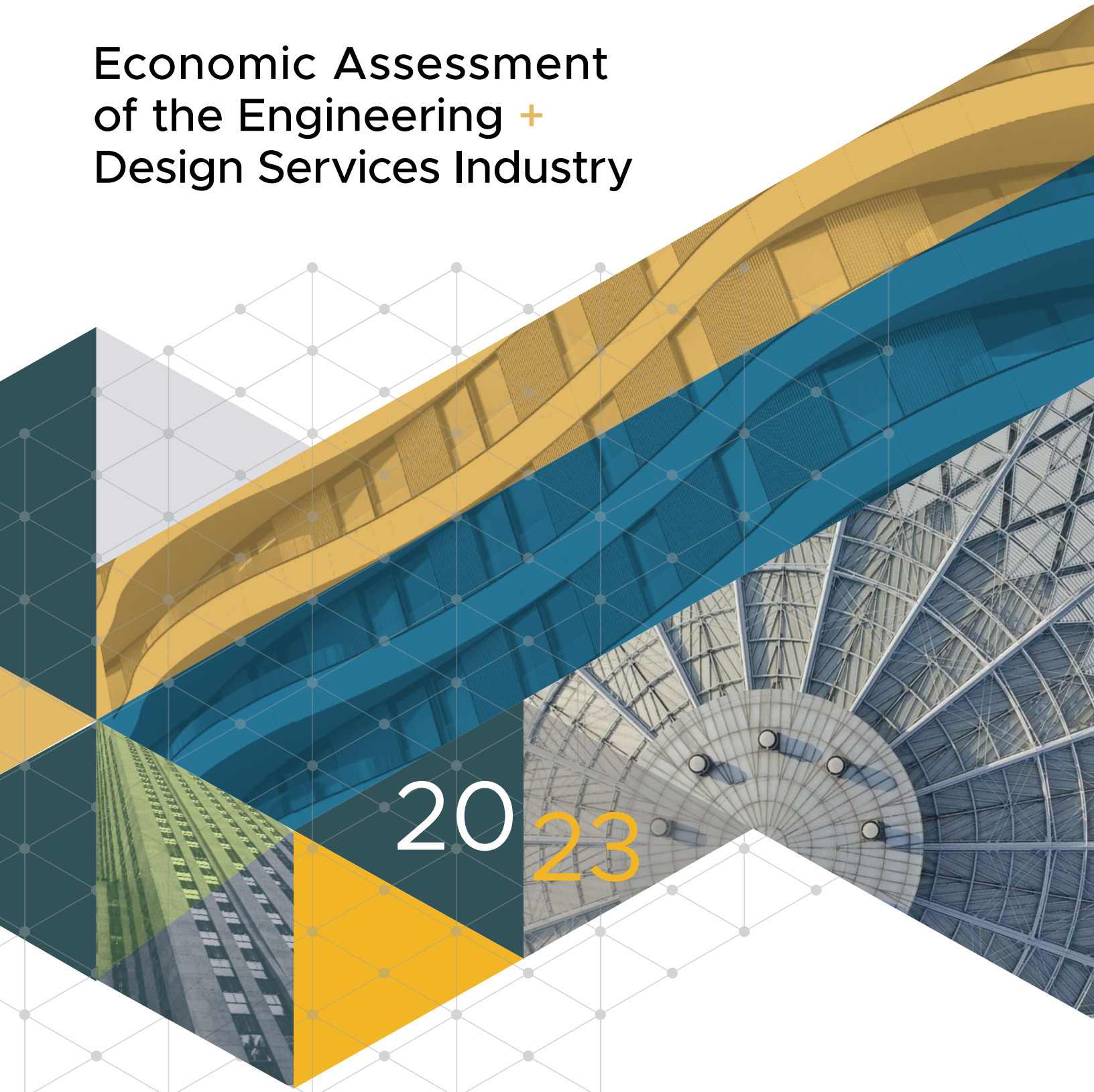
Economic Assessment of the Engineering + Design Services Industry



2023

ACEC RESEARCH INSTITUTE

acecresearchinstitute.org

2023 ECONOMIC ASSESSMENT OF THE ENGINEERING AND DESIGN SERVICES INDUSTRY

TABLE OF CONTENTS

INTRODUCTION

This is the fourth annual release of the Engineering and Design Services industry forecast. In 2020, the ACEC Research Institute first commissioned a series of studies – the Industry Impact Series – to profile and analyze performance in the Engineering and Design Services industry (A/E Services).

This study is updating that series which aims to describe, measure, and analyze the economic significance of the Engineering and Design Services industry and demonstrate the inextricable partnership between engineering, architects, and other design services to deliver the built environment of the United States. The built environment refers to all human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks/green space to neighborhoods and cities including their supporting infrastructure, such as water supply or energy networks.

The study was conducted by Rockport Analytics, an independent market and economic research firm using both publicly and privately available data, as well as proprietary analysis.

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 environment for the Engineering and Design Services sector, including key challenges and opportunities. This includes modeling key market and macro drivers of the industry to help inform ACEC's membership on the future performance of the Engineering and Design Services industry. The outlook and modeling assets can be used to forecast industry revenue in the Engineering and Design Services sector and evaluate scenarios surrounding policy, geopolitical, and other future conditions.

This research is intended to be of value to ACEC members and their constituents. It will provide 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.

OVERVIEW OF INDUSTRY PERFORMANCE IN 2022

Key Points

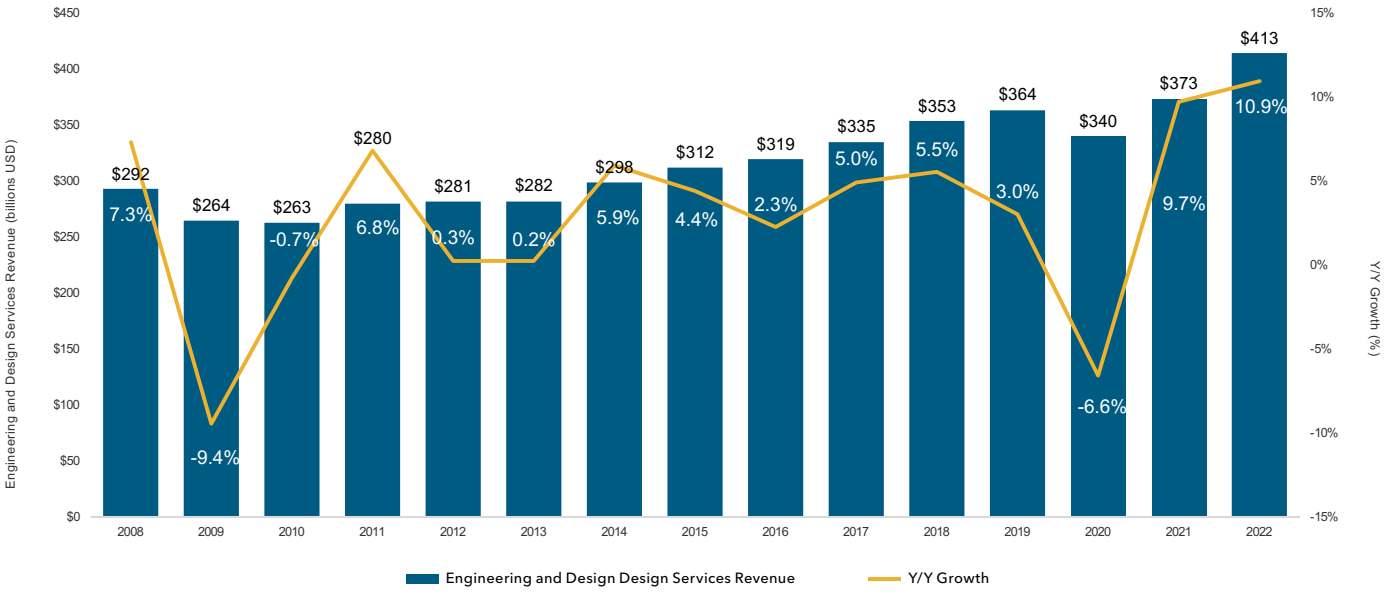
Industry Revenue Growth:

- The Engineering and Design Services industry grew by 10.9 percent in 2022. This represents the second consecutive year of record-breaking growth.
- While inflation eroded some of these gains, real growth was relatively strong at 7.5 percent.
- Growth continued to be driven by stimulus-fueled recovery from the COVID-19 pandemic, which includes the passing of Infrastructure Investment and Jobs Act (IIJA) and its associated boost to infrastructure investment.
- Other key end-markets fueled the recovery as well, with manufacturing, data center, residential and commercial construction all outperforming last year. It should be noted that end market performance has since shifted which is covered in more detail on page 12.
- We continue to see outperformance in the sunbelt with key markets like Texas, Georgia, and North Carolina leading the charge.

Industry Jobs & Wages:

- Total industry employment did not pace the growth in real output, advancing only 4.7 percent over 2021 levels.
- Firms continued to be challenged by labor shortages, the higher cost of labor, and skills mismatch between open roles and the workers available to fill them.
- Wages grew 4.6 percent in 2022, after growing 3 percent in 2021. The industry long-run annual average increase is 2.9 percent
- Wage growth appears to be accelerating in 2023, up 9.7 percent on a year-over-year basis through the first quarter; however, there are signs of some relief in wage pressure that should help to slow wage growth in the coming quarters.

