

WINTER 2020

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PRIVATE MATTERS

PRIVATE SECTOR MARKETS
PROVIDING ENGINEERING FIRMS
AMPLE OPPORTUNITY FOR GROWTH

ACEC
OKLAHOMA
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CONTENTS

Winter 2020

12

COVER STORY

SPOTLIGHT: PRIVATE SECTOR MARKET

DIVERSIFYING AND SUCCEEDING IN THE PRIVATE SECTOR

More and more engineering firms are choosing to focus on the private sector with exceptional results.

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FEATURES

SPOTLIGHT: PRIVATE SECTOR MARKET

18

GROWTH CONTINUES IN LIFE AND HEALTH SCIENCES SECTOR

Vital signs indicate a healthy and evolving market for engineering firms in this private sector.

22

TRANSIT-ORIENTED DEVELOPMENTS ON THE FAST TRACK

Vibrant, livable, and sustainable communities create rapidly growing community epicenters.

26

PRESIDENTIAL CANDIDATES DISCUSS INFRASTRUCTURE

First-ever Candidate Infrastructure Forum provides diverse visions of America's infrastructure future.

31

FAIR WARNING

2019 PLI Survey of Carriers indicates tightening market in the coming years.

36

ACEC OKLAHOMA PROFILE

State organization key to the establishment of ACEC.

40

CULTIVATING STEM

Garver partners with 100 schools to increase STEM learning opportunities.



DEPARTMENTS

4 FROM ACEC TO YOU

Meaningful rewards from Presidential Candidate Infrastructure Forum.

6 MARKET WATCH

MEP market embracing new technology in concert with client demand.

8 LEGISLATIVE ACTION

ACEC secures repeal of \$7.6 billion rescission of federal highway funding; tax policy included in budget deal.

10 THE PRIVATE SIDE

Southeast port growth spurs intermodal opportunities; expected EV increase to result in site infrastructure changes.

44 IN THE NEWS

Goldman Copeland designs geothermal screening tool; HDR Fellows Program helps employees pursue professional passions.

46 MERGERS AND ACQUISITIONS

Party on, deal-makers!

48 RISK MANAGEMENT

Peering at peer review risk.

49 MEMBERS IN THE NEWS

Wood appoints Cox CEO; CHA Holdings, Inc., promotes Stephenson to CEO; RLG Consulting Engineers appoints Markussen chairman; Architectural Engineers, Inc. promotes Wisler to president; and Maser Consulting appoints Haney to CEO.

52 BUSINESS INSIGHTS

Crystal Ball Workshop looks into the future.

COVER: RELATED COMPANIES | OXFORD PROPERTIES GROUP

AMERICAN COUNCIL OF ENGINEERING COMPANIES

Meaningful Rewards from Presidential Candidate Infrastructure Forum

It was a thrill to hear in person the leading Democratic presidential candidates tout their plans to solve the nation's infrastructure funding dilemma as part of the recent Moving America Forward Infrastructure Forum in Las Vegas.

While all proposed plans contained differing dynamics from the candidates—U.S. Sen. Amy Klobuchar, D-Minn.; former Vice President Joe Biden; former Mayor Pete Buttigieg, and hedge fund financier Tom Steyer—they all had one commonality, the promise to finally produce robust infrastructure investment (see *infrastructure forum*, page 26).

At the forum, our name was announced nationally as part of the host committee and the ACEC logo was in prominent view on the stage backdrop behind the candidates along with the other host committee members. The forum was nationally broadcast and livestreamed by C-SPAN and moderated by the *Wall Street Journal's* Jerry Seib and Jeanne Cummings.

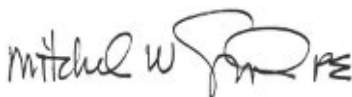
Whenever and wherever a major political discussion occurs concerning one of our industry's major markets—our name, our presence, and our influence should be there. We will continue to work on that.

This issue of *Engineering Inc.* provides a special focus on private sector markets, including why so many member firms use these markets as primary business targets, and examples of which markets demonstrate the best growth (see page 12).

An outstanding lineup of national business and political experts—including veteran journalist Chris Wallace; renewable energy expert Jessica O. Matthews, founder and CEO of Uncharted Power; and Scott Harrison, founder and CEO of charity: water—await attendees at the upcoming 2020 Annual Convention (April 26–29) in Washington, D.C.

Convention highlights also include: Capitol Hill visits where hundreds of Council members meet with their Congressional delegations to advocate for key industry objectives; more than 20 leading-edge business education sessions; and the 53rd Annual Engineering Excellence Awards Gala, hosted by Emmy award-winner Ross Shafer.

We look forward to seeing all of you there.



Mitchel W. Simpler
ACEC Chairman



Linda Bauer Darr
ACEC President & CEO



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Journalist, Host of Fox
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MEPs Embracing New Technology as Client Demand Evolves

By Gerry Donohue

Technological innovation plays a huge role in the mechanical/electrical/plumbing (MEP) market sector. Clients expect firms to stay on top of the latest equipment in a fast-moving marketplace, and firms need to stay current—or ahead—of the latest developments in design and project management tools.

“When it comes to technology, I like the analogy of a train, with the engine leading and caboose bringing up the rear,” says Robin Greenleaf, CEO of Architectural Engineers in Boston and ACEC chair-elect for 2020–2021. “We want to be the engine, using technology to keep us competitive in the market and out in front of the industry.”

Many MEP firms have developed structures and systems for monitoring the market and making decisions on when to pull the trigger on new technology.

“My role is to help our internal people identify investments that we want to make in ourselves, our own talent, and technology,” says Nadja Turek, R&D facilitator at Woolpert in Dayton, Ohio. “We identify trends, see where the market is going, find out about new needs of clients, and then determine how to spend our strategic investment money.”

P2S in Long Beach, California, has assembled an MEP Automation Group to stay up to date. “The group consists of about 25 people, and their task is to focus on innovation,” says Aravind Batra, principal at P2S. “They are constantly researching what products are coming out and how we might make our processes more efficient.”

Of course, when trying to stay on the cutting edge of technology, you are not always going to be right.

“Sometimes we pick wrong,” says Joel Goodmonson, EVP of Architectural Engineers and chair of ACEC’s CAMEE Coalition. “We have made significant purchases that have not been that useful. When that happens, you just have to lick your wounds and keep going.”

TECHNOLOGICAL BASELINE

The primary design tool for most MEP firms today is Autodesk’s Revit BIM software. Introduced in 2000, Revit has gone through many iterations and today is a comprehensive program that creates a 3D model of a project, including both the physical properties and the interactions of building components.

“It leads to a more responsive and efficient project,” says Adam Rickey, vice president of MEP/FP/Energy at KCI Technologies in Sparks Glencoe, Maryland. “We can collaborate with the other



CHARY_TEE/GETTY IMAGES

consultants and see clashes and conflicts between the different trades immediately. Because of that, we have been able to reduce change orders and schedule delays.”

Rickey and other practitioners say another key piece of technological equipment for MEP firms is a 360-degree 3D scanner. “It is especially effective in renovations when you’re figuring out what is in a space,” he says. “The precision is tremendous. It is accurate up to 1/16 of an inch.”

