

The Engineering and Design Services industry faces a significant challenge due to its aging workforce and high turnover rates. This has exacerbated an existing skills gap, making it difficult for firms to hire qualified workers. According to ACEC Research Institute's 2024 Q4 Engineering Business Sentiment study, over half of firms (51 percent) continue to turn down work due to workforce shortages. Among firms turning down work, most (83 percent) are being more selective about the projects they are accepting, down from 88 percent in 2024 Q1. Twenty-six percent of firms also indicate that they are turning down good profitable projects, up two points from 2024 Q1.

Unfortunately, we don't expect these trends to reverse anytime soon. The Bureau of Labor Statistics (BLS) data show that slightly over one-quarter (27 percent) of Engineering and Design Services workers were aged 55 and over in 2023–compared to 23 percent for all industries. This proportion has remained higher than the industry average since before the pandemic. This means that a substantial portion of the workforce is nearing retirement, taking a lot of valuable skills and knowledge with them, and further widening the pre-existing skills gap. One of the biggest challenges for Engineering and Design Services firms has been hiring workers with the required skill set to meet the demands of existing work.



Workers Aged 55+

All Industries

Source: Rockport Analytics, U.S. Census Bureau



These workforce challenges are illustrated by the gap between job openings and new hires in the Professional and Business Services sector. While the gap has narrowed since 2022, it has remained stubbornly wide since mid-2023 at around 1.5 openings per new hire. In a healthy labor market, we would expect the ratio to be closer to one. According to the ACEC Research Institute's 2024 Q1 Engineering Business Sentiment study, nine out of 10 (92 percent) firms still have at least one opening. The median number of open positions is five.

Another factor exacerbating labor challenges is that the Labor Force Participation Rate (LFPR) also remains significantly lower than it was before the pandemic (by around five million workers across all industries) and many economists expect these low participation rates to persist. Particularly concerning for the Engineering and Design Services industry is the decline in the participation rate of prime-age males (age 25-54), from 94 percent in the 1980s to 89 percent in mid-2024. In 2023, 83 percent of the industry's workforce was male. To address these gaps, the industry will need to rely more heavily on increased female participation, attracting young workers, skilled immigration, and automation.

These labor supply challenges coupled with our forecast for continued growth in industry revenue will support continued pressure on wages in the Engineering and Design Services sector. Industry wage growth, which previously lagged the all-industry average, has since accelerated, reaching 4.5 percent in 2022 before easing slightly to 4.3 percent in 2023, outpacing the all-industry average of 3.2 percent



Professional and Business Services Hires vs. Job Openings 2019-2024

Source: Bureau of Labor Statistics, Rockport Analytics

Engineering and Design Services vs. All Industry Average Wages - Y/Y Growth



Source: U.S. Census Bureau, Quarterly Services Survey, Rockport Analytics

Artificial Intelligence (AI) Adoption in the Engineering and Design Services Industry Could Help Unlock the Productivity Trap

The Professional, Scientific, and Technical Services industry has been ahead of the curve in adopting AI into their workflows, with an adoption rate of 12 percent, ranking second to only Information Services. Adoption has not been even, however, with firms over 10,000 employees leading the way in adoption.⁷



Al Adoption by Industry

Source: Census Business Trends and Outlook Survey, 2023

7 Brian Eastwood, "The who, what, and where of AI adoption in America", MIT, 2024

While we expect it to take time for adoption to hit critical mass, AI holds significant promise in both operational efficiency and labor productivity within the Engineering and Design Services industry. Industry surveys have shown that over two-thirds of firms expect to see productivity increases, reductions in excess expenditures, and improvements in communication through the use of AI.⁸ According to ACEC Research Institute's 2024 Q1 Engineering Business Sentiment study, half (52 percent) of firms have an AI strategy in place or are working on one and 63 percent of firms believe that AI will have a positive impact on their firm in the coming year. Engineering and Design Services firms will need to weigh the costs and the benefits of transitioning toward a heavier reliance on AI in their workflows.

As illustrated in the chart below, Engineering and Design Services lagged the broader market in productivity growth over the last eight years. From the period of 2015 to 2023, productivity growth in Engineering Services has essentially been non-existent while, in aggregate, private industries across the U.S. have grown their productivity in the one to two percent range each year, with the only exception being the volatile period following the COVID-19 crisis. There is hope that AI could be one tool to fight the labor and productivity challenges persistent in the industry but studies on productivity gains have found varying levels of improvement, ranging from eight percent to 26 percent in terms of project timeline improvement and the quality of the work delivered.⁹ We expect broad-scale adoption to take time considering the upfront investment and the need for more relevant tools and technologies to be built on top of existing AI infrastructure.



