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MEP GIANTS 2020

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EATON CONGRATULATES THE 2020 MEP GIANTS WINNERS

Doug Dillie
Industry Manager -
Electrical Consultants

This is our 12th year of helping to recognize our industry's best of the best. As always, we're proud to be a part of the 2020 issue of Consulting-Specifying Engineer MEP Giants.

Things have certainly changed since this time last year. COVID-19 has dramatically impacted all of our personal and working lives. It's changed how we socialize with friends and family, how and where we shop, how we educate our children and often how we access healthcare. Our offices are now our dining rooms and spare bedrooms. Business meetings are now virtual.

Although your day-to-day lives have changed, you're still doing what consultants and engineers do: designing tomorrow's buildings. At Eaton, we're also moving ahead. We're focused on keeping our factories open—safely—to meet the needs of industry. Our application engineers are ready as ever to support you via email, phone and video calls.

Another change that we've clearly recognized as many of us continue to work remotely is a significant increase in the demand for online education and training. Check out our article describing the various online education resources that Eaton offers.

One thing you can be sure of in this increasingly unpredictable world is that Eaton will continue to lead the way with the products, support and training to meet the complex challenges and rigorous demands of creating safe, reliable power systems. No matter what unforeseen hurdles may come along.

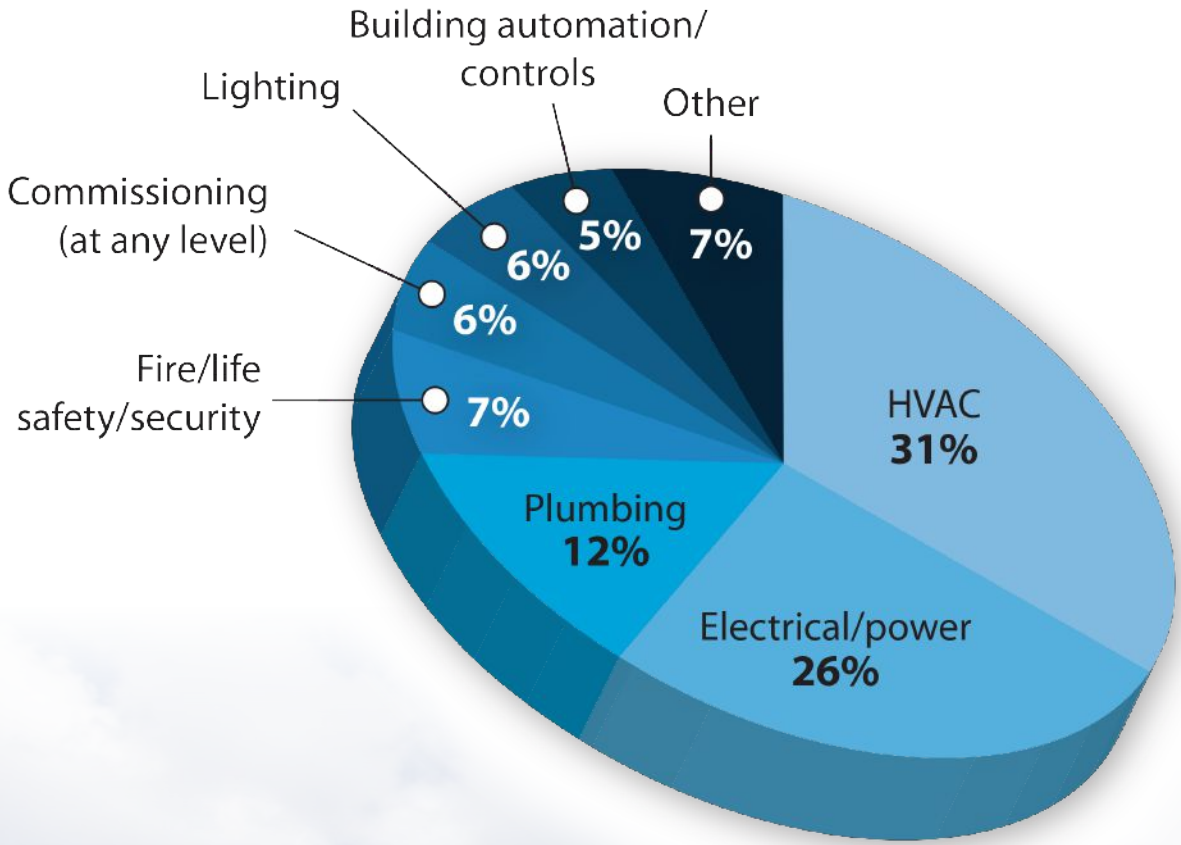
I want to thank Consulting-Specifying Engineer for recognizing the 2020 MEP Giants, and along with my Eaton colleagues I'd like to congratulate each one. Together, we're powering what matters.

Douglas A. Dillie
Industry Manager, Electrical Consultants
Eaton

MEP GIANTS 2020

BY THE NUMBERS

PERCENTAGE OF MEP DESIGN BILLINGS



$67,795,880,658
Grand total gross revenue

$8,829,622,360
Grand total MEP design revenue

59,677
Total engineers employed

9,572
LEED APs on staff

91%
Of MEP design revenue came from projects within the U.S.

29%
Of expenditures are allocated to new tools, such as software or hardware, on average

29%
Cite staffing — specifically the quality of young engineers — as their biggest corporate challenge

31%
Provided engineering services to the Middle East in 2019

11%
Of MEP design revenue was earned from industrial or manufacturing facilities/ warehouses projects

17%
Of engineering staff are female

2020 MEP GIANTS INDEX

MEP GIANTS 2020

RANK	FIRM NAME
2	AECOM
11	Affiliated Engineers Inc.
35	AlfaTech Consulting Engineers Inc.
38	AMA Group
89	Apogee Consulting Group PA
50	Arora Engineers Inc.
8	Arup
40	Bala Consulting Engineers
72	Ballinger
15	Bard, Rao + Athanas Consulting Engineers
100	Barton Associates Inc.
57	Bernhard
78	Bridgers & Paxton Consulting Engineers Inc.
53	BRPH Architects Engineers Inc.
91	BSA LifeStructures
4	Burns & McDonnell
33	Burns Engineering Inc.
32	CannonDesign
52	CDM Smith
70	CJL Engineeering Inc.
74	Clark Nexsen
24	CMTA Inc.
87	Core States Group
25	CRB
55	Cushing Terrell (formerly CTA Architects Engineers)
36	Dewberry
42	DLR Group
66	Dunham Associates Inc.
99	EEA Consulting Engineers
20	ESD
43	EwingCole
9	EXP
96	Farnsworth Group Inc.

RANK	FIRM NAME
34	Gannett Fleming
46	Ghafari Associates
84	GHT Limited
67	GPI/Greenman-Pedersen Inc.
73	H.F. Lenz Co.
59	H2M architects + engineers
6	HDR
44	Heapy
65	HED
14	Henderson Engineers Inc.
48	HGA
83	Highland Associates
13	IMEG Corp.
97	Integrated Design Solutions
12	IPS-Integrated Project Services
1	Jacobs
26	Jaros, Baum & Bolles
10	Jensen Hughes
62	Johnson, Mirmiran and Thompson Inc.
37	Jordan & Skala Engineers
86	Karpinski Engineering
95	KLH Engineers
41	kW Mission Critical Engineering
71	LaBella Associates DPC
88	LEO A DALY
69	Lilker Associates Consulting Engineers PC
61	M/E Engineering PC
80	Matrix Technologies Inc.
54	McKinstry
21	ME Engineers
68	Michaud Cooley Erickson
64	Morrison Hershfield
56	Newcomb & Boyd
19	NV5 Global Inc.