It replaces the need for a tape measure, Turek says. “We can set it up in a mechanical room and it creates a 3D point cloud of everything in that room,” she says. “We can see if such-and-such boiler will fit in the room, what needs to be demoed, what can fit through the door, and where we would make our connections.”

TECHNOLOGY TOMORROW

Looking into the future, these practitioners see big potential changes in the technological tools for MEP firms. In the near term, they expect to see improved coordination across the design and construction teams.

“The collaborative effort between design professionals and contractors will get more and more efficient,” Rickey says. “That will further streamline the process and cut down on delays and change orders.”

Greenleaf agrees. “The interface between designers and contractors can still be rough,” she says. “We can export files, but

they are not native, and they do not work as well. I’m confident that it will not be too long before that is fixed.”

Rickey also sees improvements in Revit and other BIM programs in building operations and maintenance. “More and more owners want BIM models of the building and facility, so if there is a problem with a piece of equipment in the building, they know where it is and what it is,” he says.

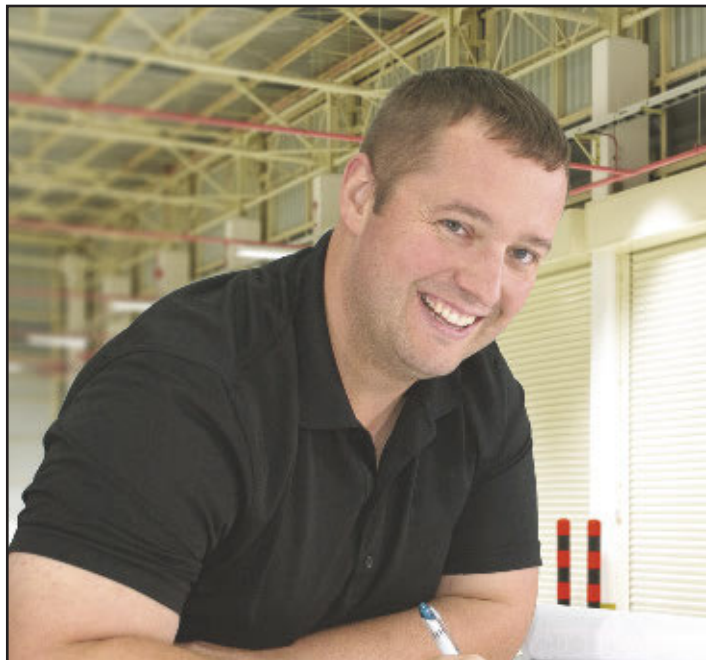
Turek sees increasing client demand for net-zero designs propelling technological innovation. “Energy codes are pushing toward net-zero design, and to achieve that we face a lot of moonshot technology challenges,” she adds.

P2S’s Batra also expects to see increasing levels of automation in overall designs. “The overall design production will become more automated and efficient using scripts in the future,” he says.

Goodmonson says it’s just the beginning for automation: “We are going to get to the point where we can tell our artificial intelligence partner what we want, and it will propose a solution. We are already there with duct sizing and locating diffusers.”

Looking further out, Goodmonson sees even more innovation. “In the not-too-distant future, we will be designing in a projected hologram, like Tony Stark in the *Iron Man* series, grabbing components out of space,” he says. ■

Gerry Donohue is ACEC’s senior communications writer. He can be reached at gdonohue@acec.org.



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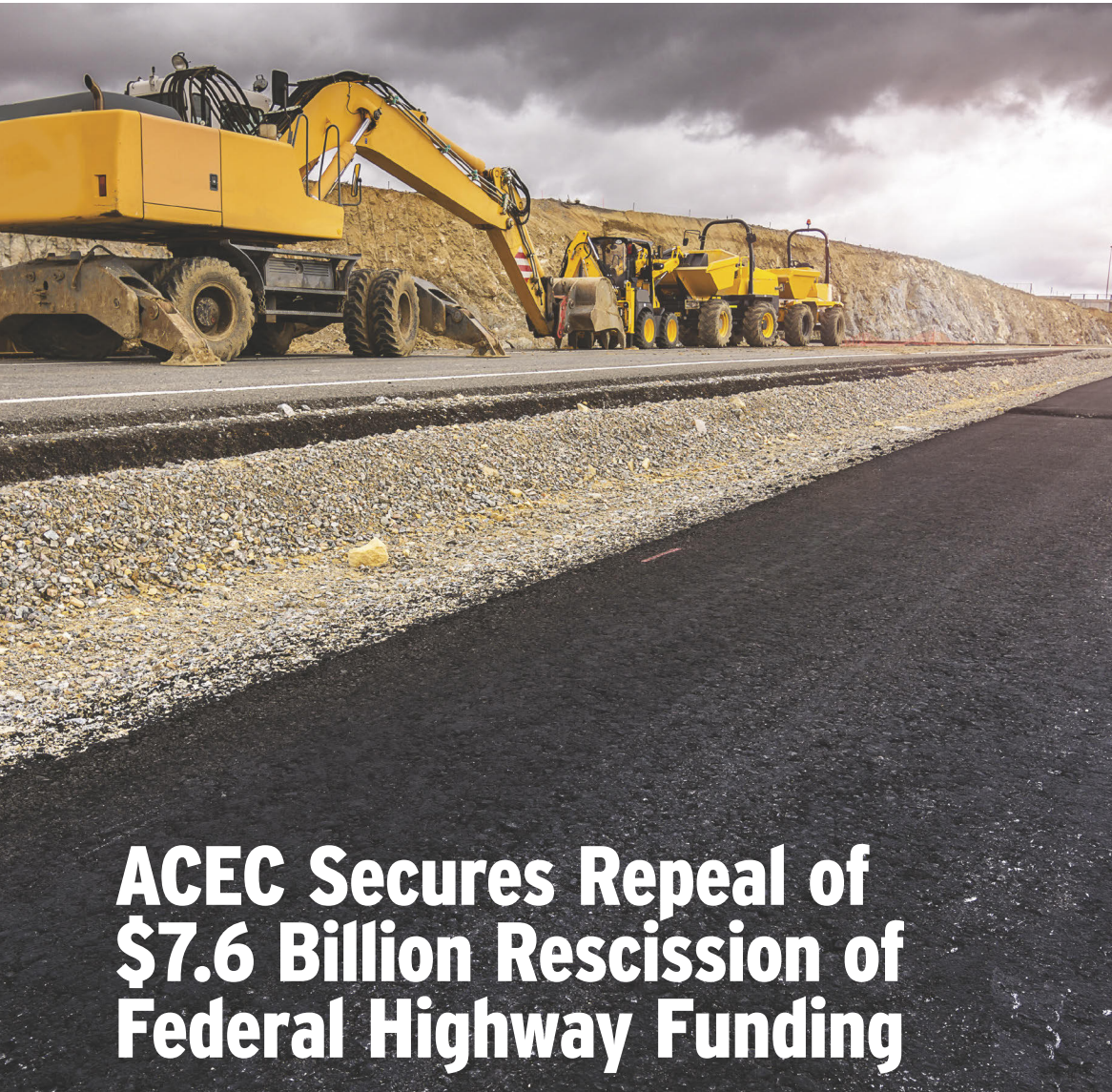
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ACEC Secures Repeal of \$7.6 Billion Rescission of Federal Highway Funding

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State Expenditures on Transportation Climb in 2019, Water Spending Drops

Strong tax collections over the past several years have led to record state expenditures, with the total reaching \$2.1 trillion in FY 2019, up from \$2.0 trillion in FY 2018, according to the annual report from the National Association of State Budget Officers.