Engineering and Design Services Revenue



KEY DRIVERS OF REVENUE GROWTH

The Engineering and Design Services industry saw robust growth in 2022, expanding by 10.9 percent. This growth was driven by factors including economic recovery from the pandemic, increased infrastructure investments, low interest rates, manufacturing sector expansion, and technological advancements.

KEY REVENUE DRIVERS FOR THE INDUSTRY

Pandemic Recovery

A significant driver of the industry's strong growth was its continued recovery from the economic effects of the COVID-19 pandemic. As the pandemic disrupted many sectors of the economy, it also prompted historic levels of fiscal and monetary stimulus which helped to prop up US businesses and employment, and fuel the overall recovery in the Engineering and Design Services industry.

Infrastructure Investment

The Engineering and Design Services industry benefitted from increased public and private sector investments in infrastructure projects. Initiatives aimed at upgrading and expanding transportation networks, utilities, and public facilities created a substantial demand for engineering and design services. Government-funded programs, such as the Infrastructure Investment and Jobs Act (IIJA), provided a significant boost to infrastructure-related projects, contributing to industry growth.

Inflation

High inflation levels have played a significant role in driving nominal growth in recent times. High inflation boosts nominal growth as prices rise, but it often masks real economic expansion. These remarkable levels of inflation were a key driver of revenue growth in Engineering and Design Services in 2021 and 2022 as many firms attempted to pass on higher wage rates and maintain profitability.

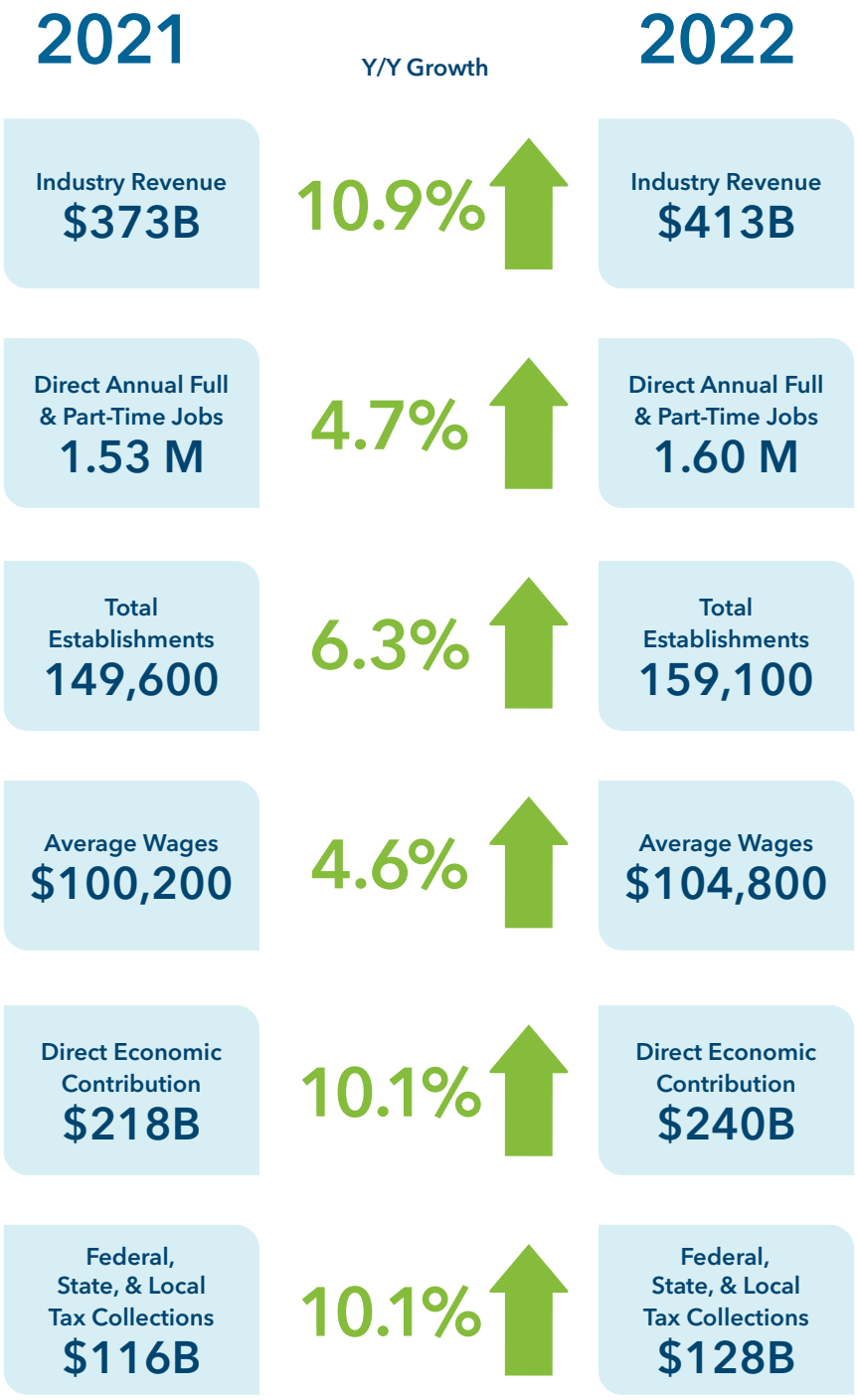
Outperformance of Key End Markets

Non-Residential & Commercial and Non-Building construction sectors displayed robust growth, with the Manufacturing sector notably surging due to domestic reshoring efforts. This expansion prompted facility expansions and increased demand for engineering and design expertise. Other key end markets driving growth in 2022 included commercial, public construction and a booming residential market.

Technology Advancements

Advancements in technology, including Building Information Modeling (BIM), Computer-Aided Design (CAD), and simulation tools, have increased the efficiency and effectiveness of engineering and design services. These technologies enabled firms to deliver higher-quality projects with greater accuracy, contributing to their competitive advantage and attracting clients.

ENGINEERING AND DESIGN SERVICES: BY THE NUMBERS



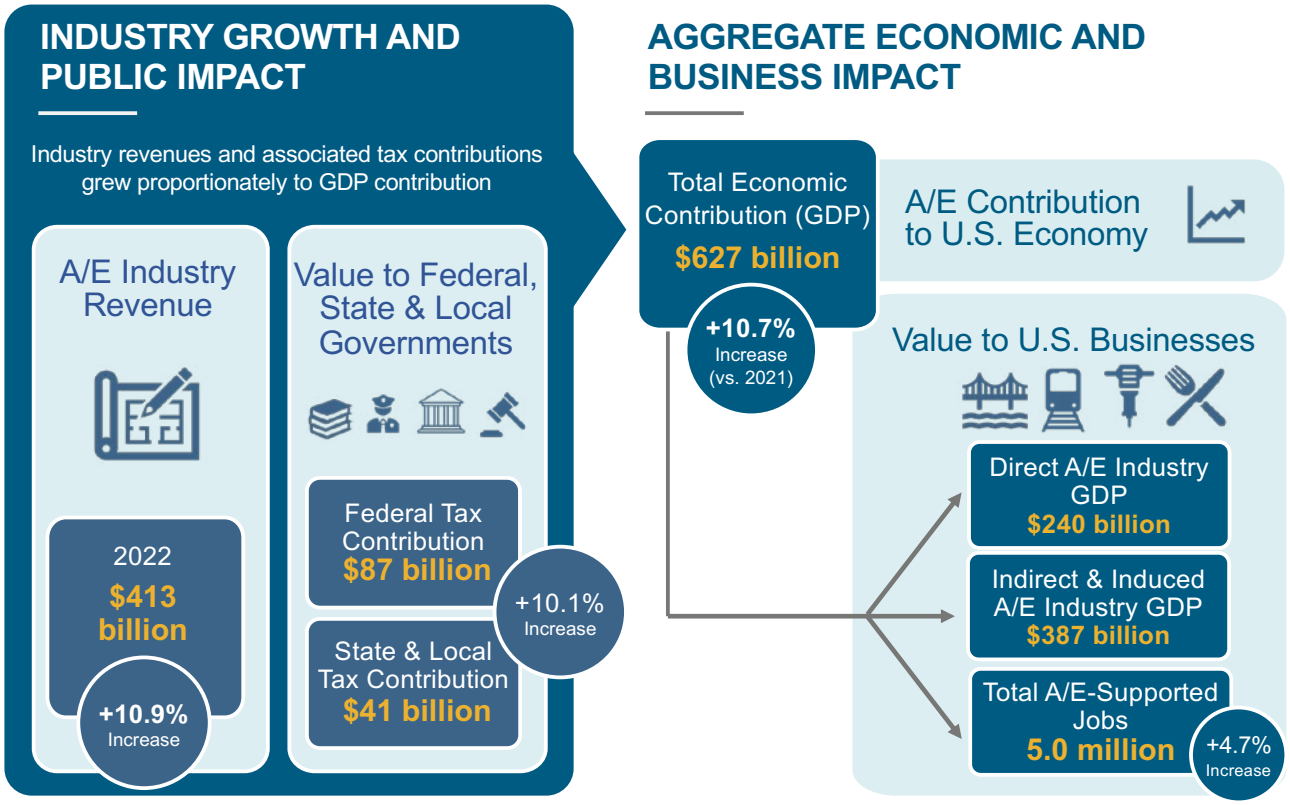
[1]QCEW updated Total Establishments for 2021

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 contribute significantly to the Construction industry, the figures below do not include the value of the built environment supported by those services. That would be part of the Construction sector's economic contribution. Instead, the metrics below include only the unique economic footprint of the Engineering and Design Services industry itself.