RANK	FIRM NAME
81	Optimation Technology Inc.
77	Osborn Engineering
39	P2S Inc.
31	Page
92	PBS Engineers
90	Peter Basso Associates Inc.
94	Pond
75	Professional Engineering Consultants PA
98	Rist-Frost-Shumway Engineering PC
30	RMF Engineering Inc.
79	Ross & Baruzzini Inc.
63	RTM Engineering Consultants
85	Rushing
17	Salas O'Brien
82	Setty
29	Smith Seckman Reid Inc.
28	SmithGroup
22	Southland Industries
76	Spectrum Engineers
47	SSOE Group
23	Stanley Consultants
5	Stantec Inc.
58	STV
18	Syska Hennessy Group
7	The High Performance Buildings Group (Glumac, NDY, Cosentini)
51	ThermalTech Engineering Inc.
45	tk1sc
27	TLC Engineering Solutions Inc.
49	Triad Consulting Engineers Inc.
16	Vanderweil Engineers
93	VBFA
60	Wiley|Wilson
3	WSP USA

2020 MEP GIANTS

RANK	FIRM NAME	LOCATION	TOTAL GROSS REVENUE FOR FISCAL YEAR ($ US)	TOTAL MEP DESIGN REVENUE ($ US)	PERCENT MEP REVENUE	MEP REVENUE, U.S. PROJECTS
1	Jacobs	Dallas, TX, U.S.	$12,737,900,000	$1,910,685,000	15%	8%
2	AECOM	Los Angeles, CA, U.S.	$20,200,000,000	$1,225,000,000	6%	24%
3	WSP USA	New York, NY, U.S.	$6,670,663,000	$510,220,375	8%	95%
4	Burns & McDonnell	Kansas City, MO, U.S.	$4,167,181,876	$343,559,294	8%	94%
5	Stantec Inc.	Edmonton, AB, Canada	$3,638,576,920	$277,564,896	8%	32%
6	HDR	Omaha, NE, U.S.	$2,504,000,000	$257,515,313	10%	60%
7	The High Performance Buildings Group (Glumac, NDY, Cosentini)	Pasadena, CA, U.S.	$3,100,000,000	$250,000,000	8%	63%
8	Arup	New York, NY, U.S.	$454,170,000	$157,730,966	35%	41%
9	EXP	Brampton, ON, Canada	$634,900,000	$156,995,026	25%	65%
10	Jensen Hughes	Baltimore, MD, U.S.	$267,000,000	$156,500,000	59%	73%
11	Affiliated Engineers Inc.	Madison, WI, U.S.	$150,861,000	$141,411,806	94%	94%
12	IPS-Integrated Project Services	Blue Bell, PA, U.S.	$646,482,975	$139,124,088	22%	73%
13	IMEG Corp.	Rock Island, IL, U.S.	$203,746,095	$128,360,039	63%	99%
14	Henderson Engineers Inc.	Lenexa, KS, U.S.	$192,091,853	$125,790,838	65%	99%
15	Bard, Rao + Athanas Consulting Engineers	Boston, MA, U.S.	$95,715,000	$95,715,000	100%	98%
16	Vanderweil Engineers	Boston, MA, U.S.	$122,506,100	$94,910,500	77%	97%
17	Salas O'Brien	Santa Ana, CA, U.S.	$117,015,968	$89,884,599	77%	99%
18	Syska Hennessy Group	New York, NY, U.S.	$107,274,311	$89,168,965	83%	98%
19	NV5 Global Inc.	Hollywood, FL, U.S.	$683,390,973	$87,304,923	13%	81%
20	ESD	Chicago, IL, U.S.	$85,054,194	$81,422,164	96%	99%
21	ME Engineers	Golden, CO, U.S.	$79,000,000	$79,000,000	100%	80%
22	Southland Industries	Dulles, VA, U.S.	$1,077,845,943	$71,801,226	7%	100%
23	Stanley Consultants	Muscatine, IA, U.S.	$189,200,000	$69,000,000	36%	75%
24	CMTA Inc.	Prospect, KY, U.S.	$126,162,771	$65,568,795	52%	100%
25	CRB	Kansas City, MO, U.S.	$161,208,364	$65,100,000	40%	92%
26	Jaros, Baum & Bolles	New York, NY, U.S.	$70,484,461	$60,319,910	86%	90%
27	TLC Engineering Solutions Inc.	Orlando, FL, U.S.	$69,525,613	$59,202,329	85%	98%
28	SmithGroup	Detroit, MI, U.S.	$290,344,747	$58,564,624	20%	98%
29	Smith Seckman Reid Inc.	Nashville, TN, U.S.	$85,105,020	$57,910,104	68%	99%
30	RMF Engineering Inc.	Baltimore, MD, U.S.	$61,000,000	$54,200,000	89%	100%
31	Page	Washington, DC, U.S.	$193,000,000	$54,000,000	28%	85%
32	CannonDesign	Buffalo, NY, U.S.	$253,600,000	$52,300,000	21%	100%
33	Burns Engineering Inc.	Philadelphia, PA, U.S.	$64,890,000	$52,127,000	80%	100%