Transportation was the largest capital expenditure, climbing 9.3 percent in FY 2019 to \$73.1 billion. That comes on the heels of a 2.8 percent decline in state transportation spending in 2018. Since 2010, state transportation spending has averaged 4.9 percent annual growth.

In contrast, state spending on environmental projects, including water and wastewater, fell 5.6 percent in FY 2019 to \$6.4 billion. Since 2010, environmental spending has grown at an average annual 1.3 percent rate.

Other large FY 2019 capital expenditure categories were higher education (up 2.4 percent to \$12.1 billion), corrections (up 5.7 percent to \$1.2 billion), and all other—including parks, hospitals, community development projects, and information technology systems (up 13 percent to \$17.2 billion).

Following months of advocacy by ACEC and a strong cohort of industry allies, Congress repealed a scheduled rescission of unobligated highway funding in a short-term stopgap spending bill.

The \$7.6 billion rescission was originally included in the FAST Act in 2015 and would have resulted in significant drawbacks to state department of transportation highway programs.

ACEC joined with American Association of State Highway and Transportation Officials, the U.S. Chamber of Commerce, and dozens of other stakeholders in repeatedly calling on Congress to repeal the rescission. According to the Federal Highway Administration, states had \$5.4 billion in unobligated funds at the beginning of the fiscal year when the rescission was to be calculated, and an additional \$2.2 billion would have been pulled out of FY 2020 apportionments.

The coalition explained that the cuts would have had a disproportionate impact on state planning, project delivery, and asset management. State departments of transportation were facing the threat of delaying existing projects in order to provide the necessary amount of contract authority to be rescinded.

“This was a great outcome for ACEC and our DOT partners,” said Council President and CEO Linda Bauer Darr. “What was done as a budget gimmick in the FAST Act to artificially lower the apparent cost of the bill would have seriously undermined our collective efforts to invest more in transportation infrastructure.”

ACEC Wins Indonesian Regulatory Change During Southeast Asia Trade Mission

During the U.S. Commerce Department trade mission to Southeast Asia in 2019, ACEC Chair Mitchel Simpler and former Chair Manish Kothari won a regulatory change to help U.S. engineering firms operating in Indonesia.

The Indonesian regulation required shareholders of foreign engineering firms to have the same professional licenses as those held by the company in which they hold shares.

This posed a problem for many U.S. firms because if the parent firm has an engineering license but one of its subsidiaries has a construction license, it would conflict with the rule.

Simpler and Kothari raised the issue with U.S. Commerce Secretary Wilbur Ross, who then discussed it in a one-on-one meeting with the minister in charge of maritime and investment affairs. Following the meeting, the minister committed to resolving the issue by the end of the year.

ACEC's achievement was also published in *ENR*. Read the article at: <http://bit.do/ACEC-Indonesian-Regulation-Win>



ACEC Chair Mitch Simpler (right) meets with Indonesian President Joko Widodo during the U.S. Department of Commerce trade mission to Southeast Asia.

ISSUES ON THE MOVE

Transportation funding

Water infrastructure

WHAT'S NEXT

Further action on FAST Act reauthorization in 2020

Water bill expected to take shape in early 2020

Congressional Water Infrastructure Agenda is Taking Shape

House leaders are hoping to boost a federal program to finance wastewater projects as part of the Water Resources Development Act (WRDA).

In October, a bipartisan majority on the House Transportation and Infrastructure Committee supported passage of the Water Quality Protection and Job Creation Act (HR 1497), which authorizes over \$16 billion for the Clean Water Act State Revolving Fund and related set-asides over five years.

The measure would also direct funding to projects that incorporate technologies such as: green infrastructure; water and energy efficiency; improvements to wastewater treatment plant resilience to climate change; and water reuse and recycling. Notably, the bill extended the point-source discharge permit period for municipal wastewater treatment plants from the current five-year limit to 10 years. ACEC supported the bill.

The House will likely attach this legislation to a larger WRDA bill in 2020. That legislation will also include new Corps of Engineers water resource projects and other water policy initiatives. The debate over emerging contaminants, such as PFAS, could also be addressed as part of WRDA.



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Tax Policy Included in Budget Deal

Congress extended expired tax provisions as part of a year-end budget deal in December. Most were reinstated retroactively for 2018 and 2019, and prospectively for 2020.

Approximately three dozen tax provisions expired since the end of 2017, including the Section 179D energy-

efficient commercial buildings deduction and the Section 45 production tax credit for renewable resources. ACEC submitted comments to the congressional tax-writing committees supporting a multiyear extension of Section 179D and Section 45, and extension of these provisions was a key

issue during the 2019 ACEC Annual Convention and fly-in.

Other provisions in the budget bill include a package of retirement savings incentives and tax provisions designed to assist individuals and businesses affected by natural disasters. The legislation also repealed three taxes that were part of the

Affordable Care Act: the health insurance tax on fully insured plans sold to individuals and small firms, the medical device tax, and the "Cadillac tax" on high-cost health insurance plans.

ACEC will continue to urge Congress to provide more certainty with respect to key tax provisions.

For More News

For legislative news, visit ACEC's *Last Word* blog online at www.acec.org.

Southeast Port Growth Spurs Intermodal Opportunities

By Erin McLaughlin



Due to continued economic growth, Sun Belt migration and the 2016 Panama Canal expansion, U.S. seaports on both the Gulf and East coasts are experiencing rapid expansion. Billions in capital improvements are being invested into these ports (*see Top 5 Fastest Growing U.S. Ports*), resulting in booming industrial real estate markets inland and expanded infrastructure connected to these coasts.

As the seaports in the Southeast expand, new inland ports have also emerged (*see Fastest Growing Port & Industrial Real Estate Markets*) including two in South Carolina (Inland Port Greer and Inland Port Dillon), the Appalachian Regional Port in Georgia, and the Virginia Inland Port. Additionally, the intermodal market in Lehigh Valley, Pennsylvania, is expanding due to Port of New York/New Jersey growth.

When analyzing what geographic areas present the best opportunities for capturing work from intermodal and logistics clients, “following the freight” from sea to land is a critical strategy. With the most growth occurring in seaports in the Southeast and Texas, the nearby industrial real estate markets are also experiencing some of the most significant expansions (*see Top 5 Fastest Growing Industrial Real Estate Markets*).

The story of Wilmington, North Carolina’s port growth is particularly interesting. The small port grew by more than 26

percent in one year. Analysts credit this in large part to the availability of cold storage warehousing on dock and in the nearby industrial real estate market. Wilmington’s port is becoming a player in the growing cold supply chain, which is experiencing an uptick in demand due to changing consumer preferences and the widespread adoption of online grocery purchasing.