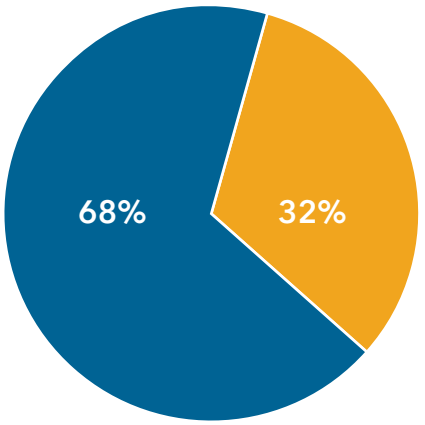


Engineering and Design Services 2022 revenue increased 10.9 percent over 2021. Revenue ($413 billion) includes sales to public and private construction, business services, mining, manufacturing, exports, and other end-market sectors.

The industry's contribution to U.S. GDP totaled $627 billion and was up 10.7 percent compared to 2021. The components of total economic contribution include direct, indirect, and induced value-added. Direct A/E ($240 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 ($387 billion) comprise upstream and downstream effects.

Engineering and Design Services contributed $87 billion in federal taxes in 2022. Federal taxes include corporate and personal income taxes, social security, and various excise fees. **The industry contributed another $41 billion in state and local taxes.** State and local taxes include sales, income, property, excise, and other licenses/fees.

Engineering and Design Services Tax Impact



Engineering and Design Services Industry Initiated Taxes

	2022 Tax Collections (in millions $)	2022 % of Total
Federal - U.S.		
Corporate Income	$3,564	2.8%
Personal Income	$33,168	26.0%
Excise & Fees	$3,653	2.9%
Social Security & Other Taxes	$46,199	36.2%
Federal Tax Total	**$86,584**	**67.9%**
State & Local		
Corporate Income	$1,560	1.2%
Personal Income	$8,617	6.8%
Social Insurance Taxes	$771	0.6%
Business Taxes	$15,528	12.2%
Household Taxes	$2,179	1.7%
Property Taxes	$12,344	9.7%
State & Local Tax Total	**$40,999**	**32.1%**
Total A/E-Initiated Taxes	**$127,582**	**100.0%**

Sources: Rockport Analytics, IMPLAN, Bureau of Economic Analysis, Bureau of Labor

Engineering and Design Services directly employed more than 1.6 million Americans. Considering both the up and downstream contribution of A/E's activities, a **total of slightly over 5 million full- and part-time jobs can be attributed to the A/E industry.** A/E's contribution to payrolls was $367.6 billion in 2022.

2022 Engineering and Design Services Industry Bottom Line

For the U.S. Economy (in billions of $ unless otherwise noted)	Direct	Indirect (Supply Chain)	Induced (Ripple Effect)	Total	% vs 2021
Total Industry Revenue				**$413.4**	**10.9%**
Total Economic Contribution					
A/E Contribution to GDP	$239.7	$141.1	$246.3	$627.1	10.1%
Jobs Supported (Full & Part-Time, in thousands)	1,601	1,389	2,029	5,019	5.8%
Contribution to Payrolls	$167.8	$81.9	$118.0	$367.6	9.5%
Total Tax Receipts (in billions)	$46.8	$28.0	$52.8	$127.6	10.1%
Federal	$37.9	$19.0	$29.7	$86.6	10.1%
State & Local	$8.9	$9.0	$23.1	$41.0	10.1%

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

Economic Contribution by Sector and State

Assessing the economic contribution of the Engineering and Design Services industry is an exercise in tracking the interindustry relationships between A/E activity and its upstream and downstream industry partners. This can be done at both the national and state levels.

- At the national level, slightly over 5.0 million U.S. jobs, including full and part-time workers, could be attributed to the Engineering and Design Services industry in 2022. Direct A/E industry jobs totaled 1.6 million, representing approximately one-third (32 percent) of the industry's total impact. The remaining two-thirds can be attributed to jobs supported along the industry's supply chain (1.4 million) and the jobs supported by the respent wages (2.0 million) of A/E workers and the workers along the A/E supply chain.

A/E Contribution to U.S. Employment by Industry Sector

Industry (NAICS)[1]	Direct	Indirect (Supply Chain)	Induced (Respent Wages)	Total
54 Professional, Scientific & Tech Services	1,600,790	379,120	108,360	2,088,270
56 Administrative & Waste Services	0	384,420	121,360	505,780
72 Accommodation & Food Services	0	131,720	243,200	374,920
62 Health & Social Services	0	20	362,240	362,260
44-45 Retail Trade	0	7,230	259,420	266,650
81 Other Services	0	34,890	199,110	234,000
53 Real Estate & Rental	0	100,970	100,280	201,250
52 Finance & Insurance	0	45,450	144,420	189,870
31-33 Manufacturing	0	71,920	88,270	160,190
48-49 Transportation & Warehousing	0	67,540	89,120	156,660
42 Wholesale Trade	0	35,710	53,820	89,530
71 Arts, Entertainment & Recreation	0	21,210	60,990	82,200
55 Management of Companies	0	47,180	26,040	73,220
51 Information	0	32,090	35,310	67,400
61 Educational Services	0	1,500	59,860	61,360
11 Ag, Forestry, Fish & Hunting	0	5,480	36,610	42,090
23 Construction	0	7,450	15,290	22,740
92 Government	0	3,520	11,830	15,350
22 Utilities	0	5,440	8,710	14,150
21 Mining	0	6,090	5,170	11,260
Total	**1,600,790**	**1,388,980**	**2,029,400**	**5,019,170**

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

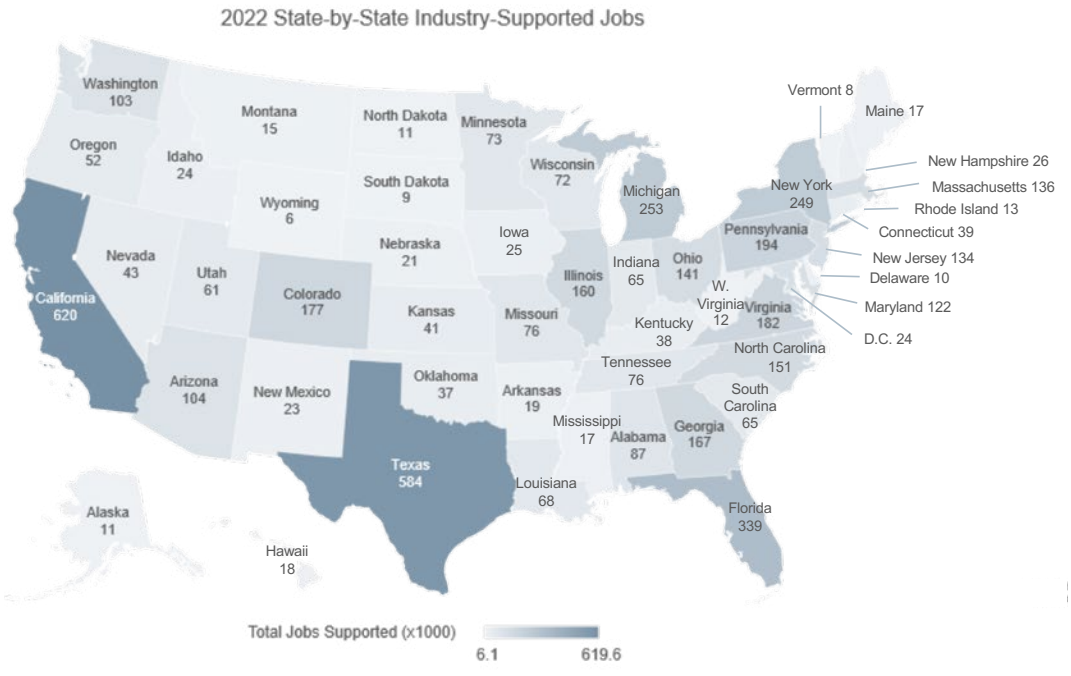
Source: Rockport Analytics, IMPLAN

Impact by State

- The Engineering and Design Services industry is highly concentrated with over half of the value-added generated by the industry in 2022 located in just seven states: California, Texas, Florida, Michigan, New York, Colorado, and Virginia.
- Unsurprisingly, California and Texas remain the largest contributors with $91 billion and $85 billion, respectively. The second tier of states including Florida, Michigan, New York, Colorado, and Virginia range from $24 – $35 billion.
- The map below shows the total number of Engineering and Design Services jobs supported by each state. California and Texas are the two largest contributors to the industry for both economic contribution and jobs. California employs approximately 620,000 workers in the Engineering and Design Services industry, while Texas employs approximately 584,000.