2020 MEP GIANTS

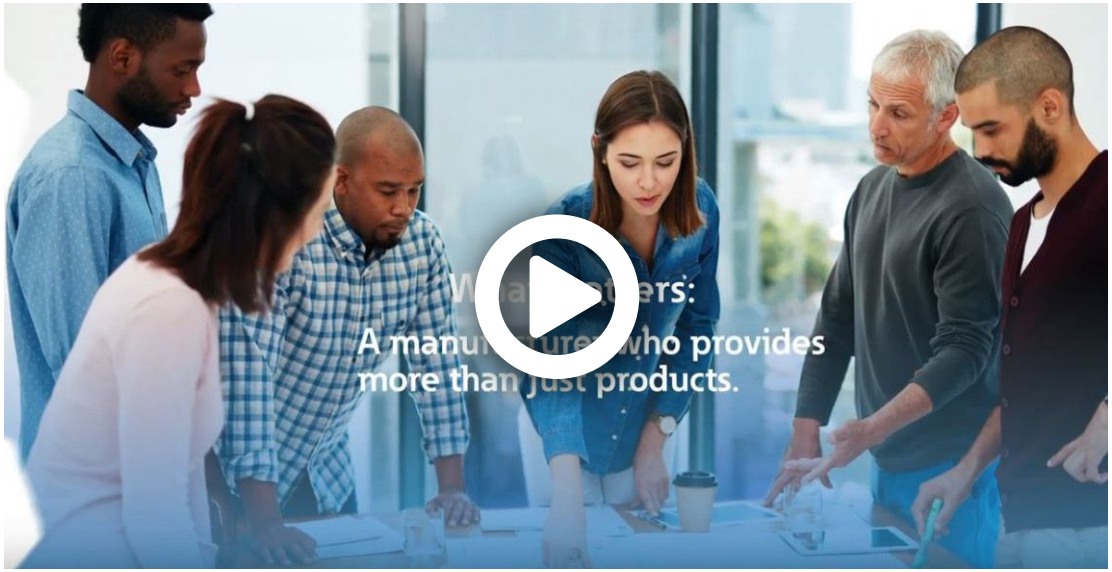
RANK	FIRM NAME	LOCATION	TOTAL GROSS REVENUE FOR FISCAL YEAR ($ US)	TOTAL MEP DESIGN REVENUE ($ US)	PERCENT MEP REVENUE	MEP REVENUE, U.S. PROJECTS
34	Gannett Fleming	Camp Hill, PA, U.S.	$553,000,000	$51,000,000	9%	100%
35	AlfaTech Consulting Engineers Inc.	San Jose, CA, U.S.	$46,592,372	$46,592,372	100%	100%
36	Dewberry	Fairfax, VA, U.S.	$470,882,964	$44,165,794	9%	99%
37	Jordan & Skala Engineers	Norcross, GA, U.S.	$43,791,000	$42,969,000	98%	100%
38	AMA Group	New York, NY, U.S.	$60,000,000	$42,000,000	70%	98%
39	P2S Inc.	Long Beach, CA, U.S.	$46,114,974	$41,826,686	91%	100%
40	Bala Consulting Engineers	King of Prussia, PA, U.S.	$41,300,000	$41,300,000	100%	100%
41	kW Mission Critical Engineering	Troy, NY, U.S.	$40,891,000	$40,891,000	100%	88%
42	DLR Group	Phoenix, AZ, U.S.	$270,000,000	$40,500,000	15%	99%
43	EwingCole	Philadelphia, PA, U.S.	$97,000,000	$40,000,000	41%	100%
44	Heapy	Dayton, OH, U.S.	$39,503,301	$39,501,301	100%	100%
45	tk1sc	Irvine, CA, U.S.	$39,000,000	$37,870,000	97%	100%
46	Ghafari Associates	Dearborn, MI, U.S.	$131,200,000	$36,000,000	27%	85%
47	SSOE Group	Toledo, OH, U.S.	$159,000,000	$35,700,000	22%	94%
48	HGA	Minneapolis, MN, U.S.	$201,150,841	$35,444,514	18%	94%
49	Triad Consulting Engineers Inc.	Morris Plains, NJ, U.S.	$36,012,000	$32,951,000	92%	96%
50	Arora Engineers Inc.	Chadds Fords, PA, U.S.	$30,907,497	$30,907,497	100%	100%
51	ThermalTech Engineering Inc.	CINCINNATI, OH, U.S.	$62,730,000	$29,936,000	48%	100%
52	CDM Smith	Boston, MA, U.S.	$1,265,649,715	$29,388,554	2%	2%
53	BRPH Architects Engineers Inc.	Melbourne, FL, U.S.	$73,287,750	$28,582,222	39%	99%
54	McKinstry	Seattle, WA, U.S.	$720,000,000	$28,000,000	4%	100%
55	Cushing Terrell (formerly CTA Architects Engineers)	Billings, MT, U.S.	$69,802,445	$27,292,912	39%	99%
56	Newcomb & Boyd	Atlanta, GA, U.S.	$36,113,832	$27,011,810	75%	99%
57	Bernhard	Baton Rouge, LA, U.S.	$642,958,000	$26,900,000	4%	100%
58	STV	New York, NY, U.S.	$582,496,000	$26,747,123	5%	100%
59	H2M architects + engineers	Melville, NY, U.S.	$84,008,835	$26,404,519	31%	100%
60	Wiley|Wilson	Lynchburg, VA, U.S.	$55,400,000	$26,200,000	47%	100%
61	M/E Engineering PC	Rochester, NY, U.S.	$28,727,300	$26,189,450	91%	100%
62	Johnson, Mirmiran and Thompson Inc.	Hunt Valley, MD, U.S.	$304,294,945	$25,386,056	8%	100%
63	RTM Engineering Consultants	Schaumburg, IL, U.S.	$26,860,738	$25,312,500	94%	100%
64	Morrison Hershfield	Markham, ON, Canada	$135,104,460	$25,107,181	19%	33%
65	HED	Southfield, MI, U.S.	$104,000,000	$25,000,000	24%	100%
66	Dunham Associates Inc.	Minneapolis, MN, U.S.	$24,700,000	$24,700,000	100%	96%

2020 MEP GIANTS

RANK	FIRM NAME	LOCATION	TOTAL GROSS REVENUE FOR FISCAL YEAR ($ US)	TOTAL MEP DESIGN REVENUE ($ US)	PERCENT MEP REVENUE	MEP REVENUE, U.S. PROJECTS
67	GPI/Greenman-Pedersen Inc.	Babylon, NY, U.S.	$296,000,000	$24,000,000	8%	100%
68	Michaud Cooley Erickson	Minneapolis, MN, U.S.	$23,000,000	$22,015,000	96%	95%
69	Lilker Associates Consulting Engineers PC	New York, NY, U.S.	$25,600,000	$22,000,000	86%	100%
70	CJL Engineeering Inc.	Moon Township, PA, U.S.	$21,135,000	$21,135,000	100%	100%
71	LaBella Associates DPC	Rochester, NY, U.S.	$127,960,476	$20,899,612	16%	100%
72	Ballinger	Philadelphia, PA, U.S.	$53,084,047	$20,877,000	39%	100%
73	H.F. Lenz Co.	Johnstown, PA, U.S.	$23,855,000	$20,735,000	87%	100%
74	Clark Nexsen	Virginia Beach, VA, U.S.	$93,120,000	$20,506,200	22%	96%
75	Professional Engineering Consultants PA	Wichita, KS, U.S.	$47,473,000	$20,415,000	43%	99%
76	Spectrum Engineers	Salt Lake City, UT, U.S.	$21,239,689	$19,546,142	92%	100%
77	Osborn Engineering	Cleveland, OH, U.S.	$30,029,000	$19,218,560	64%	96%
78	Bridgers & Paxton Consulting Engineers Inc.	ALBUQUERQUE, NM, U.S.	$19,200,966	$19,200,966	100%	100%
79	Ross & Baruzzini Inc.	St. Louis, MO, U.S.	$65,300,000	$19,100,000	29%	100%
80	Matrix Technologies Inc.	Maumee, OH, U.S.	$53,475,134	$18,901,605	35%	100%
81	Optimation Technology Inc.	Rush, NY, U.S.	$27,200,000	$18,800,000	69%	69%
82	Setty	Washington, DC, U.S.	$20,496,035	$18,784,661	92%	100%
83	Highland Associates	New York, NY, U.S.	$29,960,000	$18,700,000	62%	100%
84	GHT Limited	Arlington, VA, U.S.	$18,307,684	$18,307,684	100%	100%
85	Rushing	Seattle, WA, U.S.	$17,200,000	$17,200,000	100%	100%
86	Karpinski Engineering	Cleveland, OH, U.S.	$17,475,801	$16,740,320	96%	100%
87	Core States Group	Ambler, PA, U.S.	$59,792,860	$16,680,222	28%	99%
88	LEO A DALY	Omaha, NE, U.S.	$169,490,000	$16,121,000	10%	95%
89	Apogee Consulting Group PA	Cary, NC, U.S.	$20,822,000	$16,032,000	77%	100%
90	Peter Basso Associates Inc.	Pleasant Ridge, MI, U.S.	$17,800,000	$15,900,000	89%	100%
91	BSA LifeStructures	Indianapolis, IN, U.S.	$49,639,532	$15,560,332	31%	100%
92	PBS Engineers	Glendora, CA, U.S.	$15,304,000	$15,304,000	100%	100%
93	VBFA	Murray, UT, U.S.	$19,540,693	$15,000,000	77%	90%
94	Pond	Peachtree Corners, GA, U.S.	$219,200,000	$14,264,469	7%	99%
95	KLH Engineers	Fort Thomas, KY, U.S.	$14,038,086	$14,038,086	100%	100%
96	Farnsworth Group Inc.	Bloomington, IL, U.S.	$83,357,402	$14,012,337	17%	99%
97	Integrated Design Solutions	Troy, MI, U.S.	$28,000,000	$14,000,000	50%	100%
98	Rist-Frost-Shumway Engineering PC	Laconia, NH, U.S.	$15,830,000	$13,740,000	87%	100%
99	EEA Consulting Engineers	Austin, TX, U.S.	$16,889,693	$13,464,486	80%	100%
100	Barton Associates Inc.	York, PA, U.S.	$12,687,407	$12,687,407	100%	100%