Top 5 Fastest Growing U.S. Ports

Rank	Port	Import & Export TEUs, 2018	Growth % 2017-2018
1	Wilmington (NC)	226,021	26.2%
2	Houston (TX)	2,230,348	10.3%
3	Savannah (GA)	3,404,558	7.4%
4	Mobile (AL)	269,312	7.2%
5	Jacksonville (FL)	880,220	6.8%

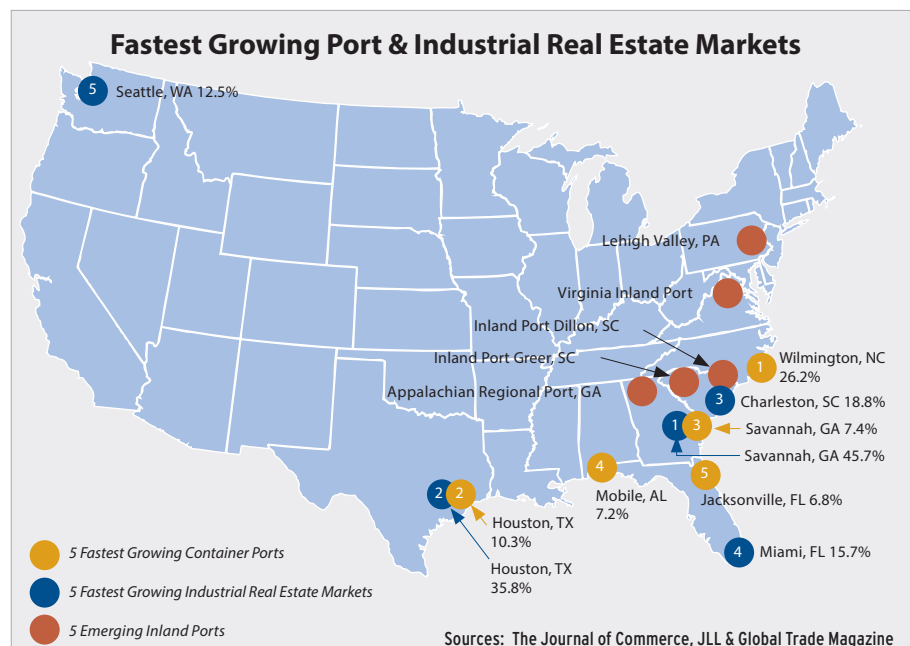
TEU – Twenty-Foot Equivalent Unit, which is used to measure a ship’s cargo carrying capacity. The dimensions of one TEU are equal to that of a standard 20-by-8-foot shipping container.

Source: The Journal of Commerce

Top 5 Fastest Growing Industrial Real Estate Markets

Rank	Real Estate Market	Market Size (Square Feet)	Growth % 2010-2018
1	Savannah (GA)	45.7 million	45.7%
2	Houston (TX)	63.1 million	35.8%
3	Charleston (SC)	23.8 million	18.8%
4	Miami (FL)	115.5 million	15.7%
5	Seattle (WA)	175.8 million	12.5%

Source: JLL





Expected EV Increase to Result in Site Infrastructure Changes

By 2040, BloombergNEF predicts 57 percent of passenger vehicle sales globally will be electric vehicles (EVs), according to its *Electric Vehicle Outlook 2019*. With this dramatic escalation, the result may be a change in land use and infrastructure design. EVs are currently less than 0.5 percent of the global vehicle fleet, but a rapid adoption is expected mainly due to the falling prices of lithium-ion batteries and a global carbon-emission consciousness.

Unlike fueling up at a gas station—which takes only a few minutes—charging an electric-powered vehicle takes more time, and analysts expect this will not change dramatically even with further battery development. As a result, charging will continue to occur where cars are parked for more than a few minutes, including at owners' homes, workplaces, and retail establishments such as large shopping centers.

The U.S. Department of Energy (DOE) estimates there are more than 68,800 Level 2 and DC fast-charging units throughout the United States. However, only 16 percent of these are DC fast-charging stations, which make long-distance travel in an EV practical. According to DOE, a 20-minute charge from a DC fast-charging unit results in 60-80 miles of driving range; for Level 2 chargers about one hour of charging only adds 10 to 20 miles of range.

Development of DC fast-charging stations will be key to alleviating "range anxiety." There

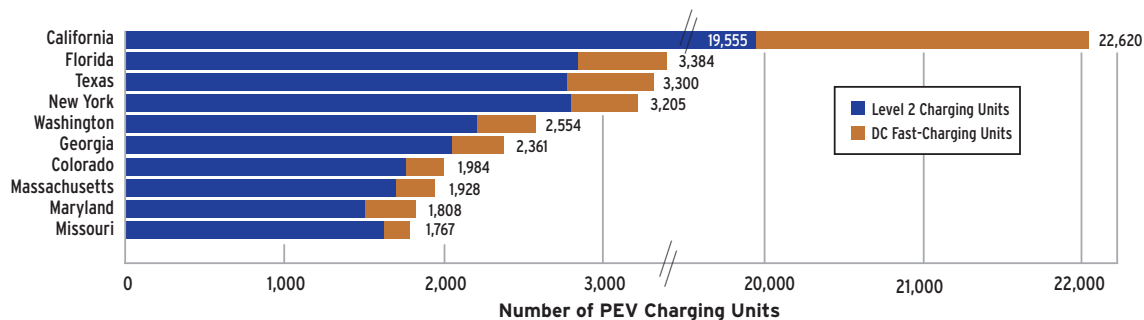
are different types of companies emerging in this market. These include automakers such as Tesla—which is building a network of chargers solely for their automobiles—and other companies aiming to serve broader markets such as ChargePoint, EVgo, and Electrify America.

With a decrease in demand for fossil fuels, the number of retail gasoline stations in the U.S.—currently more than 168,000—may shrink and the properties would need to be repurposed. Opportunities for engineering firms will include not only site design but also environmental services related to underground storage tank removal and redevelopment of brownfield sites.

Currently, California and other large states lead in the number of charging stations—although the vast majority are Level 2. In the table *Top 10 EV Charging Units by State and Charge Level, May 2019* (below), the figures include public and nonresidential charging units (a charging station may have multiple units). ■



Top 10 EV Charging Units by State and Charge Level, May 2019



Source: U.S. Department of Energy



Commercial & Residential Real Estate



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Economic Outlook



Public-Private Partnerships (P3s)

The Private Side department focuses on the private-sector markets to the left, and information and insights on public-private partnerships and economic data relevant to the industry. For more on these topics, subscribe to ACEC's bimonthly *Private Industry Briefs*: <https://programs.acec.org/industrybrief/>.

Erin McLaughlin is ACEC's vice president of private market resources. She can be reached at emcloughlin@acec.org.