Engineering and Design Services Industry
Total Economic Contribution

States in 2022							
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	$90.7	14.5%	14.5%	620	12.3%	$53
2	Texas	$85.2	13.6%	28.0%	584	11.6%	$46
3	Florida	$35.6	5.7%	33.7%	339	6.8%	$21
4	Michigan	$34.8	5.6%	39.3%	253	5.0%	$21
5	New York	$28.9	4.6%	43.9%	249	5.0%	$18
6	Colorado	$25.6	4.1%	48.0%	177	3.5%	$15
7	Virginia	$24.2	3.9%	51.8%	182	3.6%	$15
8	Pennsylvania	$21.7	3.5%	55.3%	194	3.9%	$13
9	Illinois	$20.0	3.2%	58.5%	160	3.2%	$11
10	Massachusetts	$19.9	3.2%	61.6%	136	2.7%	$12
11	Georgia	$19.5	3.1%	64.7%	167	3.3%	$11
12	New Jersey	$17.9	2.9%	67.6%	134	2.7%	$10
13	North Carolina	$15.8	2.5%	70.1%	151	3.0%	$9
14	Ohio	$15.0	2.4%	72.5%	141	2.8%	$9
15	Maryland	$14.8	2.4%	74.8%	122	2.4%	$9
16	Washington	$14.2	2.3%	77.1%	103	2.1%	$8
17	Arizona	$11.6	1.8%	79.0%	104	2.1%	$7
18	Alabama	$10.5	1.7%	80.6%	87	1.7%	$7
19	Tennessee	$9.7	1.5%	82.2%	76	1.5%	$5
20	Missouri	$9.2	1.5%	83.6%	76	1.5%	$5



- The table below shows Engineering and Design Services industry revenue for the top 20 states, ranked by 2022 growth over the previous year. The states with the greatest growth – such as Mississippi, Oklahoma, Wyoming, New Hampshire, Vermont, South Dakota, and Arkansas – are generally more rural, sparsely populated, have lower operational costs, and less legacy development.

Engineering and Design Services Revenue by State: Top 20

Ranked By 2022 Growth in A/E Revenue

State	2021 (in mils$)	2022	Annual Growth
Mississippi	$1,030	$1,249	21.3%
Oklahoma	$2,133	$2,538	18.9%
Wyoming	$392	$463	18.2%
New Hampshire	$1,970	$2,303	16.9%
Vermont	$551	$643	16.8%
South Dakota	$628	$730	16.2%
Arkansas	$1,217	$1,408	15.7%
Kansas	$3,061	$3,527	15.2%
North Dakota	$812	$934	15.0%
North Carolina	$8,958	$10,295	14.9%
Montana	$1,103	$1,265	14.7%
Washington	$8,616	$9,880	14.7%
Utah	$3,566	$4,089	14.7%
Georgia	$10,396	$11,858	14.1%
Tennessee	$5,367	$6,106	13.8%
Texas	$42,777	$48,624	13.7%
Indiana	$4,114	$4,670	13.5%
Maine	$1,149	$1,304	13.5%
Nevada	$2,767	$3,131	13.2%
Arizona	$6,393	$7,225	13.0%
Other States	$265,600	$291,130	9.6%
Total U.S.	**$372,600**	**$413,373**	**10.9%**

Source: Rockport Analytics, U.S. Census Bureau

- Two states stand out as opportunities due to both a high level of annual growth and total industry revenue: North Carolina and Georgia. Both states' investment in technology and development of industry talent alongside relatively favorable labor laws should continue to cast both as attractive opportunities for firms in the industry.
- Texas continues to be a behemoth in the industry. In addition to its massive contribution to industry revenue, favorable laws and business conditions continue to attract firms and talent. The state should continue to be seen as the industry's largest hub of growth for at least the near future. It is reasonable to suspect Texas may surpass California within the next five years in terms of total production.
- Detailed tables showing Engineering and Design Services industry contribution for each state across all metrics are available in Appendix I on page 16 of this report.

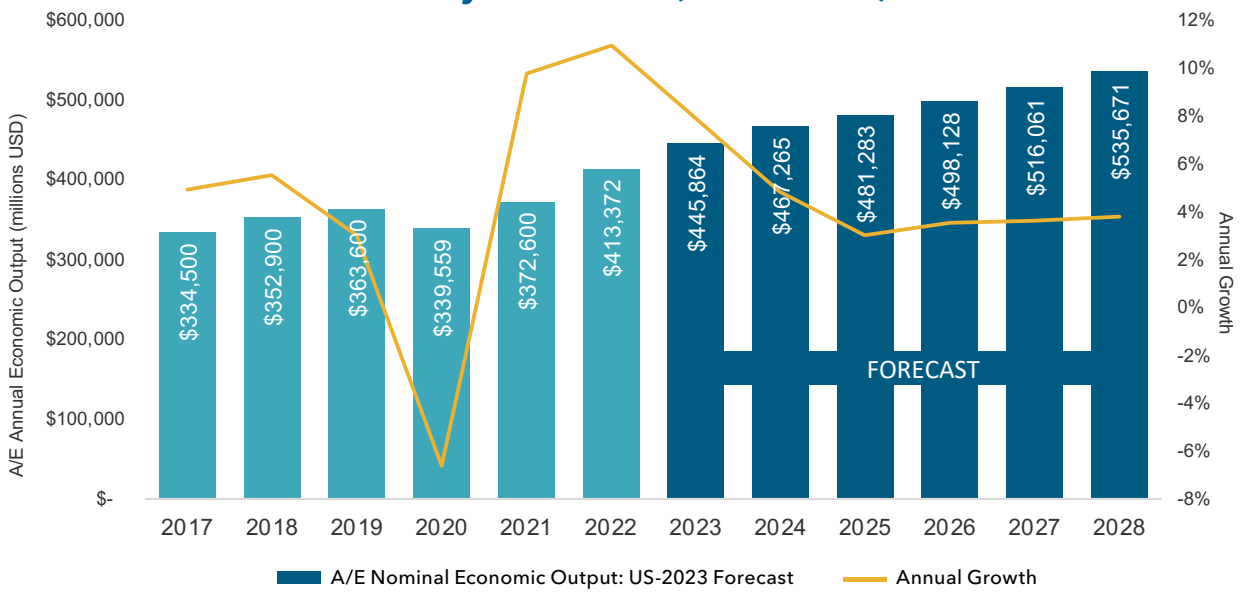
ENGINEERING AND DESIGN SERVICES INDUSTRY IN 2023 AND BEYOND

Growth Will Moderate Over the Next Year. Labor Dynamics Will Continue to Represent a Challenge in the Near Term.

The Engineering and Design Services industry has exhibited a resurgence over the past two years. Since the pandemic-induced declines in 2020, industry output has grown 10.3 percent on average. As of 2022, industry output is 14 percent above pre-pandemic levels, but lags output in the broader US economy, which sits 22 percent above pre-pandemic levels. We expect growth in Engineering and Design Services revenue to moderate somewhat this year but remain well above historical averages. Growth will return to a more normal pattern over the next few years as the industry continues to digest post-pandemic economic stimulus and the impact of rising interest rates.

- Engineering and Design Services industry revenue increased 10.9 percent in 2022 to a peak of $413 billion.
- We expect economic output growth to slow this year but remain well above historical averages, growing 7.9 percent to $446 billion.
- The growth in public A/E activity will help to offset weakness in both residential and non-residential construction in 2024 and 2025. We expect IIJA supported A/E spend to peak in 2024, while other private sector end markets including office, commercial, retail, and residential will likely see declines.
- We expect output to continue to grow over the forecast horizon, reaching $536 billion by 2028. Headwinds and downside risks we are watching include rising interest rates, more restrictive lending, labor constraints, and a high degree of uncertainty over the direction of the U.S. economy.

A/E Nominal Economic Output in the United States: History & Forecast (2017-2028)



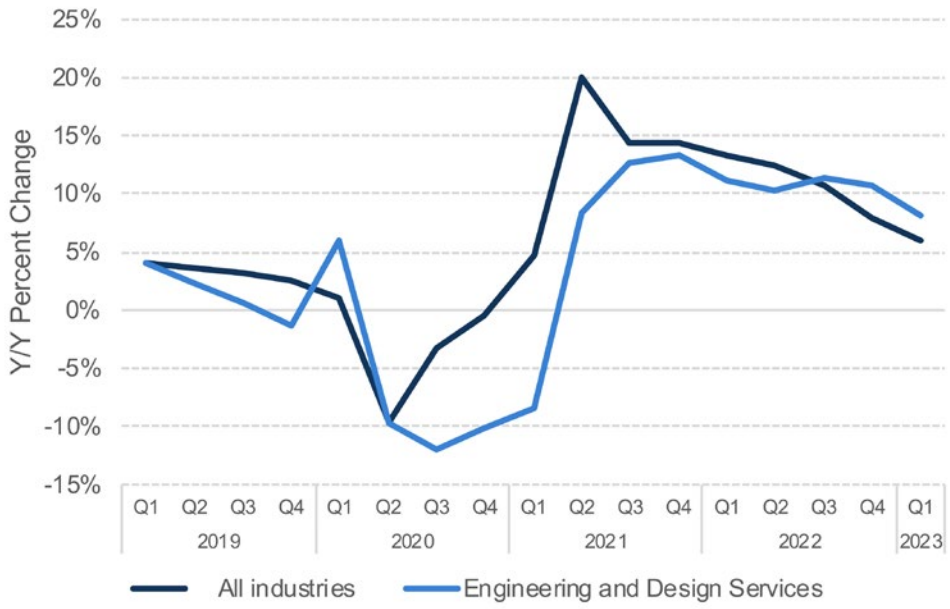
2023 Forecast	2023	2024	2025	2026	2027	2028
Nominal Output Growth	7.9%	4.8%	3.0%	3.5%	3.6%	3.8%
Real Output Growth	3.3%	2.5%	0.9%	1.5%	1.6%	1.7%