WHAT MATTERS: A MANUFACTURER WHO PROVIDES MORE

Powering Business Worldwide



What matters: A manufacturer who provides more than just products

Learn about various ways consulting and specifying engineers benefit from working with Eaton on key projects.

By Amara Rozgus, Editor-in-Chief, and Amanda Pelliccione, Director of Research, Consulting-Specifying Engineer, Downers Grove, Ill.

MEP Giants revenue increased 5% over last year

The 2020 MEP Giants gross revenue increased nearly $8 billion, while MEP/FP revenue increased $434 million compared to last year

The 2020 MEP Giants generated approximately $67.8 billion in gross annual revenue during the previous fiscal year, an increase of about $7.99 billion over last year's numbers, in which firms generated $59 billion. This year, the 2020 MEP Giants earned $8.8 billion in mechanical, electrical, plumbing and fire protection engineering design revenue, an increase over 2019 MEP Giants' revenue of $8.4 billion.

While no major shake-ups occurred within the top 20 firms on the MEP Giants list, there were some newcomers. Several companies either joined the list for the first time or returned after time away from reporting data (in order of ranking on the list): Bard, Rao + Athanas Consulting Engineers LLC; AMA Group; EwingCole; Johnson, Mirmiran and Thompson Inc.; Ballinger; Optimation Technology Inc.; Rushing; Apogee Consulting Group PA; VBFA; Integrated Design Solutions LLC; Rist-Frost-Shumway Engineering P.C.; and Barton Associates Inc.

Other companies also moved up more than 10 slots, frequently due to mergers and acquisitions (in order of appearance on the list): Stanley Consultants, CRB, AlfaTech Consulting Engineers Inc., kW Mission Critical Engineering, Arora Engineers Inc., Newcomb & Boyd, Bernhard, H2M architects + engineers, Wiley|Wilson, RTM Engineering Consultants LLC, Spectrum Engineers, Osborn Engineering and Bridgers & Paxton Consulting Engineers Inc.

The list this year comprises 63% private companies (up from 59% in 2019), 24% employee-owned companies (a slight decrease), 7% limited-liability companies and 6% public companies. The 2020 MEP Giants are made up of consulting engineering firms (59%, down from 64% last year) and architectural engineering firms (32%).

Another large jump in mergers and acquisitions occurred in the past year; 28% of the firms reporting acquired another company (see page 20 for the article "MEP Giants mergers and acquisitions are steady, but future remains uncertain").

Table 1 shows the top firms based on MEP design revenue, which is how the MEP Giants are ranked. EXP joined the top 10 firms this year. Table 2 shows the top MEP Giants firms based on total gross revenue.

2020 MEP GIANTS SPECIAL REPORT

Table 1: Top 10 firms by MEP design revenue

Rank	Firm	MEP design revenue
1	Jacobs	$1,910,685,000
2	AECOM	$1,225,000,000
3	WSP USA	$510,220,375
4	Burns & McDonnell	$343,559,294
5	Stantec Inc.	$277,564,896
6	HDR	$257,515,313
7	The High Performance Buildings Group (Glumac, NDY, Cosentini)	$250,000,000
8	Arup	$157,730,966
9	EXP	$156,995,026
10	Jensen Hughes	$156,500,000

Table 1: *Top 10 firms are listed by MEP design revenue. Jacobs topped the list yet again — as it has since 2013 — with 15% of its gross revenue dedicated to MEP design. Courtesy: Consulting-Specifying Engineer*

More than half (55%) of all 2020 MEP Giants' revenue is generated from MEP design, with an average MEP design revenue of $88.3 million per firm, up from $83.9 million last year.

Again at the top of concerns is the MEP Giants' worry about "staffing: quality of young engineers." This year, 29% indicated it was their biggest corporate challenge. The next challenge was "evolving information technologies for design or project management" at 13% and "the economy's impact on the construction market" at 11%.

Human resources

The 2020 MEP Giants firms employ 24,981 MEP/FP engineers, up slightly from 23,991 engineers in 2019. On average, each 2020 MEP Giants firm has 115 mechanical engineers (up from 112 in 2019), 107 electrical engineers (up from 101), 18 plumbing engineers (down from 20), 10 fire protection engineers (up from 7) and 32 environmental engineers (up from 26).

This year's MEP Giants employ 196,467 people, including all types of administrative staff and job titles (a decrease from last year's staffing total of 230,213 people). For the 2020 MEP Giants, firms averaged 1,965 staff members, both engineering and nonengineering staff (down from 2,302 in the previous reporting period).

The engineering staffs of this year's firms are made up of 17% females, another uptick of 1%. On average, 46% of nonengineering staff are female, an increase over last year.
On average, firms had 96 LEED Accredited Professionals (at any level) on their team and 9 commissioning agents or professionals (CxAs or CxPs) on the team.