SPOTLIGHT: PRIVATE SECTOR MARKET

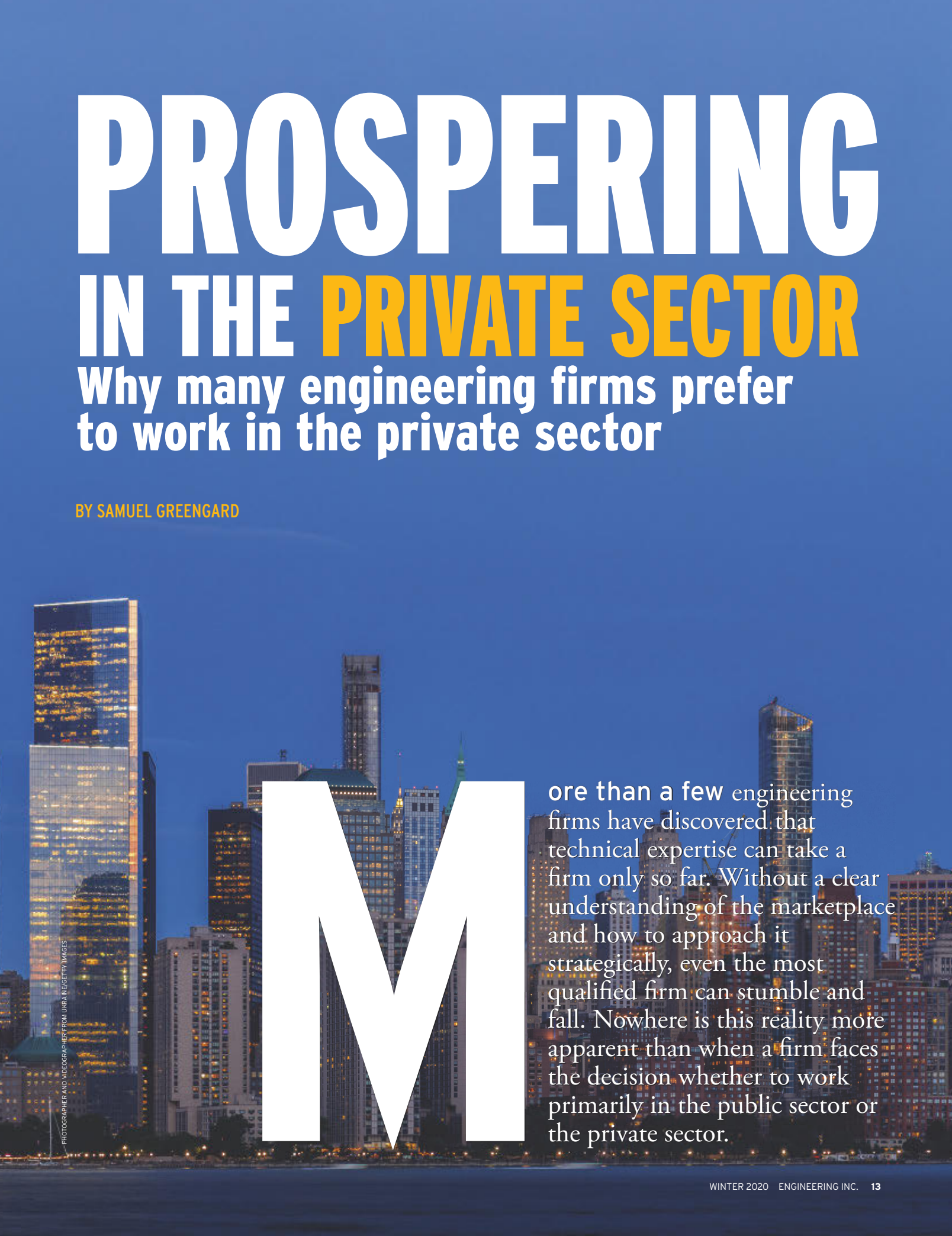
Jaros, Baum & Bolles includes One World Trade Center in New York City as part of their portfolio of private sector projects. Approximately 95 percent of the firm's work is in the private sector space.



PROSPERING IN THE PRIVATE SECTOR

Why many engineering firms prefer to work in the private sector

BY SAMUEL GREENGARD



M

ore than a few engineering firms have discovered that technical expertise can take a firm only so far. Without a clear understanding of the marketplace and how to approach it strategically, even the most qualified firm can stumble and fall. Nowhere is this reality more apparent than when a firm faces the decision whether to work primarily in the public sector or the private sector.

"They are very different worlds that require very different expertise. Each has its pros and cons," says Ray Kogan, president of the consulting firm Kogan & Company. Yet, many engineering firms have a strong desire to solely focus work on the private sector. For some, it is the sense that projects move faster and it is possible to boost revenue. For others, there is a desire to avoid the rigid and cumbersome government processes and procedures. Also, private projects frequently promote innovation and, because of their complexity, can deliver a more stimulating and satisfying framework for designers.

"The private sector is often more willing to be a first adapter of technology and engineering improvements," says John Lucey, CEO of McKim & Creed.

Regardless of how a firm approaches work, one thing stands out: A cohesive strategy is essential. Understanding how public sector or private sector work impacts everything from hiring and skills to cultural issues and project management is vital. Although many engineering firms straddle the line between public and private work, even those operating exclusively in the private arena must come to a reckoning. Diversifying their work among various sectors and industries is critical.

"A diversified firm is better positioned to absorb downturns but also take advantage of hot markets," Kogan says.

PRIVATE MATTERS

The difference between public sector and private sector projects is more than cosmetic. It is not that an engineering firm requires specialized expertise to work in one field or the other—although this could be the case with certain projects—the two worlds require fundamentally different business acumen and project management skills. Furthermore, the culture of public and private entities can be very different.

"There is a different rhythm and flow to projects and an entirely different level of ownership in terms of how clients are invested," says David T. Gockel, president and CEO of Langan. Approximately 85 percent of Langan's projects are focused on the private sector, and the remaining 15 percent are either public or quasi-public engineering projects, such as hospitals and universities.

"Private sector clients tend to have more latitude to appreciate the measurable value an engineering firm brings to projects," Gockel says. "Public sector clients have their hands somewhat tied in regard to decision-making. You are often dealing with a



McKim & Creed furnished design-build services for a water intake facility, pump station, and pipeline (above) to transport water from the Ohio River via a freshwater pipeline. In terms of total megawatts installed (right), McKim & Creed has developed approximately 7 percent of the solar energy generation in North Carolina and Florida combined.



"If you are an exceptional company and you provide exceptional results for your clients, you will land repeat business more readily in the private sector. In the public sector, low price rather than performance and overall value dictates consultant selection."

DAVID T. GOCKEL
PRESIDENT AND CEO
LANGAN



MCKIM & CREED



MCKIM & CREED

purchasing department rather than the individual within that organization who must manage the project. It is a somewhat different mindset.”

Not surprisingly, this leads to fundamentally different project frameworks. In many cases, private entities are more relationship based than their public counterparts.

“If you are an exceptional company and you provide exceptional results for your clients, you will land repeat business more readily in the private sector. In the public sector, low price rather than performance and overall value dictates consultant selection,” Gockel says.

Process and politics can also play roles in how firms approach the two arenas. According to Keith Jackson, senior vice president at HNTB, who in the past worked for a firm that did between 40 to 60 percent private sector work, private projects are typically a “race to market.” In comparison, public sector projects frequently intersect with “politics and community engagement.” The latter can involve closer scrutiny and analysis along with additional processes and legal reviews.