Growth is Moderating at a Different Pace for Architectural Services Firms vs Engineering Services Firms

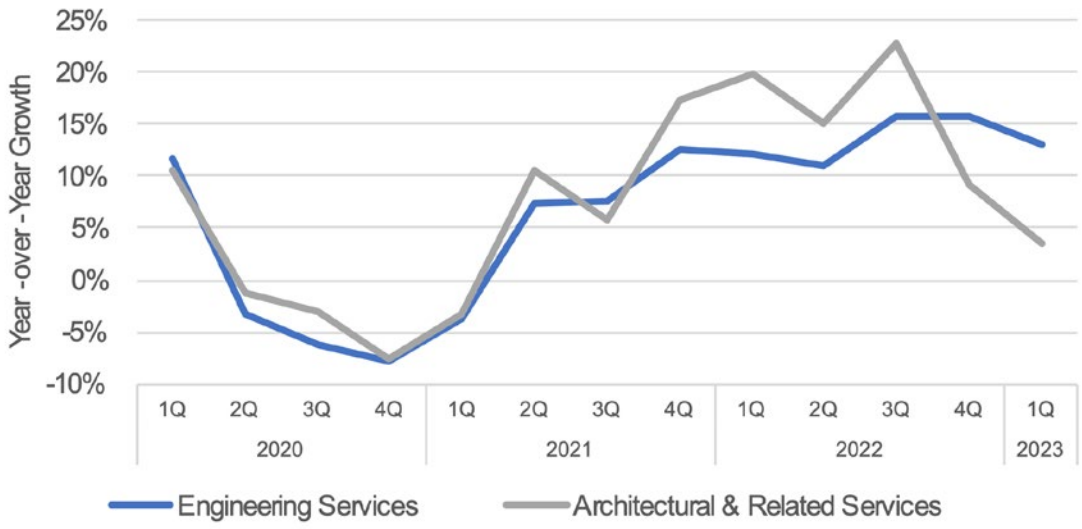
Engineering and Design Services revenue has been growing at a double-digit rate since the second half of 2021. The rate of growth, however, began declining in late 2022 and dropped below 10 percent in the first quarter of 2023.

Both Engineering and Architectural Services witnessed a robust recovery coming out of the pandemic-induced recession. Architectural Services, which tends to be more cyclical in nature, exploded in 2022, growing more than 15 percent on a year-over-year basis from the 4th quarter of 2021 through the 3rd quarter of 2022. However, growth slowed dramatically in late 2022 and early 2023 in concert with a more rapid rise in interest rates.

Annual Growth in Revenue



Engineering Services vs. Architectural & Related Services – Y/Y Growth in Revenue



Market Dynamics Continue to Alter the Prospects for A/E End Markets

Residential is beginning to slow after multi-year surge, IIJA provides outsized opportunity in transportation and utilities.

While overall 2023 growth versus the previous year has slowed, the value of total U.S. construction in 2023 continues to grow at 3.1 percent exceeding $1.9 billion. The slowing of growth can be attributed to volatility and decline in residential construction.

In 2022, non-residential & commercial construction grew 11.8 percent, driven by manufacturing's 39.8 percent growth. Manufacturing continued strong into H1 2023, up 75.7%. In H1 2023, non-residential & commercial construction rose 19.8 percent.

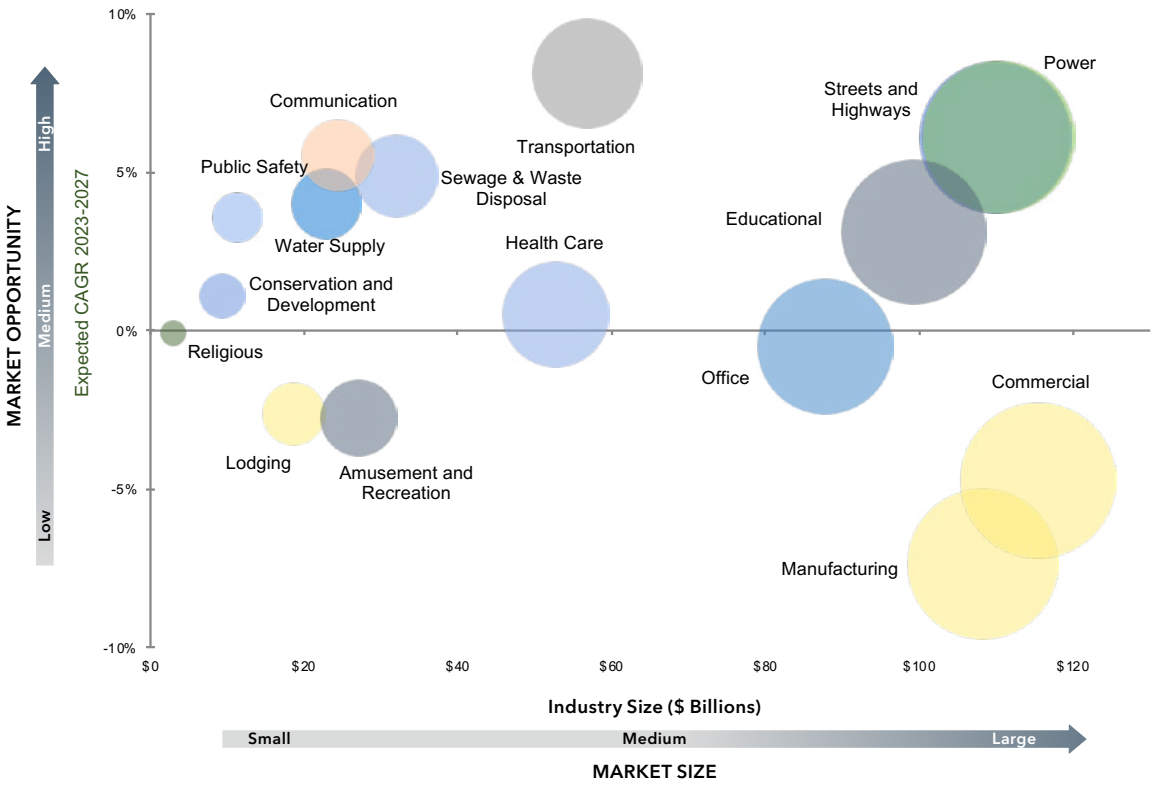
Non-building construction grew 3.6 percent in 2022, led by conservation & development (19.3 percent). H1 2023 shows even further growth in non-building construction at 13 percent driven by the continued growth of Conservation and Development and Sewage and Waste Disposal.

There is volatility in residential growth rates.
2021 = 24.6 percent
2022 = 14.9 percent
H1 2023 = -10.5 percent

The current growth rate for 2023 obviously indicates a significant decline versus the two previous years.

- Supply-demand imbalances in residential real estate were caused by soaring new household formation and a lag in construction activity in 2020 led to a backlog of inventory shortages and fueled residential construction in both 2021 and 2022. Rising home prices and interest rates have made the home-buying environment far more challenging in 2023, resulting in slowing demand and dragging residential construction, which declined –10.5 percent in the first half of the year.
- The biggest bright spot in the non-residential and commercial segment has been the unprecedented growth in Manufacturing. Manufacturing construction continues to be driven by the onshoring of manufacturing and supply chains by domestic companies.
- Growth opportunities over the next five years are likely to continue to shift from private to public construction. We expect more cyclical markets to suffer from higher interest rates and a slowing U.S. economy. We expect the effect of the IIJA to continue to bolster the growth of public construction opportunities, particularly in A/E end markets of conservation & development, sewage & waste disposal, streets and highways, and water supply systems.