In 2020, the MEP Giants earned 91% of their MEP design revenue for U.S.-based projects, a small decrease from last year (92%). Several opportunities are open to MEP Giants outside the United States. Engineering services are provided in North America (Mexico, Canada) 50% of the time (a decrease from

Table 2: Top 10 firms by gross annual revenue

Rank	Firm	Gross annual revenue	Total MEP revenue %
2	AECOM	$20,200,000,000	6%
1	Jacobs	$12,737,900,000	15%
3	WSP USA	$6,670,663,000	8%
4	Burns & McDonnell	$4,167,181,876	8%
5	Stantec Inc.	$3,638,576,920	8%
7	The High Performance Buildings Group (Glumac, NDY, Cosentini)	$3,100,000,000	8%
6	HDR	$2,504,000,000	10%
52	CDM Smith	$1,265,649,715	2%
22	Southland Industries	$1,077,845,943	7%
54	McKinstry	$720,000,000	4%

Table 2: *This shows the top 10 firms by gross annual revenue. Courtesy: Consulting-Specifying Engineer*

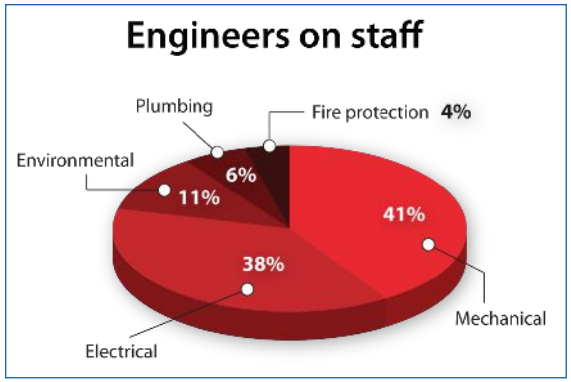


Figure 1: *Among those employed by the 2020 MEP Giants, there are 28,201 mechanical, electrical, plumbing, fire protection and environmental engineers (an increase from last year's 26,602). Nonengineering staff comprises 136,790 employees, which is a large decrease from the previous year's reported 168,688 staff. Courtesy: Consulting-Specifying Engineer*

57% last year). Other areas of international revenue include the European Union (32%, a decrease), Asia (37%, a decrease), the Middle East (31%, a decrease), the Caribbean (28%, an increase) and South America (18%, an increase).

When it comes to sustainable engineering, the number of U.S. Green Building Council LEED projects decreased for this reporting period yet again; 1,111 projects were submitted for LEED certification in the past fiscal year, whereas 1,199 projects were submitted for the previous reporting period. The number of projects submitted in the past fiscal year to the U.S. Environmental Protection Agency's Energy Star Buildings Label increased to 449 projects, with an average of four projects completed by each of the 2020 MEP Giants, the same as in the previous year.

Project types

The 100 firms listed here don't handle all aspects of engineering. Many subcontract specialty services including acoustics (68%, down from 73% the previous year), computational fluid dynamics modeling (29%, up from 21%), construction management (15%, down from 17%) and security system design (15%, down from 17%). Commissioning was subcontracted out 15% of the time.

As shown in Figure 2, MEP Giants indicated that they split their time between new construction (42%, no change) and retrofit/renovation (39%, slight increase). These numbers have deviated only slightly year over year, with a percent or two of change each year based on economic conditions. Rounding out the projects are maintenance, repair and operations (10%); commissioning or retro-commissioning (6%); and "other" (3%). For a more in-depth report on commissioning, read the October 2020 article on the Commissioning Giants.

The 2020 MEP Giants firms continue to work on several projects in hospitals and health care facilities; office buildings; industrial/manufacturing facilities; utilities, public works and transportation; and colleges and universities. Figure 3 breaks down the various building types in which MEP Giants firms work; the health care and office building markets were at the top for this reporting period, as they were the past four years. Build-

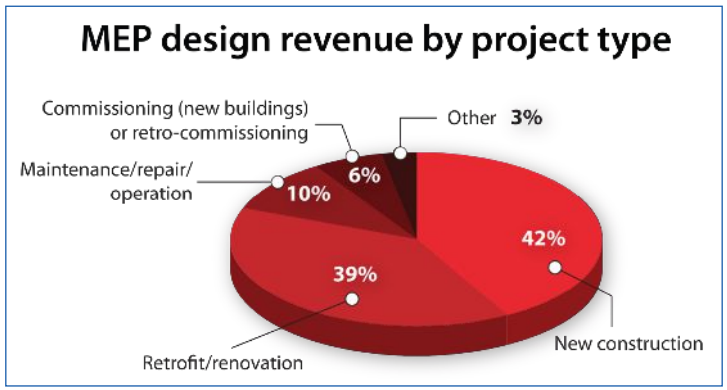
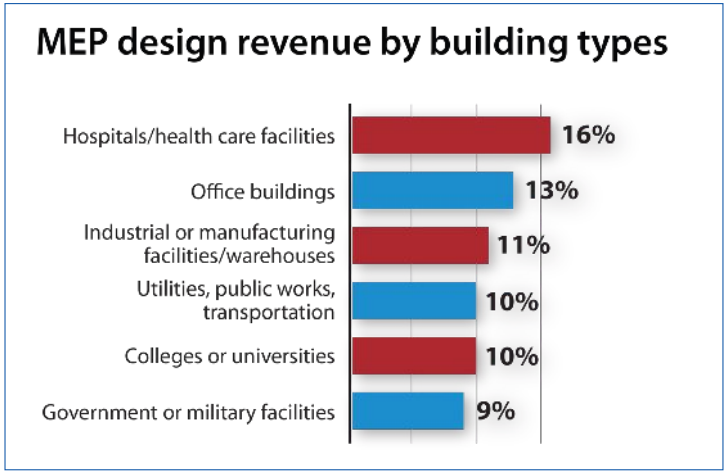


Figure 2: *Similar to data from previous MEP Giants research, the amount of new construction is nearly the same as retrofit/renovation work. These numbers have varied only slightly since data collection started many years ago. Courtesy: Consulting-Specifying Engineer*

Figure 3: *The 2020 MEP Giants earned revenue in two key building types: hospitals/health care facilities and office buildings. It is expected that hospitals/health care facilities will continue to gain these firms additional revenue in combating the COVID-19 crisis. Courtesy: Consulting-Specifying Engineer*



ing types reported for the next MEP Giants will undoubtedly change due to the COVID-19 pandemic. Read about several project profiles at www.csemag.com/giants.

The complete picture

Various new questions were introduced in the past four years to help provide a broader picture of how the MEP Giants firms are managing their businesses. As a result, interesting facts about the 2020 MEP Giants include:

- Many firms have lead engineers or experts who handle a particular focus: chief mechanical engineer (84%, up from 82%), business development director (86%, an increase from 80% last year), chief electrical engineer (84%, up from 80%), sustainability or green building coordinator (76%, up from 73%) and commissioning engineer or coordinator (75%, up from 73%).
- New York is once again listed as the No. 1 state that firms call home, with 15 companies headquartered there. Pennsylvania (11) and California (7) are next on the list.
- In addition to traditional labor and overhead costs, MEP Giants spend capital funds on new tools (such as software or hardware, 29%), capital improvement (such as office space, 19%) and promotions and marketing (16%).
- Private owners remain the No. 1 source of work/clients (98%), with design-build coming in second (95%).

Survey methodology

At the beginning of 2020, the *Consulting-Specifying Engineer* staff collected and analyzed data from several consulting and engineering firms. Some of the top mechanical, electrical, plumbing and fire protection engineering firms submitted their firms' profiles to *Consulting-Specifying Engineer*; however, not all consulting firms were willing or able to participate in this year's MEP Giants survey. The smallest amount of MEP design revenue reported this year was more than $12 million. Some firms were unable to report final data due to the COVID-19 pandemic.

In 2020, more than 100 engineering firms provided their information for the MEP Giants program, with some newcomers or firms reentering the program. Data and percentages are based on the top 100 companies that responded to the request for information; the results do not fully represent the construction and engineering market as a whole. However, with nearly identical questions asked in previous years and more than 100 engineering firms participating this year, we present a qualified portrait of where the top engineering firms stand in 2020.

In the electrical industry, safety, efficiency, sustainability and reliability are critical. But people matter most.