“You have to comply with the same codes and permits, but there are significant differences in plan sets and specifications,” Jackson says.

Furthermore, large public projects frequently hinge on funding through tax revenues or more complex public funding mechanisms. The result? “Private entities are more willing to accept more risk in exchange for moving faster,” Jackson says.

The downside, he adds, is that public entities usually pay promptly while private developers can sometimes drag out payments or refuse to settle a bill.

“Public entities are typically bound by standard of care provisions, but the same protections do not carry over to the private arena, including public-private partnerships. It is a fact you have to be cognizant of when you enter a business relationship,” Jackson says.

Another engineering firm with a heavy private sector focus is Jaros, Baum & Bolles (JB&B). The firm’s portfolio of projects includes One World Trade Center in New York City and the Bank of China Tower in Hong Kong. Upward of 95 percent of the company’s work is in the private sector space.

ACEC Chairman Mitchel Simpler, who is partner and managing partner emeritus at JB&B, said this focus is no accident. “We are allowed more freedom to be innovative and creative in the private sector. At this point, we



"We are allowed more freedom to be innovative and creative in the private sector. At this point, we have very little need to look outside the private sector."

MITCHEL SIMPLER
ACEC CHAIRMAN
PARTNER AND MANAGING PARTNER EMERITUS
JAROS, BAUM & BOLLES

have very little need to look outside the private sector," he says.

JB&B addressed diversification challenges by adopting a broad project portfolio that spans industries, Simpler notes. With a highly flexible framework and internal expertise across various sectors, it can pivot quickly and adapt to the ebbs and flows of industries and the overall economy.

"When one market is hot, another often is not. It is not a significant issue if you are able to adapt," Simpler says, adding that the public portion of his firm's portfolio is mostly focused on universities and educational institutions. "They often do not want to compete against the commercial market. They wait for a more opportunistic time—such as a downturn—and then make their move," he says.

Although many firms prefer to operate in the private sector,

Kogan considers it unwise to automatically write off public sector work. This ultimately means understanding how to best position a firm in each marketplace.

"The key is to deal with the cyclical and volatility that exists in today's business environment," Kogan says. This means establishing a strategic plan. "Once you know your target markets, you can begin to build a business that is much more in sync with the marketplace."

A PROPER PUBLIC/PRIVATE BALANCE

The path of least resistance can prove alluring. Engineering firms often gravitate toward work that is comfortable and lucrative, according to Kogan. Yet, the short-term gains may be offset by long-term volatility and risk.



HNTB designed the \$1.2 billion Levi's Stadium, home of the San Francisco 49ers.

HNTB

“Unfortunately, when the 2008 recession hit, the firms that fared worst were the ones that did not consider diversifying into other markets because it would siphon money away from their most profitable work,” Kogan says. Although it may be impossible to know when the next downturn will occur, the current economic expansion reached 125 months in November 2019. This far exceeds the typical economic cycle of 58 months since 1945.

A starting point for developing a long-term strategic diversification plan is to understand where a firm is and where it needs to be to reduce risk. That includes taking into account the size of the firm, sectors and industries where it has expertise, and how prepared it is to pivot when conditions change, according to Kogan. Establishing a team or group to solicit work in an industry does not guarantee any level of success.

“You must possess the necessary skills, expertise, and market presence,” Kogan says.

Engineering expertise, however, is not enough to succeed. A firm must possess the business acumen, project management skills, and cultural understanding of client demands. This means aligning groups to address whatever combination of public and private sectors a firm focuses on. In the private sector, this includes industries such as health care, retail, manufacturing, real estate, and energy.

“Ultimately, each group or team must be competitive on its own,” Kogan says.

At McKim & Creed, balancing public and private sector work is crucial, according to Lucey. The firm’s project breakdown is roughly two-thirds private sector and one-third public sector. It has built expertise in several areas including energy, land planning, MEP, and surveying residential, commercial, and industrial projects.

“We like the diversification that these markets provide. The diversification between public and private also provides some protection against the impact of any market correction,” Lucey says.

However, McKim & Creed has also pushed to diversify its private sector work. For example, it has a strong presence in the solar energy market but also in oil and gas.

Other firms have taken aim at the challenge in different ways. For instance, HNTB has established parallel groups for public and private sector projects—across areas such as wastewater, transportation, and environmental.

“The requirements for each—items such as contracts, documents, plan sets, specifications, and business practices—are significantly different,” Jackson says.

Furthermore, using the same group of employees across public and private sector projects can increase the risk of errors, miscommunications, and project breakdowns. One method in which engineering firms have addressed gaps in expertise and skill in an immediate way is to consider a strategic acquisition, according to Kogan.

“It is incredibly challenging to build a practice area from scratch. There can be a slow uptick in business, and the initiative can become a drain on resources,” Kogan says. A sound, strategic acquisition creates an immediate market presence. “It builds instant traction and allows a firm to hit the ground running,” he adds.

KEY REASONS WHY MANY FIRMS PREFER PRIVATE SECTOR WORK

1. **Innovation Matters.** Many public sector projects require significant levels of innovation. However, overall, the private sector tends to have a greater focus on new ideas, designs, technologies, and engineering methods.
2. **Speed Counts.** The pace of public projects is often slower to lower risk. For firms that prefer a fast-paced framework, the private sector makes more sense—and maximizes profits.
3. **Less Paperwork, Fewer Legal Hoops.** Supplying government entities with RFPs, legal documents, and more can take weeks, even months. However in some cases, it is possible to complete private sector paperwork in days.
4. **QBS Matters.** Public sector entities generally follow the Qualifications-Based Selection (QBS) procurement process and then negotiate level of effort and price. Private clients do not always follow QBS.
5. **Regular and Steady Clients.** In many cases, firms that establish a relationship with a client continually land steady work with that client. Public sector projects are frequently a one-off.

KEY REASONS WHY MANY FIRMS PREFER PUBLIC SECTOR WORK

1. **Less Turbulence.** Public sector projects tend to be less affected by economic updrafts and downturns.
2. **Prompt Payments.** Government entities typically pay on time. Litigation is infrequent and firms face fewer nonpayment issues.
3. **A Focus on the Standard of Care.** Many of the protections offered in the public sector—particularly a focus on standard of care provisions—do not necessarily carry over to the private arena.

In the end, Kogan believes there is no right or wrong way to decide on public sector versus private sector work. It is crucial to match an engineering firm’s focus and capabilities with the marketplace—and to recognize that sectors and industries change, and a firm must change with them.

“No sector or market stays hot forever. When engineering firms identify their target markets and diversify, they are better prepared to ride the ups and downs successfully,” Kogan says. ■

Samuel Greengard is a technology writer based in West Linn, Oregon.

A FLOURISHING LIFE SCIENCES MARKET



The Genomic research lab space is one of the numerous research labs at the 170,000-square-foot New York Genome Center.

In case you have not noticed, the demand for space to accommodate companies in the life sciences—especially biotech—is on the rise. Engineering firms with experience in this primarily private sector market are taking full advantage of the boom times and, fortunately, the pace does not seem to be slackening.