Evaluating Prospects Among A/E End Markets



Value of Construction Put in Place: Non-Residential & Commercial, Non-Building, and Residential 2021-2023

	GROWTH RATES (PREVIOUS VS. CURRENT YTD)		RAW YEARLY VALUE		
Billions($)	*2022-2021 Y/Y%*	*2023-2022 YTD Y/Y%*	*2021*	*2022*	*2023 YTD**
Non-Residential & Commercial	**11.8%**	**19.8%**	**$561**	**$628**	**$732**
Manufacturing	39.8%	75.7%	$82	$115	$183
Lodging	3.5%	25.4%	$19	$20	$23
Health Care	8.8%	12.9%	$50	$55	$61
Commercial	25.1%	9.4%	$94	$117	$127
Transportation	-0.6%	8.1%	$59	$59	$63
Educational	1.1%	6.9%	$101	$102	$109
Office	1.9%	6.5%	$90	$92	$96
Religious	-4.8%	4.7%	$3	$3	$3
Public Safety	-9.8%	3.3%	$13	$12	$12
Amusement and Recreation	10.7%	2.7%	$27	$30	$31
Communication	5.3%	2.6%	$23	$24	$25
Non-Building	**3.6%**	**13.0%**	**$279**	**$289**	**$319**
Total Conservation and Development	19.3%	29.7%	$8	$9	$12
Sewage & Waste Disposal	13.4%	23.8%	$29	$33	$38
Streets and Highways	10.4%	16.0%	$103	$114	$127
Water Supply Systems	15.4%	14.9%	$20	$23	$25
Power Plants/Pipeline/Communications	-7.8%	5.3%	$119	$110	$117
Residential	**14.9%**	**-10.5%**	**$799**	**$918**	**$857**
Total Construction	**11.8%**	**3.1%**	**$1,653**	**$1,849**	**$1,908**
Total Public Construction	5.2%	12.1%	$358	$376	$412
Total Private Construction	13.6%	0.8%	$1,296	$1,472	$1,496

*2023 is only January - June and June is preliminary data

Source: Rockport Analytics, U.S. Census Bureau

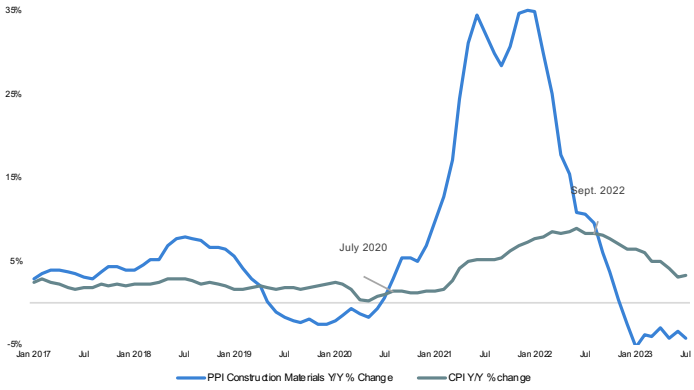
Other Trends Driving the Outlook for Engineering and Design Service

The industry is currently presented with a unique opportunity as aggregate material costs have decreased and supply chain pressures have eased, which should help to support the viability of a larger number of construction projects. However, this favorable scenario contrasts with continued labor shortages and wage inflation in the Engineering and Design Services sector. This wage growth will continue to erode profit margins, necessitating strategic adjustments in compensation structures, talent acquisition, and retention practices to maintain competitiveness. In this evolving landscape, adaptable cost management, supply chain optimization, and talent retention strategies are essential for architecture and engineering professionals to thrive.

Construction and Global Supply Chain Headwinds Subsiding

The prices of construction materials have improved significantly in the last year. In September 2022, the year-over-year percent change in the consumer price index surpassed the year-over-year percent change in the producer price index of construction materials for the first time since July 2020. Gypsum, concrete, and builders' hardware are examples of materials that are still higher in 2023 than they were in 2022 (year to date), but many other materials, most critically – steel and lumber – have dropped in price compared to this time last year.

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

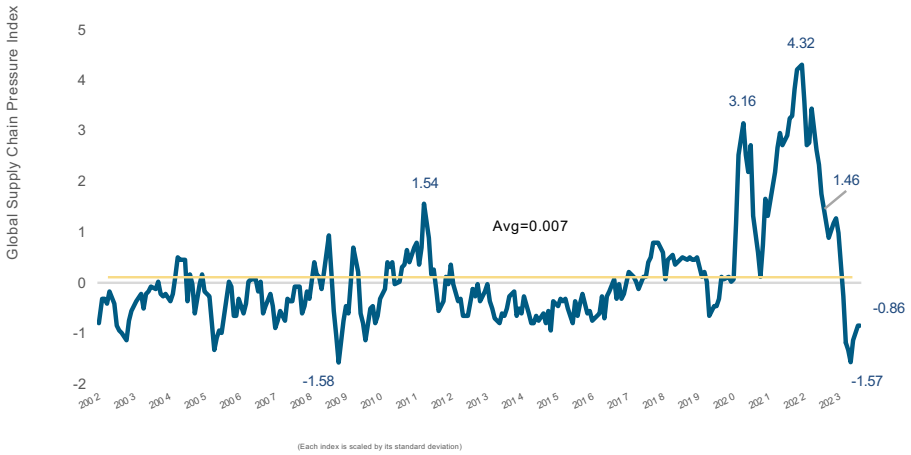


Producer Price Index	2022/2021 Y/Y % change	2023/2022 YTD* Y/Y % change
Gypsum	19.8%	12.9%
Concrete	13.0%	12.9%
Builders' Hardware	12.5%	4.5%
Steel Mill Products	8.7%	-20.0%
Metals-Iron & Steel	6.7%	-16.8%
Hardwood Lumber	3.7%	-14.8%
Plywood	0.7%	-21.6%
Softwood Lumber	-5.4%	-42.0%

*YTD = January through July

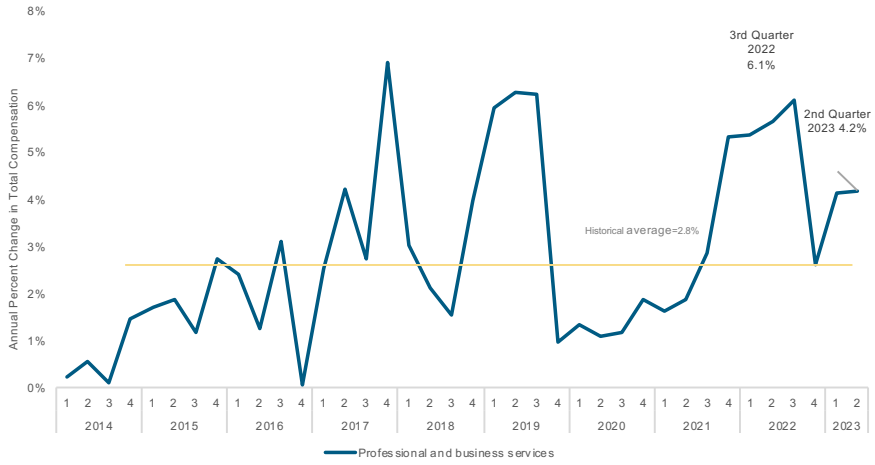
The Global Supply Chain Pressure Index (GSCPI) tracks the state of global supply chains using data from the transportation and manufacturing sectors. The GSCPI reached a historical high in December 2021 (4.32) and then in May 2023 (-1.57) nearly reached the November 2008 historical low (-1.58). The current index (August 2023) has been climbing since June but is below normal at -0.86, indicating very low pressure on the global supply chain.

Global Supply Chain Pressure Index



Labor Costs Still Cutting into A/E Firms' Margins While Labor Shortages Begin to Ease

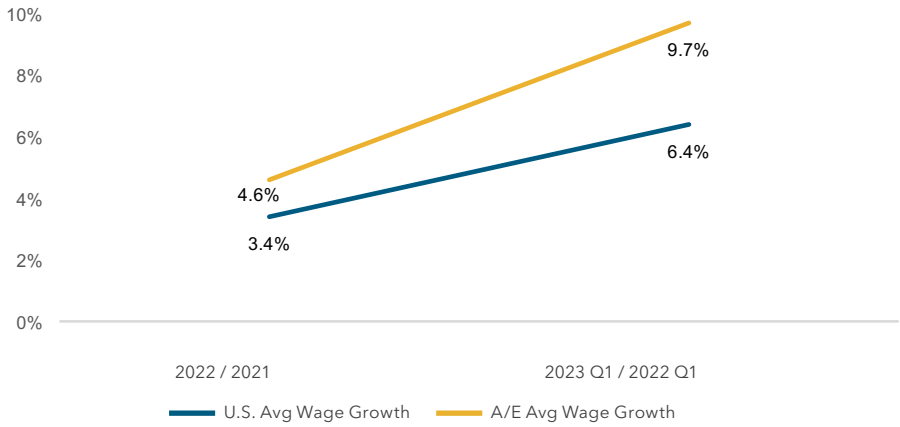
Annual Growth in Total Compensation in the U.S. for Professional and Business Services



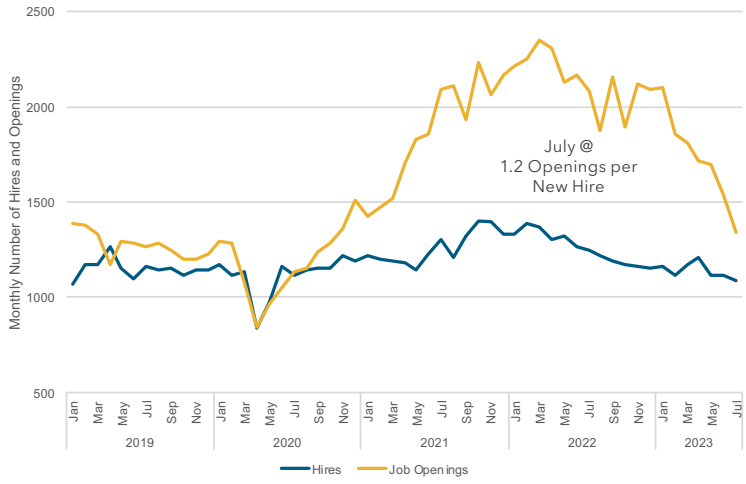
The annual growth in compensation for the professional and business services sector has declined from a year ago but remains above average. In the second quarter of 2023, total compensation grew 4.2 percent compared to 2022's third quarter growth of 6.1 percent This compares to a historical average of 2.8 percent growth.