We're powering what matters by preparing the next generation of industry leaders through education and training initiatives, at all levels. We shape curricula in partnership with top-tier universities. Our Experience Centers give new and seasoned professionals insight into the latest technologies and equipment. And our experts regularly share their unique perspectives through webinars, podcasts, presentations and more. Because brighter leaders build a brighter future.

Eaton.com/Consultanteducation

We make what matters work.

EATON

Powering Business Worldwide

Training programs in a socially distant world

Investment in education and training is essential

Creating safe, reliable power systems is complex, which makes education and training programs essential for new and experienced power system design engineers alike. Traditionally, hands-on education programs for electrical engineers occurred primarily in person. Today, however, many technological advancements are enabling more effective online education than ever before. This revelation has accelerated due to the social distancing requirements of COVID-19.

Necessity is the mother of invention. In the last few months, training programs were nearly exclusively conducted online. The global pandemic boosted the use and acceptance of online and virtual platforms across nearly all industries. From telemedicine visits to ubiquitous online meetings and classrooms, COVID-19 pushed traditional in-person interactions into a virtual world nearly overnight.

Eaton has a long history of providing training for the electrical industry to support long and successful careers and safe and reliable power systems. Our decades of power management experience and deep investments in specialized learning environments and programs uniquely position us as a trusted, valued resource for industry education.

As training leaders, we recognize there will always be a need for physical face-to-face education for electrical consultants. At the same time, we're driving the evolution of our online learning programs to fill the current void and provide valuable

supplemental benefits into the future. But in the midst of a global pandemic and required social distancing, how do you get your hands on the training and education resources you need? What's available? And how do you maximize online resources to make real connections?

Investment in education and training pave the road to a successful career

Meeting state licensing requirements for continuing education is mandatory for a Professional Engineer. Beyond those guidelines, training and education have always been important for consultants. Whether you're new to the electrical engineering workforce or an industry veteran, there are a multitude of reasons that make education and training programs essential to a successful career—from learning the basics to expanding skill sets.

TRAINING PROGRAMS IN A SOCIALLY DISTANT WORLD

Here are five reasons why we see training and education especially important today:

1. **Workforce retirements mean young engineers must fill the positions of senior designers.** Every day, thousands of baby boomers reach age 65. And that trend is expected to continue for the next decade. Young engineers need to learn the basics. Out of college, many engineers know what a piece of electrical equipment looks like in a one-line drawing, but have not had the opportunity to see the electrical equipment in person. Having an in-depth knowledge about how these pieces of electrical equipment are constructed and operate is incredibly helpful as new engineers design these components into electrical system plans later.

2. **Codes rule everything and they change regularly.** That means no matter if you're a seasoned professional or new to the industry, keeping up with the National Electrical Code (NEC) and other industry standards is a continuous journey.

3. **Technology marches forward with advances in safety, IIoT, cybersecurity and more.** Education is critical to keep up with power system changes: meet evolving codes, create cybersecure systems and understand technology advancements that support safety and connectivity and more. In the past three years alone, the proliferation of connected devices has spurred the development of completely new UL and International Electrotechnical Commission (IEC) cybersecurity assessment programs. It is critical that electrical consultants keep up with similarly changing technology and its impact on the electrical industry.

4. **Energy delivery systems and sources are changing.** Our world is in the midst of a major energy transition. More and more renewables are coming online and connected to existing and new buildings. According to McKinsey's 2019 Global Energy Perspective, after 2035, more than half of power generation is expected to come from renewables. Further, more energy storage and microgrid systems are being added to the mix, creat-ing an **Everything as a Grid** environment where a centralized electricity supply is not the only reality. With these new grid dynamics and the two-way flow of power, electrical infrastructure needs to do a lot more; simply getting power from the grid to building loads and operations is not enough.

5. **Construction project schedules continue to be squeezed.** Pressure on time and budget means training and tools to support productivity are critical. At the same time, there's less time and money to dedicate to training, which means getting online, on-demand training when you need it is essential.

Traditional training programs deliver on experience and connections

For years, education programs for consulting engineers were primarily conducted through mentoring and lunch-and-learn sessions in person and in classroom environments. Training sessions were typically guided by experienced co-workers, experts from manufacturers or industry organizations who would show how solutions can be applied and problems addressed through visual models. Further, these sessions were highly personalized with extensive Q&A sessions specific to project challenges.

Our application engineers have conducted hundreds of lunch-and-learn sessions each year at design firms. These are typically one-hour sessions focused on new technologies and/or code requirements. In a more ordinary year, these sessions would be in person and often bleed into the afternoon, and one-to-one discussions resulting from a training seminar would provide insight on specific project questions. In today's socially distanced world, lunch-and-learn sessions have moved online and continue to be available through our application engineers.

In recent years, we have focused heavily on onsite training programs in our specialized training environments. For example, thousands of people have come through our Eaton Experience Centers each year for hands-on training programs. These sessions include accredited courses on topics including power system analysis, overcurrent protection and power quality – performed in controlled lab environments outfitted with full-scale power systems designed for a variety of difficult to access application environments, such as: microgrids, data centers, utilities and harsh industrial environments.

We also developed the Power Up program to guide early-career professionals through a variety of electrical design topics and provide an opportunity to see equipment in the real world. We've conducted hundreds of hours of this two-day trainings to help attendees become far more familiar with what equipment looks like and how it operates in person. Experienced engineers provide this training at the Eaton Experience Centers, so participants can see the latest electrical industry technologies at work.

Additionally, we have regional manufacturing centers throughout the country that provide hands-on and classroom environments for Power Up training sessions and continuing education sessions on complex topics. These facilities offer a unique learning setting, providing real world experiences in a controlled manufacturing plant environment. Eaton application engineers from around the country run dozens of these sessions in a typical year.

We've also leveraged the expertise of our engineering services team to provide a range of in-depth technical workshops that address complex topics in electrical safety, power quality, electrical analysis and more. The courses led by this group provide attendees with the opportunity to experience products within solution-based applications through state of the art, market-specific demonstration centers.

Consultants are instructed by highly experienced Eaton professionals, including many who actively participate in IEEE and

other industry boards that support the development of standards. Through decades of application experience, our trainers are uniquely able to address a range of difficult industry subjects and can customize trainings for the needs of an individual firm. Workshops cover specific topics, including overcurrent protection, overvoltage protection, arc flash safety, understanding electrical drawings and more. Sessions can last anywhere from half a day to a full week, depending on the topic and firm's specific needs. In addition to the live sessions, we've created eLearning sessions that are available online.

Training and education are evolving (fast!)

Before COVID-19, training was already becoming more digital by the day. The global pandemic just made education and training move at a lightning pace to a virtual environment. Nearly all training in recent months has been pushed online. There are both opportunities and challenges with this shift.

Eaton has long recognized the value of remote learning and is committed to providing a nearly "one- stop-shop" for engineers to easily access information in support of long and successful careers. Today, we offer one of the broadest ranges of **online engineering support** in the industry, including in-depth design guides, accredited webinars, training videos and more.

We've taken the most requested topics for live education and developed sessions for an online audience. Today, we have education platforms for arc flash safety, NEC code updates and more – available completely online and on demand. These self-paced classes are often condensed versions of the in-person sessions.