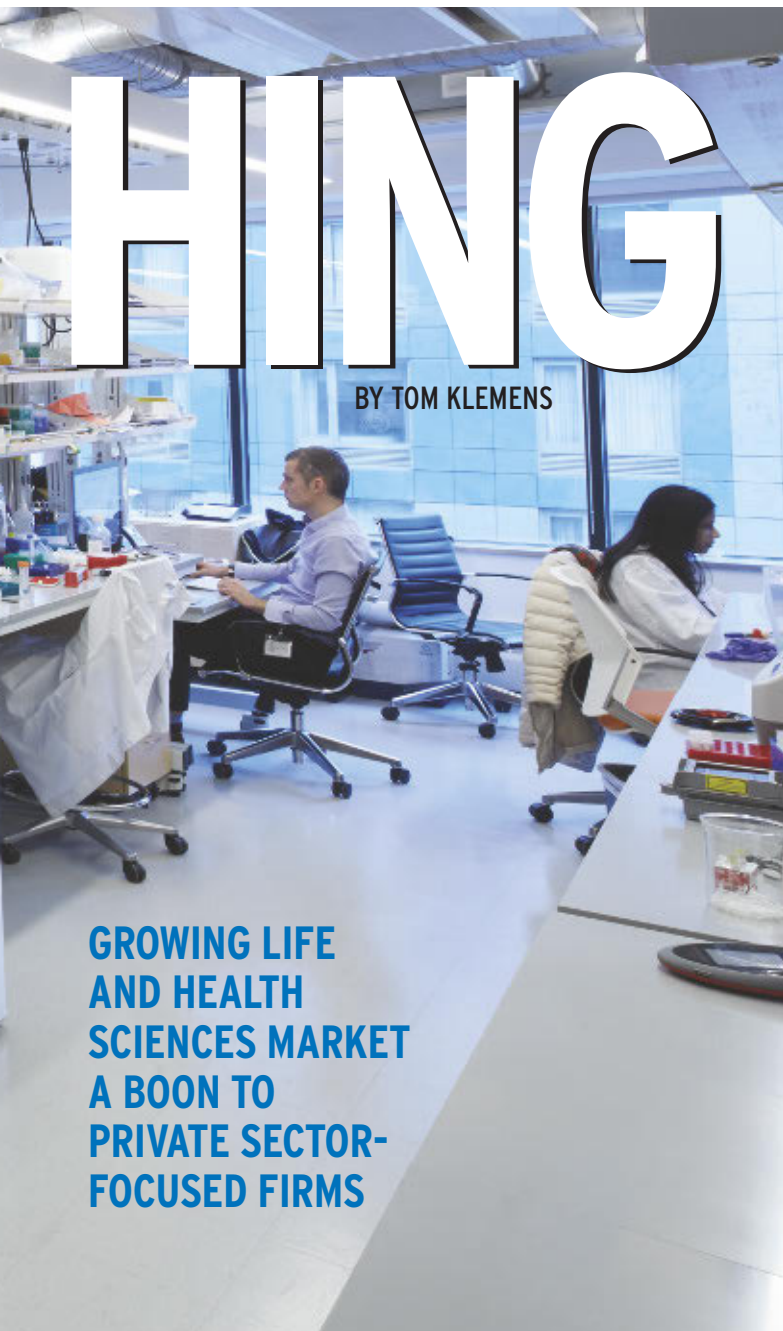
According to Deloitte’s “2019 Global Health Care Outlook,” the activity in the life sciences field is thriving as a result of a perfect storm of sorts: Technology is advancing at breakneck speed, an aging population is paying more attention than ever to prolonging health and wellness, and investors and developers looking for the next big thing are seeing great potential in the life sciences as a hotbed for entrepreneurs.

PLETHORA OF CONSIDERATIONS

The field of life sciences is admittedly very broad, but among the subcategories under that umbrella term, biotech is the next burgeoning field. In fact, a significant amount of money, energy, and brainpower is already being directed toward biotech because many believe that is where the next breakthroughs in science and in health care are going to occur.

As a result, institutions are pushing to build new research facilities, not only to foster the latest technology for research but also to attract the brightest and best minds to their institutions. Concurrently, there has been a shift in the mindset of many institutions where research traditionally has been carried out.

“Today, many institutions are encouraging researchers to spin off for commercialization a lot of what they develop and



HING

BY TOM KLEMENS

GROWING LIFE AND HEALTH SCIENCES MARKET A BOON TO PRIVATE SECTOR- FOCUSED FIRMS

SHANE YOUNG PHOTO

discover,” says Mitchel Simpler, partner and managing partner emeritus at Jaros, Baum & Bolles (JB&B) and ACEC chair. “That means entrepreneurs are flooding the market, looking for places to start doing their Stage 1 R&D.”

As a result, JB&B’s project portfolio reflects this increasing demand: the company currently has five major life science projects underway in the New York area.

As these startups obtain further funding and evolve into real working capital enterprises, their facility needs also typically grow. And the market growth has not gone unnoticed by investors and developers. Already private sector research clusters have sprung up around the world, many of them supported by developers that cater to life science and technology companies. By developing flexible, appropriately outfitted facilities, developers

can foster the long-term relationships that are highly desirable in this market.

“They begin by providing the incubator space for fledgling companies to develop their processes and make them commercially viable,” Simpler says. “The developer then has the ability to move them from space to space as they grow and become more successful.”

Part of the success of these market-focused brokers and developers comes from not tying down their tenants to the typical five-year or longer fixed lease. As a company grows, it can move to a larger space as needed, which in turn frees up more space for more incubators as other startups begin the process.

“The developers are basically establishing pipelines to continuously grow and expand these developing firms,” Simpler says.

Relatively large and well-known research centers already have taken root in places including Cambridge, Massachusetts, and La Jolla, California, and additional clusters are showing up in a variety of primarily metro areas. Location and access to transportation are important considerations for such facilities. Frequently, new biotech research and development clusters are located in close proximity to medical centers expressly to provide easier access for medical professionals. The growth in collaboration and cross-disciplinary research also is a factor.

THE NEXT BIG CLUSTER?

One area with the potential for development of a large biotech presence is New York, which should come as no surprise, given the available resources and the business environment. For example, the New York Genome Center, which was formed in 2011 and moved to its current location in 2013, has established itself as one of the world’s leading medical research collaborations. The 170,000-square-foot facility includes numerous research labs with space available to host principal investigators and their teams from various member institutions. Already the Genome Center is attracting additional development to the area, including a 30-incubator life sciences startup named JLABS @ NYC.

“There are a lot of doctors and research companies that are looking for space to do their experiments,” says John Baranello, principal at Severud Associates. “Until recently that has typically been at a hospital or in a hospital complex campus setting. But now they have a private sector, or office, type building that they can go to and keep to themselves.”

Baranello says that facilities being designed for the life sciences or biotech tenants tend to be not much different than standard office buildings.

“With one exception: The floor framing systems are more robust because the vibration criteria are more restrictive,” he says.

ABOUT THE DIFFERENCES

Although life science facilities may not be very different in terms of structural requirements, they are significantly different in other areas.