Engineering and Design Industry Wage Growth Outpacing the U.S.

However, the pressure is greater for firms in the Engineering and Design Services industry than average. Wages in this sector are growing at a faster pace than overall U.S. wages and therefore continue to cut into A/E firms' margins.



Professional & Business Services Hires vs. Job Openings 2019-2023



The labor pressure in the Professional and Business Services sector is easing, with the number of seasonally adjusted job openings per new hire decreasing from 1.8 in January 2023 to 1.2 in July. This trend should help to alleviate wage growth in the coming quarters.

APPENDIX I: A/E ECONOMIC IMPACT MEASURES BY STATE

Engineering and Design Services Industry State-Level Impacts

Jobs Supported 2022				
State	*Direct Jobs*	*Indirect Jobs*	*Induced Jobs*	*Total Jobs*
Alabama	30,816	19,054	36,683	86,554
Alaska	4,372	1,922	4,928	11,223
Arizona	30,516	32,961	40,483	103,960
Arkansas	7,312	3,473	8,409	19,195
California	194,190	177,954	247,407	619,551
Colorado	55,679	49,488	71,550	176,716
Connecticut	12,960	10,539	15,891	39,390
Delaware	3,435	2,103	3,955	9,492
District of Columbia	8,056	8,194	8,040	24,289
Florida	101,150	105,371	132,854	339,375
Georgia	48,420	53,228	65,449	167,097
Hawaii	6,198	4,122	7,542	17,863
Idaho	8,275	5,355	9,886	23,516
Illinois	48,574	46,406	64,607	159,587
Indiana	22,617	14,595	27,678	64,891
Iowa	8,699	5,645	10,178	24,523
Kansas	14,689	9,074	17,173	40,936
Kentucky	13,633	7,972	15,985	37,590
Louisiana	22,673	16,480	28,419	67,572
Maine	5,832	4,134	7,197	17,163
Maryland	39,570	33,627	49,204	122,401
Massachusetts	43,794	38,399	54,021	136,215
Michigan	88,549	57,142	107,296	252,987
Minnesota	24,369	18,576	29,909	72,854
Mississippi	6,488	3,276	7,542	17,306
Missouri	24,386	21,177	30,899	76,461
Montana	5,701	3,050	6,624	15,375
Nebraska	7,574	4,851	9,001	21,426
Nevada	13,640	12,728	16,876	43,244
New Hampshire	8,487	7,004	10,431	25,922
New Jersey	41,548	39,843	52,730	134,121
New Mexico	8,673	4,442	9,985	23,101
New York	76,704	77,881	94,414	248,999
North Carolina	46,197	43,525	61,007	150,729
North Dakota	4,217	1,831	4,738	10,786
Ohio	44,926	38,826	56,926	140,677
Oklahoma	12,453	9,508	15,202	37,163
Oregon	18,431	11,938	21,710	52,080
Pennsylvania	60,096	55,467	78,774	194,337
Rhode Island	4,381	3,295	5,283	12,960
South Carolina	21,961	15,489	27,091	64,541
South Dakota	3,511	1,625	4,078	9,214
Tennessee	24,776	19,866	31,829	76,471
Texas	175,142	170,162	238,930	584,233
Utah	18,778	18,368	24,088	61,234
Vermont	2,866	1,920	3,418	8,205
Virginia	57,784	52,259	72,044	182,086
Washington	37,271	22,867	43,351	103,489
West Virginia	4,577	2,111	5,151	11,839
Wisconsin	23,453	18,820	29,834	72,106
Wyoming	2,390	1,057	2,699	6,146
U.S. TOTAL	1,600,788	1,389,000	2,029,402	5,019,190

Source: Rockport Analytics, IMPLAN

Engineering and Design Services Industry State-Level Impacts

Wages Supported 2022 (in millions $)				
State	*Direct Wages*	*Indirect Wages*	*Induced Wages*	*Total Wages*
Alabama	$3,208	$1,140	$2,154	$6,502
Alaska	$412	$123	$264	$799
Arizona	$2,932	$1,626	$2,121	$6,679
Arkansas	$571	$188	$371	$1,131
California	$23,647	$12,726	$16,694	$53,068
Colorado	$6,267	$3,623	$4,633	$14,524
Connecticut	$1,314	$527	$870	$2,711
Delaware	$334	$109	$208	$651
District of Columbia	$1,036	$390	$536	$1,962
Florida	$9,228	$4,712	$6,619	$20,559
Georgia	$4,812	$2,601	$3,527	$10,939
Hawaii	$634	$244	$430	$1,309
Idaho	$696	$275	$469	$1,440
Illinois	$4,884	$2,683	$3,611	$11,177
Indiana	$1,895	$754	$1,310	$3,959
Iowa	$831	$313	$540	$1,684
Kansas	$1,431	$599	$954	$2,984
Kentucky	$1,175	$429	$780	$2,384
Louisiana	$2,106	$763	$1,422	$4,291
Maine	$529	$195	$357	$1,082
Maryland	$4,199	$1,883	$2,832	$8,915
Massachusetts	$5,553	$2,702	$3,742	$11,998
Michigan	$9,861	$4,342	$6,842	$21,045
Minnesota	$2,501	$1,225	$1,753	$5,480
Mississippi	$507	$150	$331	$987
Missouri	$2,488	$1,141	$1,729	$5,357
Montana	$513	$161	$335	$1,009
Nebraska	$722	$277	$478	$1,477
Nevada	$1,271	$589	$852	$2,711
New Hampshire	$934	$414	$622	$1,970
New Jersey	$4,620	$2,558	$3,258	$10,436
New Mexico	$794	$255	$515	$1,564
New York	$8,482	$3,710	$5,505	$17,697
North Carolina	$4,178	$1,976	$2,972	$9,126
North Dakota	$379	$113	$241	$733
Ohio	$4,026	$1,988	$2,870	$8,884
Oklahoma	$1,030	$459	$707	$2,196
Oregon	$1,723	$792	$1,171	$3,686
Pennsylvania	$5,948	$2,774	$4,182	$12,904
Rhode Island	$378	$139	$245	$762
South Carolina	$2,019	$811	$1,408	$4,238
South Dakota	$296	$84	$192	$572
Tennessee	$2,478	$1,201	$1,808	$5,486
Texas	$19,732	$10,843	$15,169	$45,744
Utah	$1,660	$953	$1,199	$3,812
Vermont	$261	$87	$168	$516
Virginia	$6,584	$3,447	$4,507	$14,538
Washington	$4,010	$1,772	$2,699	$8,480
West Virginia	$356	$100	$222	$677
Wisconsin	$2,117	$864	$1,450	$4,431
Wyoming	$188	$50	$118	$356
U.S. TOTAL	$167,751	$81,877	$117,994	$367,623

Source: Rockport Analytics, IMPLAN

Engineering and Design Services Industry State-Level Impacts

Total Industry GDP 2022 (in millions $)				
State	*Direct*	*Indirect*	*Induced*	*Total GDP*
Alabama	$4,592	$2,035	$3,917	$10,545
Alaska	$595	$226	$428	$1,250
Arizona	$4,216	$2,666	$4,683	$11,565
Arkansas	$814	$337	$610	$1,761
California	$33,764	$21,498	$35,421	$90,683
Colorado	$8,957	$5,991	$10,676	$25,625
Connecticut	$1,892	$920	$1,541	$4,352
Delaware	$481	$208	$312	$1,001
District of Columbia	$1,513	$680	$214	$2,407
Florida	$13,289	$7,903	$14,372	$35,564
Georgia	$6,877	$4,436	$8,145	$19,458
Hawaii	$915	$450	$854	$2,218
Idaho	$994	$473	$848	$2,316
Illinois	$6,923	$4,688	$8,370	$19,980
Indiana	$2,691	$1,350	$2,577	$6,618
Iowa	$1,185	$540	$867	$2,592
Kansas	$2,036	$1,086	$1,767	$4,890
Kentucky	$1,666	$767	$1,376	$3,809
Louisiana	$3,012	$1,310	$2,564	$6,887
Maine	$762	$325	$643	$1,730
Maryland	$6,054	$3,328	$5,380	$14,762
Massachusetts	$7,981	$4,738	$7,168	$19,886
Michigan	$14,058	$7,380	$13,373	$34,812
Minnesota	$3,544	$2,085	$3,525	$9,154
Mississippi	$726	$271	$550	$1,546
Missouri	$3,532	$2,053	$3,594	$9,179
Montana	$738	$290	$551	$1,579
Nebraska	$1,034	$478	$836	$2,348
Nevada	$1,834	$1,012	$1,608	$4,454
New Hampshire	$1,345	$613	$983	$2,942
New Jersey	$6,595	$4,390	$6,897	$17,882
New Mexico	$1,142	$446	$833	$2,421
New York	$12,218	$6,930	$9,775	$28,923
North Carolina	$5,970	$3,429	$6,386	$15,786
North Dakota	$545	$208	$379	$1,132
Ohio	$5,694	$3,346	$5,932	$14,972
Oklahoma	$1,468	$746	$1,316	$3,530
Oregon	$2,466	$1,370	$2,258	$6,094
Pennsylvania	$8,448	$4,750	$8,477	$21,675
Rhode Island	$544	$245	$400	$1,189
South Carolina	$2,892	$1,491	$2,962	$7,345
South Dakota	$425	$154	$313	$892
Tennessee	$3,525	$2,094	$4,074	$9,693
Texas	$28,060	$18,778	$38,322	$85,160
Utah	$2,364	$1,591	$2,657	$6,613
Vermont	$375	$151	$265	$790
Virginia	$9,443	$5,851	$8,860	$24,154
Washington	$5,739	$3,204	$5,294	$14,237
West Virginia	$512	$169	$300	$982
Wisconsin	$3,001	$1,477	$2,706	$7,184
Wyoming	$272	$93	$175	$540
U.S. TOTAL	$239,723	$141,051	$246,334	$627,108