There are many rewards to this type of online education, including the fact that more people can participate, and no travel

is required to help firms save time and money. In some cases, virtual environments can enable participants to get a much closer look at energized electrical equipment than live training environments. And, for complex topics, participants can take a slower, self-paced approach.

Although online education offers a variety of positive aspects, there are also challenges. Online training misses on peer-to-peer interactions, networking and real mentoring. Whether at a lunch-and-learn or a Power Up training, participants often learn as much from their peers and informal discussions with their instructor over breaks or at dinner as they do from the formal instruction, and these connections can last for years. For anyone with school-age children, this point is really apparent. No matter how good the online instruction can be, there is no substitute for children's direct connections with their peers and a caring teacher. The past few months have made that painfully obvious.

It can also be difficult to find trusted online learning resources amid the various options available. How do you know if the resource you're viewing is credible? If the information is accurate? And, is it really the right and most current approach? As traditional onsite training sessions are steadily replaced with online webinars and broadcasts, it is critical to ensure engineers can rely on a trusted advisor who provides the experience and guidance needed to succeed in the future of our changing industry.

Eaton continues to deliver on education and training

At Eaton, we're committed to providing the training and certification programs needed to support electrical professionals. Through our Eaton Experience Centers, regional facilities and global network of engineering professionals, we offer real-world experiential learning that new workforce entrants and experienced electrical incumbents need to grow their skills, enhance productivity and ensure safety for all.

With a vast assortment of technical and application presentations, onsite programs, video learning and equipment-level overviews, Eaton offers the resources consultants and engineers at any career stage need to learn more about effective power distribution. Today, we're proud to offer educational platforms designed specifically for early career training and experienced professionals alike.

1. Early career training

There are many factors new professionals need to consider in the design of power distribution systems. Our **Basics of Power System Design** guide is a free resource available to download that provides an introduction to the topics most relevant to new (and experienced) power engineers—from system design and analysis to component overviews and guidance on codes and standards.

For in-person training, our **Power Up** early-career training seminars guide early-career professionals through a variety of electrical design topics, including power system design, system protection and coordination and power quality.

We also offer a **101 Basics** series to provide a solid foundation of electrical power distribution and control equipment knowledge—from the fundamentals of electricity and electrical distribution to basic information on product groups like adjustable frequency drives, panelboards and motor control centers. Each learning module focuses on a specific product group and contains general information such as common terms, product theory and operation, codes and real-world applications.

Further, Eaton's website is designed to provide easy access to a multitude of educational resources. Frequently asked questions (FAQ) address common questions on a range of topics like **surge protection** and **power conditioning** and provide guidance on how to overcome common application issues. Our equipment "fundamentals" pages also provide basic information on a range of equipment—from **low-voltage switchgear** and **medium-voltage switchgear** to **transformers** and much more.

2. Keeping up with changing technologies and code changes

Eaton has an expansive network of application engineers throughout North America that is unique to the industry. This experienced team of experts can provide customized in-house or remote training on a variety of application topics to support localized education. They have performed hundreds of lunch-

and-learn sessions annually in person and online on topics that are most relevant or requested.

Additionally, we offer a wide range of accredited training webinars every year. Our experts have conducted dozens of online sessions for PDH and CEU credits over the past few months, with thousands of professionals tuning in while sheltering at home. For instance, Eaton kicked off the 2020 National Electrical Safety Month by transitioning our most commonly requested electrical safety training programs into a series of accredited online webinars.

Further, our code experts host **regular livestreams** covering the latest code changes and their implications for electrical system design and safety. These sessions proved incredibly impactful during current social distancing requirements and have been viewed by more than 38,000 industry professionals throughout the COVID-19 pandemic. Electrical consultants can also stay up to date on the latest code changes by visiting our For Safety's Sake blog, which offers monthly articles focused on the latest codes and standards shaping electrical safety across industries.

3. Instructor-led training

Eaton provides instructor-led training courses on important topics including industrial power systems analysis, overcurrent protection, power quality analysis and more. A complete description of the course offering can be found at our power distribution training website. All courses provide continuing education credits (PDHs) and are typically offered both in-person at our Power Experience Centers in Pittsburgh in Houston, as well as online. However, we have temporarily suspended all in-person training.

Online, instructor-led courses are modeled after our live courses and are available as both 90-minute 'overviews' as well more in-depth, day-long sessions which provide additional details, examples and Q&A.

Online, instructor-led courses are currently available for the following topics:

- Understanding and overview of LV/MV electrical drawings
- Overcurrent protection
- Overvoltage protection
- Electrical and arc-flash safety

Get the training you need when you need it

The world and its industries continue to evolve. The workforce is changing as more professionals prepare for retirement. The proliferation of bidirectional power systems and energy transition requires more technical know-how, while market shifts and code changes offer more challenges today than at any other point in the power industry.

Alongside the ongoing importance of training and education for the electrical industry, COVID-19 accelerated the demand for more interactive and impactful online learning environments. Whether online, in person or on demand, Eaton will continue to lead the way to help electrical professionals obtain the knowledge needed to succeed.

To stay updated on all the latest training and educational resources from Eaton, visit
Eaton.com/ConsultantEducation
or contact your local Eaton Application Engineer.

By Nick Belitz, Morrissey Goodale LLC, Denver

MEP Giants mergers and acquisitions are steady, but future remains uncertain

Building on the prior year's torrid pace of consolidations, mechanical, electrical, plumbing and fire protection engineering firms announce even more transactions in 2019

After setting records with 387 deals globally in the architecture, engineering and construction industry in 2018, leaders of industry firms took consolidation to new heights in 2019, notching 453 deals across the globe. The new high-water mark of industry transactions represented a 17% increase over the previous year. The majority of these transactions — or 313 deals — occurred within the United States, making the country the center of industry merger and acquisition activity, a reality driven by the nation's tremendous economic heft and expectations for robust and sustained demand for engineering services of all types.

Consistent with the industry's mergers and acquisitions activity, Consulting-Specifying Engineer's 2019 MEP Giants stepped up their own deal-making last year. The number of deals made by the largest mechanical, electrical, plumbing and fire protection engineering firms rose substantially in 2019 as the group recorded 52 transactions, up 6% from the 49 deals made the year before and up 40% over deal activity in 2017. The multiyear trend indicates sustained interest by the MEP Giants in finding and acquiring firms to achieve long-term business goals.

Acquisitions by MEP Giants in 2019 were led by the usual suspects of repeat acquirers that have made doing deals a core strategy in building and diversifying their firms. Those firms include serial deal-makers NV5 (Hollywood, Fla.) and Salas O'Brien (Santa Ana, Calif.), which, in addition to being mainstays of the MEP Giants list, also regularly rank among the most active acquirers of engineering firms across all sectors in a given year.

But the past year also saw traditionally less acquisitive MEP Giants, such as Integrated Project Services (Blue Bell, Pa.), Bala Consulting Engineers (King of Prussia, Pa.) and PBS Engineers (Glendora, Calif.), enter the deal-making fray. This would indicate growing popularity in acquisitions by a greater range of MEP Giants.