Labor Productivity: Engineering Services vs All Private Businesses

Source: Bureau of Labor Statistics, Rockport Analytics

⁸ Deltek, "45th Annual Deltek Clarity Architecture & Engineering Industry Study" 2024.

⁹ Hogan, Marie and Aakash Kalyani, "Al and Productivity Growth: Evidence from Historical Developments in Other Technologies". Federal Reserve Bank of St. Louis, 2024

APPENDIX I: A/E ECONOMIC IMPACT MEASURES BY STATE

Engineering and Design Services Industry State-Level Impacts

	Jobs Supported 2023						
State	Direct Jobs	Indirect Jobs	Induced Jobs	Total Jobs			
Alabama	32,184	13,862	61,157	107,203			
Alaska	4,571	1,269	7,458	13,298			
Arizona	31,737	13,812	60,145	105,694			
Arkansas	7,736	2,350	12,706	22,793			
California	191,350	87,983	363,908	643,240			
Colorado	58,150	28,267	119,743	206,160			
Connecticut	13,438	5,620	23,656	42,713			
Delaware	4,129	1,546	6,584	12,259			
DistrictofColumbia	8,271	3,136	9,382	20,789			
Florida	106,504	48,193	205,638	360,335			
Georgia	50,395	25,576	102,343	178,314			
Hawaii	6,300	2,216	11,245	19,761			
Idaho	8,754	3,147	15,073	26,974			
Illinois	49,623	25,958	106,222	181,803			
Indiana	23,654	8,456	40,723	72,833			
lowa	9,306	2,822	15,426	27,554			
Kansas	15,772	7,069	27,894	50,735			
Kentucky	14,328	5,150	24,252	43,729			
Louisiana	23,956	9,362	43,379	76,696			
Maine	6,227	2,106	10,582	18,916			
Maryland	40,906	21,300	79,774	141,979			
Massachusetts	43,806	20,392	80,537	144,735			
Michigan	88,654	46,561	182,052	317,267			
Minnesota	25,417	10,800	47,618	83,835			
Mississippi	6,621	2,054	11,043	19,718			
Missouri	25,413	13,334	50,453	89,200			
Montana	6,020	1,924	9,888	17,832			
Nebraska	8,006	2,935	13,663	24,603			
Nevada	14,100	5,698	24,731	44,529			
NewHampshire	8,722	3,752	15,243	27,716			
NewJersey	42,411	22,457	84,992	149,860			
NewMexico	9,077	2,888	15,221	27,186			
NewYork	79,447	35,553	139,946	254,946			
NorthCarolina	48,615	20,637	90,287	159,539			
NorthDakota	4,419	1,267	6,980	12,666			
Ohio	47,308	20,385	90,747	158,440			
Oklahoma	12,550	4,736	22,437	39,723			
Oregon	18,958	7,217	32,177	58,351			
Pennsylvania	62,393	27,403	116,712	206,508			
Rhodelsland	4,507	1,611	7,153	13,272			
SouthCarolina	23,509	11,061	45,753	80,323			
SouthDakota	3,670	928	5,798	10,396			
Tennessee	25,791	13,522	55,071	94,384			
Texas	184,162	106,519	429,355	720,036			
Utah	20,085	9,914	39,502	69,502			
Vermont	3,098	964	4,934	8,997			
Virginia	60,209	31,369	119,835	211,413			
Washington	38,726	15,548	71,081	125,354			
WestVirginia	4,895	1,388	7,540	13,823			
Wisconsin	24,080	8,604	42,196	74,880			
Wyoming	2,631	662	4,015	7,308			
U.S.TOTAL	1,654,591	771,281	3,214,249	5,640,121			