Source: Rockport Analytics, IMPLAN

Engineering and Design Services Industry State-Level Impacts

Taxes 2022 (in millions $)			
State	*Total Federal Taxes*	*Total State & Local Taxes*	*Total Taxes*
Alabama	$1,456	$653	$2,109
Alaska	$173	$49	$222
Arizona	$1,597	$683	$2,279
Arkansas	$243	$128	$371
California	$12,521	$7,133	$19,654
Colorado	$3,538	$1,607	$5,145
Connecticut	$601	$366	$967
Delaware	$138	$61	$199
District of Columbia	$332	$102	$435
Florida	$4,910	$1,992	$6,902
Georgia	$2,687	$1,022	$3,708
Hawaii	$306	$201	$507
Idaho	$320	$154	$474
Illinois	$2,759	$1,449	$4,208
Indiana	$914	$430	$1,344
Iowa	$358	$167	$524
Kansas	$675	$328	$1,003
Kentucky	$526	$249	$775
Louisiana	$951	$438	$1,389
Maine	$239	$153	$391
Maryland	$2,038	$1,094	$3,132
Massachusetts	$2,746	$1,292	$4,038
Michigan	$4,806	$2,237	$7,043
Minnesota	$1,264	$695	$1,959
Mississippi	$213	$117	$331
Missouri	$1,267	$539	$1,806
Montana	$218	$112	$330
Nebraska	$324	$147	$471
Nevada	$615	$271	$885
New Hampshire	$406	$163	$569
New Jersey	$2,469	$1,482	$3,951
New Mexico	$334	$178	$512
New York	$3,993	$2,295	$6,289
North Carolina	$2,180	$906	$3,085
North Dakota	$156	$71	$228
Ohio	$2,067	$915	$2,982
Oklahoma	$487	$215	$702
Oregon	$841	$455	$1,296
Pennsylvania	$2,993	$1,536	$4,529
Rhode Island	$164	$94	$258
South Carolina	$1,014	$459	$1,473
South Dakota	$123	$44	$167
Tennessee	$1,338	$495	$1,834
Texas	$11,758	$4,386	$16,144
Utah	$913	$407	$1,320
Vermont	$109	$76	$185
Virginia	$3,335	$1,573	$4,908
Washington	$1,966	$797	$2,763
West Virginia	$136	$71	$206
Wisconsin	$992	$481	$1,473
Wyoming	$75	$29	$103
U.S. TOTAL	$86,584	$40,999	$127,582

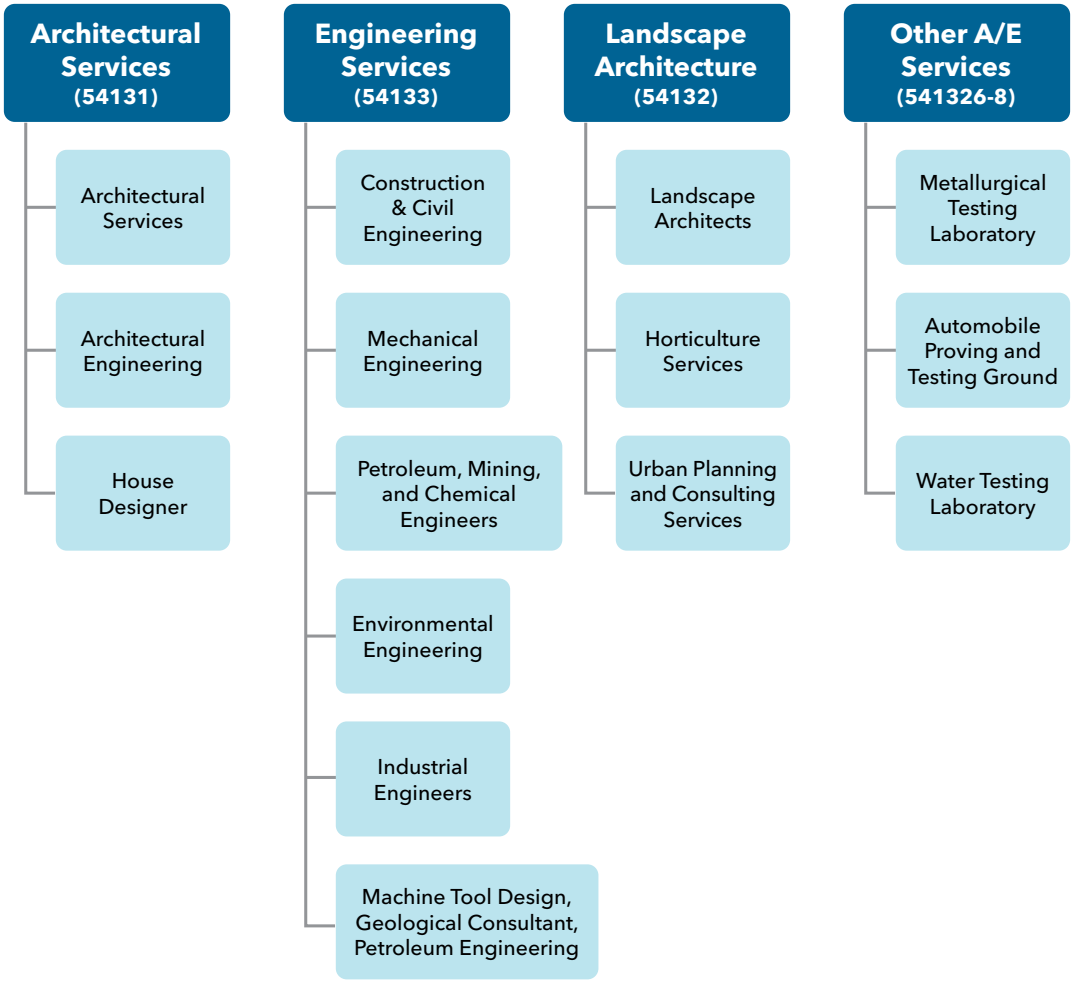
Source: Rockport Analytics, IMPLAN, Bureau of Economic Analysis, Bureau of Labor Statistics, U.S. Census Bureau

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 2023 – 2028 ENGINEERING 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 2023 – 2028 Engineering 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 non-profit 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 non-profit organization clients across the globe. Rockport Analytics provides 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

ACEC RESEARCH INSTITUTE

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.

As of October 2023

Founder Circle ($50,000+)

ACEC Florida · ACEC Life/Health Trust Est. 1965 · ACEC Minnesota · ACEC American Council of Engineering Companies of North Carolina · Autodesk · benesch · Community Foundation of Greater Muscatine On Behalf of Richard and Mary Jo Stanley · Deltek · HDR · Kimley»Horn Expect More. Experience Better. · Power Engineers · RS&H · Stanley Consultants · stv · TBS T. Baker Smith A Century of Solutions · Tierracon · The Joni & Gary Rieke Family Foundation · vhb

John & Karen Carrato

Chair Circle ($25,000+)

ACEC New Jersey American Council of Engineering Companies · ACEC Ohio · AECOM · American Engineering Testing · Gannett Fleming · Gresham Smith Genuine Ingenuity · Haley Aldrich · Hanson Trusted Partners. Proven Results. · HED · Huitt Zollars · IMEG · Kennedy Jenks · olsson · Pennoni · Sargent & Lundy · Schnabel Engineering · Stantec · Stolfus · TRANSYSTEMS

Ed & Brenda Alizadeh · Anonymous Contributor · Janice Marsters · Jay & Ann Wolverton

President Circle ($15,000+)

CHA · cma chen moore and associates · CMT · Dewberry · ECS · Freese and Nichols · GEI Consultants · Guida Surveying Inc. · Hardesty & Hanover · Hazen all things water · JBB · KCI · Lamp Rynearson · McCormick Taylor · Mead & Hunt · Merrick · Psomas · Thornton Tomasetti · Volkert · Wade Trim · Woodard & Curran · wsp

Daphne & Jeff Bryant · Kenneth & Sheri Smith

Ambassador Circle ($5,000+)

2iM Group · ACEC American Council of Engineering Companies of Illinois · ACEC New York American Council of Engineering Companies of New York · ACEC Wisconsin · ARCADIS · Sheladia Associates, Inc. · Urban Engineers · Wooten

Elizabeth Stolfus & Steve Mystkowski

ACEC Research Institute
1400 L Street, NW, Suite 400, Washington, DC 20005 | 202.347.7474 | ACECResearchInstitute.org