Further, just like the year before, a greater percentage of the MEP Giants in 2019 joined the deal-making party. More than one-quarter of the MEP Giants, 28%, reported a transaction in 2019, up slightly from 2018. This tally is also up considerably from 2017, when just 16% of the industry-leading group notched a deal. With more MEP Giants closing deals, it's fair to say the macro-level drivers of consolidation facing buyers — increasing competition, the desire for more options to grow and the need to expand in higher-growth geographies — are all at work for MEP Giants.

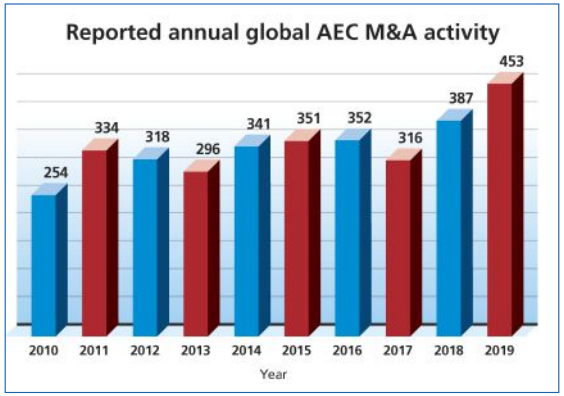


Figure 1: The increase in global mergers and acquisitions was driven by record levels of investment in engineering firms both in the U.S. and abroad. Courtesy: Morrissey Goodale

Drivers of record-breaking deal activity

Before the outbreak of COVID-19, all expectations called for continuing AEC industry consolidation. While the global pandemic certainly affected deal-making, two specific factors helped drive consolidation by MEP Giants in 2019 and we firmly believe those factors will remain in play as the outbreak subsides.

Nontraditional and technology-driven acquisitions. As engineering firms look for ways to differentiate their service offerings and fight back against the commoditization of engineering design, an increasing number of buyers have sought out acquisitions of companies offering services related to engineering, but that are also rooted in applications of technology.

Forward-thinking firm leaders are looking for ways to add value for clients beyond the traditional design process and that increasingly includes investing in niche technology service providers. The following recent deals across the industry and by the MEP Giants provide examples of this trend.

- **Tetra Tech** acquired GlobalTech, a consulting firm specializing in information technology, cloud migration, cybersecurity and management.
- **NV5** acquired The Sextant Group, an information and communications technology and acoustics specialist.
- **Ross & Baruzzini** acquired COMgroup, a telecommunications consultant.
- **Jacobs** acquired a 50% share in Simetrica, a research consultancy specializing in social value measurement and well-being analysis.
- **Gannett Fleming** acquired TTI Consulting, a traffic technology consulting firm with expertise in tolling.
- **HED** merged with Integrated Design Group, a data center designer.

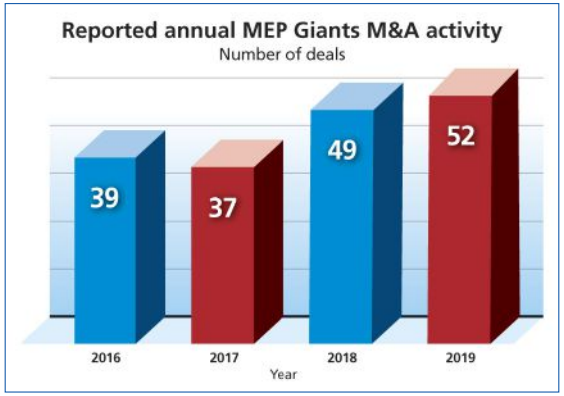


Figure 2: The number of deals made by the MEP Giants firms rose slightly year-over-year as the group recorded 52 transactions, up 6% from the 49 deals made by the group in 2018, but still significantly higher than the 37 transactions closed in 2017. Courtesy: Morrissey Goodale

Private equity capital is here to stay. The emergence of private equity investments in engineering firms has shifted from a trend to a new reality. Last year, private equity deal-making in the domestic U.S. continued to expand as Morrissey Goodale tracked 75 U.S. private equity-backed deals, up from 63 deals in 2018

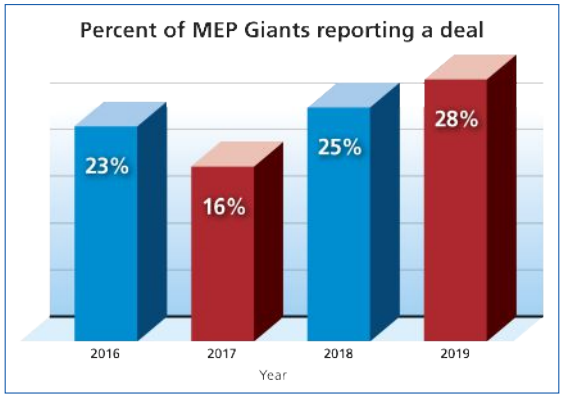


Figure 3: *More than one-quarter of the MEP Giants reported a transaction in 2019, representing a record in terms of the percentage of firms announcing a transaction. Courtesy: Morrissey Goodale*

and 45 deals in 2017. With low long-term interest rates and monetary policy structured by the Federal Reserve to encourage business investment, we expect a low cost of capital to continue to help drive private equity-backed deals, which often rely on debt financing, to a larger share of industry transactions. Active private equity buyers will spur competition for the most attractive deals that might otherwise have gone to the MEP Giants.

M&A in the time of COVID-19

The end of 2019 and start of 2020 brought the world a "black swan" event no one predicted: a global pandemic that drove a voluntary though widespread shutdown of the U.S. and world economies. While most sectors of the economy suffered swift and severe losses, the U.S. engineering industry rapidly adjusted to the new remote work environment and continued to serve clients and execute on projects.

By all accounts, the domestic engineering industry entered the COVID-19 crisis enjoying high demand for services and robust backlogs across a number of market sectors, setting the stage for a reasonable degree of business continuity. However, the uncertainty caused by the pandemic did slow deal-making, with transactions slowed — but not necessarily stopped —by the unprecedented economic disruption.

As of this writing, Morrissey Goodale's data indicates the crisis sparked by COVID-19 reduced industry transactions on a month-to-month basis by approximately 50% when comparing 2019's results to deal announcements in year-to-date 2020. We have also observed a shift in approaches to deals in the market. Whereas the MEP Giants closed deals in 2019 with an offensive strategy in mind — one driven by expansion into new markets, territories or technologies (see the list above for examples of the latter) — we expect more deals in the near term to be defensive in nature. This means acquisitions closer to the buyer's "home turf" or in proven market positions to capture local talent and market share. We also expect acquirers to focus on deals in the states with stronger growth economies and those geographies less affected by COVID-19.

In any case, when the crisis subsides, the drivers of consolidation at work in the industry, including the challenges of increased competition, the need to transition retiring owners and the influence of private equity-backed firms, will still be at work.
For that reason, Morrissey Goodale believes the slump in the number of mergers and acquisitions deals caused by COVID-19 to be temporary and that deal volume will resume as the world adapts to the new, post-COVID reality. Looking ahead, we expect mergers and acquisitions by MEP Giants, while not reaching the record levels of 2019, to return in 2021 to the consistently high levels of the recent past.

Nick Belitz *is a principal with Morrissey Goodale LLC, a management consulting and research firm that exclusively serves the architecture, engineering and construction industry. Morrissey Goodale is a CFE Media content partner.*

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