Source: Rockport Analytics, IMPLAN

Engineering and Design Services Industry State-Level Impacts

	Wages Supported 2023 (in millions \$)						
State	Direct Wages	Indirect Wages	Induced Wages	Total Wages			
Alabama	\$3,518	\$888	\$5,000	\$9,406			
Alaska	\$457	\$84	\$604	\$1,145			
Arizona	\$3,191	\$943	\$4,837	\$8,971			
Arkansas	\$631	\$129	\$852	\$1,612			
California	\$24,438	\$7,945	\$36,515	\$68,898			
Colorado	\$6,847	\$2,268	\$10,607	\$19,721			
Connecticut	\$1,421	\$403	\$1,982	\$3,807			
Delaware	\$381	\$96	\$498	\$975			
DistrictofColumbia	\$1,104	\$274	\$1,173	\$2,550			
Florida	\$10,210	\$3,170	\$15,378	\$28,758			
Georgia	\$5,224	\$1,742	\$8,040	\$15,007			
Hawaii	\$673	\$147	\$948	\$1,768			
Idaho	\$795	\$195	\$1,112	\$2,101			
Illinois	\$5,153	\$1,727	\$8,010	\$14,889			
Indiana	\$2,088	\$532	\$3,013	\$5,633			
lowa	\$923	\$177	\$1,229	\$2,329			
Kansas	\$1,626	\$474	\$2,254	\$4,355			
Kentucky	\$1,313	\$323	\$1,840	\$3,476			
Louisiana	\$2,343	\$594	\$3,324	\$6,261			
Maine	\$588	\$144	\$836	\$1,568			
Maryland	\$4,531	\$1,392	\$6,470	\$12,393			
Massachusetts	\$5,710	\$1,848	\$8,223	\$15,781			
Michigan	\$10,483	\$3,340	\$15,680	\$29,503			
Minnesota	\$2,718	\$791	\$3,960	\$7,469			
Mississippi	\$555	\$112	\$755	\$1,423			
Missouri	\$2,731	\$880	\$4,018	\$7,629			
Montana	\$569	\$126	\$775	\$1,470			
Nebraska	\$808	\$198	\$1,103	\$2,110			
Nevada	\$1,372	\$339	\$1,905	\$3,616			
NewHampshire	\$993	\$298	\$1,393	\$2,683			
NewJersey	\$4,803	\$1,675	\$7,215	\$13,693			
NewMexico	\$863	\$182	\$1,170	\$2,215			
NewYork	\$9,162	\$2,650	\$12,550	\$24,362			
NorthCarolina	\$4,714	\$1,511	\$7,188	\$13,412			
NorthDakota	\$429	\$83	\$562	\$1,074			
Ohio	\$4,471	\$1,297	\$6,683	\$12,451			
Oklahoma	\$1,128	\$279	\$1,621	\$3,028			
Oregon	\$1,869	\$547	\$2,673	\$5,089			
Pennsylvania	\$6,320	\$2,006	\$9,422	\$17,748			
Rhodelsland	\$404	\$106	\$553	\$1,063			
SouthCarolina	\$2,227	\$678	\$3,312	\$6,218			
SouthDakota	\$334	\$61	\$447	\$843			
Tennessee	\$2,656	\$851	\$4,161	\$7,669			
Texas	\$21,428	\$7,676	\$35,014	\$64,118			
Utah	\$1,891	\$605	\$2,824	\$5,320			
Vermont	\$297	\$69	\$401	\$766			
Virginia	\$7,164	\$2,362	\$10,341	\$19,867			
Washington	\$4,393	\$1,233	\$6,319	\$11,944			
WestVirginia	\$397	\$76	\$515	\$988			
Wisconsin	\$2,274	\$557	\$3,232	\$6,063			
Wyoming	\$222	\$36	\$281	\$539			
U.S.TOTAL	\$180,840	\$56,119	\$268,819	\$505,778			

Source: Rockport Analytics, IMPLAN

Engineering and Design Services Industry State-Level Impacts

Total Industry GDP 2023 (in millions \$)									
State	Direct	Indirect	Induced	Total GDP					
Alabama	\$5,238	\$1,798	\$3,008	\$10,044					
Alaska	\$693	\$155	\$291	\$1,140					
Arizona	\$4,820	\$1,841	\$3,469	\$10,131					
Arkansas	\$941	\$264	\$441	\$1,646					
California	\$36,882	\$15,085	\$24,976	\$76,943					
Colorado	\$10,350	\$4,318	\$7,818	\$22,486					
Connecticut	\$2,141	\$782	\$1,142	\$4,065					
Delaware	\$575	\$173	\$209	\$957					
DistrictofColumbia	\$1,690	\$483	\$140	\$2,313					
Florida	\$15,446	\$6,043	\$10,885	\$32,374					
Georgia	\$7,855	\$3,396	\$5,928	\$17,178					
Hawaii	\$1,020	\$289	\$581	\$1,890					
Idaho	\$1,199	\$376	\$650	\$2,225					
Illinois	\$7,681	\$3,417	\$5,892	\$16,991					
Indiana	\$3,105	\$1,080	\$1,887	\$6,071					
lowa	\$1.380	\$374	\$618	\$2.372					
Kansas	\$2.433	\$896	\$1.190	\$4.519					
Kentucky	\$1.952	\$653	\$1.044	\$3.648					
Louisiana	\$3.511	\$1.131	\$1,913	\$6,556					
Maine	\$889	\$272	\$490	\$1.651					
Maryland	\$6 867	\$2 607	\$3,938	\$13 412					
Massachusetts	\$8 641	\$3,522	\$5,218	\$17,381					
Michigan	\$15,660	\$6,443	\$10,532	\$32 635					
Minnesota	\$4,066	\$1 542	\$2 503	\$8 111					
Mississioni	\$831	\$222	\$391	\$1 445					
Missouri	\$4,086	\$1 625	\$2,392	\$8 103					
Montana	\$861	\$241	\$418	\$1,520					
Nebraska	\$1 213	\$389	\$590	\$2 191					
Nevada	\$2,075	\$667	\$1 126	\$3,868					
NewHampshire	\$1 499	\$561	\$811	\$2,871					
New Jersey	\$7,212	\$3 245	\$4.940	\$15 308					
NewMexico	\$1,212	\$3,2 4 0	\$605	¢10,000 ¢2.251					
NewYork	\$13.808	\$370 \$4.074	\$6 710	¢2,201					
NorthCarolina	\$7.068	\$2,064	\$5,187	\$15 218					
NorthDakota	\$645	φ2,304 \$168	\$266	\$1.078					
Obio	\$6 644	\$2.567	\$4.406	\$13.617					
Oklahoma	\$1,696	\$533	\$978	\$3 207					
Oregon	\$2,816	\$1.053	\$1 659	\$5,207					
Pennsylvania	\$2,010	\$1,000	\$1,009 \$6,110	\$0,520 \$10,410					
Phodololand	\$9,440 \$611	¢3,000 ¢202	¢0,110	\$13,410 \$1.104					
SouthCarolina	¢2 222	ψ202 ©1 220	¢2 021	\$1,10 4 \$6,901					
SouthDakota	\$3,323 \$503	\$1,000 \$101	φ∠,∠J I \$227	\$0,091 \$251					
Toppossoo	\$3.065	¢1 690	φ221 ¢2 107	¢0.74					
Tevas	¢0,900	\$1,009	\$0,107 \$02,005	φ0,102 ¢75.024					
Itab	\$3∠,U∠U €3,0∠4	\$ 14,909 \$1.465	φ20,220 ¢1 042	Φ10,234 Φ5 040					
Vermont	Φ440	\$1,100 ¢400	φ1,943 Φ042	\$0,949 \$704					
Vermoni	\$449 #40.004	\$129 \$4,000	φ∠ I3	\$791 ©04.000					
	\$ 10,801	\$4,333 \$2,204	Φ0,∠∠ŏ	\$21,362					
vvasnington	\$0,020	\$2,391	\$4,U3∠	\$13,049					
Westvirginia	\$594	\$153	\$Z30	\$983					
VVISCONSIN	\$3,399	\$1,123	\$1,894	\$6,415					
vvyorning	\$335	\$13	\$1 <u>2</u> 0	\$527					
	\$074 700	¢400.050	¢400.405	0 550.054					
0.5.101AL	\$271,798	\$108,050	\$180,105	\$559,954					

Source:RockportAnalytics,IMPLAN

Engineering	and Design	Services	Industry	State-Level	Impacts
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Taxes 2023 (in millions \$)								
State	Total Federal Taxes	Total State & Local Taxes	Total Taxes					
Alabama	\$1,621	\$730	\$2,351					
Alaska	\$177	\$51	\$228					
Arizona	\$1,668	\$715	\$2,384					
Arkansas	\$260	\$138	\$398					
California	\$12,641	\$7,224	\$19,865					
Colorado	\$3,725	\$1,698	\$5,423					
Connecticut	\$654	\$400	\$1,054					
Delaware	\$149	\$66	\$215					
DistrictofColumbia	\$338	\$105	\$443					
Florida	\$5,326	\$2,168	\$7,494					
Georgia	\$2,849	\$1,087	\$3,936					
Hawaii	\$303	\$200	\$503					
Idaho	\$357	\$173	\$529					
Illinois	\$2,823	\$1,488	\$4,311					
Indiana	\$985	\$465	\$1,450					
lowa	\$373	\$174	\$548					
Kansas	\$723	\$353	\$1,076					
Kentucky	\$585	\$278	\$863					
Louisiana	\$1,052	\$486	\$1,539					
Maine	\$265	\$170	\$434					
Maryland	\$2,172	\$1,169	\$3,342					
Massachusetts	\$2,832	\$1,337	\$4,170					
Michigan	\$5,360	\$2,502	\$7,862					
Minnesota	\$1.320	\$728	\$2.049					
Mississippi	\$228	\$125	\$353					
Missouri	\$1.316	\$561	\$1.878					
Montana	\$241	\$124	\$365					
Nebraska	\$349	\$159	\$508					
Nevada	\$621	\$274	\$894					
NewHampshire	\$463	\$186	\$649					
NewJersev	\$2.540	\$1.529	\$4.069					
NewMexico	\$355	\$189	\$544					
NewYork	\$4,089	\$2.357	\$6,446					
NorthCarolina	\$2,516	\$1,049	\$3,565					
NorthDakota	\$168	\$77	\$246					
Ohio	\$2,230	\$990	\$3,219					
Oklahoma	\$516	\$228	\$745					
Oregon	\$897	\$486	\$1,383					
Pennsylvania	\$3,178	\$1.637	\$4,815					
Rhodelsland	\$176	\$100	\$276					
SouthCarolina	\$1.131	\$513	\$1.644					
SouthDakota	\$134	\$48	\$182					
Tennessee	\$1.456	\$541	\$1.997					
Texas	\$12.645	\$4.731	\$17.376					
Utah	\$978	\$438	\$1.416					
Vermont	\$125	\$88	\$213					
Virginia	\$3.468	\$1,641	\$5.109					
Washington	\$2.119	\$862	\$2.981					
WestVirginia	\$153	\$80	\$233					
Wisconsin	\$1.032	\$502	\$1,534					
Wyoming	\$81	\$31	\$113					
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U.S.TOTAL	\$91,767	\$43,453	\$135,220					

Source: Rockport Analytics, IMPLAN, Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau

APPENDIX II: ENGINEERING AND DESIGN SERVICES INDUSTRY DEFINITION

The definition of the Engineering and Design Services industry has been primarily developed based upon the ways in which public and private data sources collect and publish information from all businesses across the U.S. - the North American Industry Classification System, or NAICS. NAICS is a hierarchical industry taxonomy that provides classification standards for businesses according to their stated activities. Most public and private data collection conforms to these standards.

The NAICS code "5413, Architectural, Engineering, and Related Services" is part of the broad category, "54 -Professional, Scientific, and Technical Services" and includes both private and public sector organizations from a number of sub-sectors including:

- Architectural Services
- Landscape Architectural Services
- Engineering Services
- Drafting Services
- Building Inspection Services

- Geophysical Surveying and Mapping Services
- Surveying and Mapping (except Geophysical) Services
- Testing Laboratories



This study will focus on the all-inclusive NAICS 5413 category to define Engineering and Design Services activity for several reasons:

- More data with higher frequencies and greater regional detail are available at the 4-digit (5413) NAICS level. The deeper we drill into the NAICS structure, the less available and robust the data describing sector performance.
- Second, as a result of mergers and/or vertical integration strategies, more and more traditional ACEC members do operate across many of the sub-sectors within 5413.
- Third, given the economic and policy drivers of the Engineering and Design Services industry, it is likely that measured trends for NAICS 5413 will hold for most, if not all, of its member sub-sectors.
- Finally, a broader definition of A/E may bring more potential members into the ACEC family.

One important note regarding the analysis and interpretation of the results in this study. Our focus on NAICS 5413 in its entirety is not perfectly representative of board licensed professionals providing engineering services for the built environment (physical infrastructure) and the firms for which they work. Such firms are notable and different for a number of reasons, including:

- Professional licensure creates direct moral and liability considerations for the licensed professional and their firms, regarding the safety and health of people and property.
- Federal, state, and local governments have laws and statutes which provide for separate procurement processes that involve the selection of providers of licensed professional and related services based on capability and experience criteria.
- Services can only be provided in disciplines (civil, mechanical, electrical, structural, environmental, etc.) the professionals are qualified to perform, and in many states, firm ownership is required to consist of all or a certain percentage of active professionals in the firm. This has the effect of also limiting the size of many such firms.
- Design work usually requires the teaming of firms with varied discipline capabilities and experience.
- Board licensing is for individual states or territories, resulting in geographical emphasis or limits on where work can be performed by individual firms.
- Since built environment involves facilities and infrastructure that are unique, due to the physical conditions involved, their designs must be correct when complete. Prototypes and beta testing are not an option since the initial construction costs and later corrections are prohibitive. The designs must be right the first time.

Since the definitions of NAICS Code 5413 and 541330 do not distinguish design of built environment from the design of equipment, systems, materials, instruments, software, and similar repeatable products and most data gathering surveys and processes allow for self-determination of NAICS Code reporting, many manufacturing, industrial, and management firms are included in the results. Often these are large enterprises that may skew the results.

While these firms may be "applying physical laws and principles of engineering in their design work", they are essentially operating in a different business sector of the A/E industry. ACEC represents the business interests of firms across all NAICS Code 5413, but recognizes the difference involved. We have attempted to provide context and insight where we have evidence that the more relevant data might deviate from the broader findings.

It must be emphasized that while the data contained in this report is suitable for many purposes, including understanding the size and impact of the A/E services industry, the data available and presented is not suitable for evaluating and establishing guidance for decisions on procurement practices or developing size standards for either the aggregate industry or the portion of the industry focused on design of the built environment. The latter portion is heavily concentrated in physical infrastructure design services provided to federal, state, and local governments and entities involved in public works. The firms operating in this sector of the A/E services industry make up the largest portion of ACEC membership.

The Industry Forecast Methodology

The foundation for the forecast for Engineering and Design Services includes the historical trends of sector-level industry revenue that were established in earlier phases of research. The goal of this phase of research is to:

- (1) update the previous quantitative forecast for Engineering and Design Services activity over the next five years
- (2) provide context around the key drivers of the forecast for Engineering and Design Services
- (3) analyze key trends, risks, and opportunities

The Engineering and Design Services industry forecast is developed by analyzing historical correlations between key driver variables of A/E services with overall A/E industry revenue. Using these mathematical correlations allows us to make inferences around the direction of Engineering and Design Services activity in the future. The forecast is further informed by quantitative data and industry insight to account for additional factors that may not be included in the econometric model.

The Industry Forecast Data Sources

The data-driven effort to profile the Engineering and Design Services industry took advantage of a comprehensive set of published data from several public and private sources including:

- U.S. Census Bureau Statistics of U.S. Business (SUBS) demographics, housing, income, employment and business establishment data and trends
- U.S. Census Bureau Value of Construction Put in Place
- U.S. Census Bureau Quarterly Services Survey (QSS)
- U.S. Bureau of Labor Statistics (BLS) industry employment and earnings plus occupational employment and annual salary statistics
- U.S. Bureau of Economic Analysis (BEA) National Income and Product Accounts (GDP), employment, sales, wages, and supply chain purchases
- Dodge Data and Analytics commercial construction project data
- Other public and private sources



About ACEC Research Institute

The ACEC Research Institute's mission is to deliver knowledge and business strategies that guide and elevate the engineering industry and to be the leading source of knowledge and thought leadership for creating a more sustainable, safe, secure, and technically advanced built environment. The ACEC Research Institute is an independent 501c3 nonprofit organization.

About Rockport Analytics

Rockport Analytics is a research and analytical consulting firm providing high quality quantitative and qualitative research solutions to business, government, and nonprofit organization clients across the globe. We provide fast, nimble service in a completely transparent environment. Capabilities include:

- Industry/Market Analysis and Forecasting
- Economic Impact Assessment and Economic Development
- Market Modeling and Decision Support Tools
- Project Feasibility Assessment
- Primary and Secondary Research Synthesis





The ACEC Research Institute provides the engineering industry with cutting edge research, trend data, and economic analysis to help firm owners make decisions and delivers thought leadership that advances engineering's essential value to society.

The ACEC Research Institute wishes to extend its sincere appreciation to its generous contributors.