“One difference is the amount of infrastructure required,” Simpler says. “The amount of mechanical and electrical services that gets put into these buildings is amazing. For the more advanced laboratory-type life science and biotech facilities, we essentially are building laboratories which have the primary



“When we do that kind of renovation work, it makes us better on the projects where we are designing a brand new facility. We think about what needs to happen so the facility can be renovated in the future.”

TRACI HANEKAN
PRINCIPAL
COFFMAN ENGINEERS

purpose of protecting the researchers. The environment they are working in should be as good as any environment would be if they were in regular office space.”

This typically means providing 100 percent outside air ventilation systems, which is significant because many of these buildings are required to operate 24 hours a day and thus can be big energy users.

“There is a huge emphasis placed on us, as the engineers, to design systems that are as energy efficient as physically and humanly and technically possible,” Simpler says.

Because significant improvements have been made to enable recovering most of the energy that otherwise would have been dumped outdoors, the energy and carbon footprint of these facilities is significantly lower than it was even five years ago.

“But incorporating that amount of technology is one of our biggest challenges,” Simpler says.

Other common requirements for life science buildings that go beyond what is needed in standard office space include medical gases such as oxygen, nitrogen, and argon; vacuum systems; compressed air; and extra exhaust capabilities, such as point source exhausts and fume hood exhausts.

At the same time, providing flexible space and durability are important in a life science facility. Spacious open floor plans are highly desired by life science tenants who do not know what configurations or space requirements may be in their future.

According to Carlos Perez-Rubio, principal at HERA Laboratory Planners, planning ahead for change is an important part of lab design.

“When we design a lab space, we want to make it flexible enough so that it works for today but also so that it does not require a lot of reconfiguration if capacity needs increase,” he says.

OPPORTUNITIES FOR ADAPTIVE REUSE

One factor spurring the growth of biotech in New York City is the existing inventory of available buildings. Through an organization named NYC Builds Bio+, Simpler and others are educating the real estate and design communities as well as life science professionals about the win-win possibilities of reworking older structures into biotech facilities.

“We have had great success taking old buildings that were intended for manufacturing and converting them into state-of-

the-art laboratory research buildings with all the necessary infrastructure,” Simpler says, noting there are challenges to doing that in a way that is cost-effective and timely. “The good news is that because the foundations, structure, skin, shafts, and everything are already there, many of these buildings can be brought online much faster than if we were to start from scratch and design a new building.”

Older manufacturing buildings are frequently candidates for such adaptive reuse because they tend to have higher floor-to-floor heights and heavier design capacity in the structure.

“Those are things you cannot change cost-effectively,” Simpler says. However, installing the mechanical, electrical, and plumbing infrastructure required to make such a facility life science friendly is relatively easy by comparison. “There are obviously significant technical challenges associated with this, but it is very rewarding to see the success we have had on a number of different projects. The real challenge is going into existing buildings and coming up with solutions that make those work just as well as new buildings.”

TRENDS AND CHALLENGES

Several technology trends are influencing today’s design inside laboratories in interesting ways.

“There is more automation, just as in every industry,” says Perez-Rubio. “Sometimes it requires a certain test volume to be able to run a machine efficiently, but we are finding that the instrumentation is beginning to offer higher and higher capacity. At the time, the technology is also becoming cheaper so that you can run more automated tests.”

Another trend is toward multifunction instrumentation. Rather than needing several instruments to perform a series of tests as a sample is moved from one to the next, some newer instruments perform multiple tests on the sample without the need to handle the sample in between.

There also is a trend toward mobility, which takes advantage of the smaller, more portable instruments by mounting them on a cart so they can be rolled right into a patient room. Indeed, Perez-Rubio cites the speed at which technology is changing as one of today’s more difficult challenges.

PROVIDING FOR CURRENT AND FUTURE NEEDS

Growth and modernization in life and health science facilities often require renovation of existing spaces and systems. This

Part of the success of these market-focused brokers and developers comes from not tying down their tenants to the typical **five-year** or longer fixed lease

The new 4,000-ton capacity central chilled water plant at Providence Sacred Heart Medical Center, Spokane, Washington. The original chilled water plant, built in 1971, had undergone several equipment upgrades in the past few decades.



COFFMAN ENGINEERS, INC.

can range from making relatively minor modifications to accommodate a new piece of equipment to the complete replacement of major mechanical systems. In the case of health care, the engineering required can be particularly challenging because facilities must remain functional.

A case in point: a recent chiller plant replacement at Providence Sacred Heart Medical Center in Spokane, Washington. The existing facility had begun to experience failures and required costly maintenance to keep the current equipment operational. Beyond that, the facility no longer had the redundancy for its systems to meet current code requirements.

To update the facility, Coffman Engineers, Inc., designed a replacement system that uses a series counterflow approach and new chillers with magnetic bearings, both of which are energy efficient. In addition, the new chillers operate much more quietly than the old ones. However, a big part of the chiller plant replacement project was scheduling.

"There is a window of time each year where they do not need the chiller plant, from about Halloween until April 1," says Traci Hanegan, principal and lead mechanical engineer at Coffman Engineers. As a result, the entire system could be removed and replaced without disrupting operations.

"We coordinated with the contractor to take the old

equipment out right after they shut down the chiller system for the winter," Hanegan says. "Also, we designed the system in collaboration with the contractor so that as much as possible could be shop fabricated, then bolted together in the field."

This approach reduced the amount of field welding required, saving time and ensuring top quality. And as Hanegan and her team were working on the design, they saw an additional opportunity for improvement.

"We realized that to lay out all the equipment for optimum access, we wanted to take out the hospital's domestic hot water system," Hanegan says. "The hospital had been wanting to get rid of some big storage tanks for their hot water system because they posed a risk for Legionella."

To maintain a supply of hot water during the renovation, a new connection was made to the emergency department's hot water

heater to back feed the main facility.

The project resulted in a large reduction in the risk of Legionella bacteria for the hospital and extra space to better accommodate the new chilled water system layout. Plus, leaving the connection to the emergency department water heater in place after the new system had been installed provides a backup for future use that was not previously available.

This multiphase, integrated project has been successful in both operational and financial terms. In addition to a smooth startup, the new chilled water system saved \$74,000 in utility costs in its first year of operation. The hospital also received an incentive check from the local utility company for \$181,000.

According to Hanegan, projects for institutional facilities that need to grow or upgrade for new technology and equipment are among the most complex projects the company does.

"It is a bit like doing open heart surgery, trying to work on something while keeping it going," Hanegan says. "When we do that kind of renovation work, it makes us better on the projects where we are designing a brand new facility. We think about what needs to happen so the facility can be renovated in the future." ■

Tom Klemens is a freelance writer based near Chicago and a registered professional engineer in Illinois.



"There are a lot of doctors and research companies that are looking for space to do their experiments."

JOHN BARANELLO
PRINCIPAL
SEVERUD ASSOCIATES

TRANSIT-ORIENTED DEVELOPMENTS ON THE RISE

BY CALVIN HENNICK

Located in downtown Los Angeles, Metropolis is a mixed-use development consisting of residences, hotel, and retail. It is one of a number of transit-oriented development projects in the Los Angeles area.

GENSLER

EXAMINING THE FAST-GROWING PRIVATE DEVELOPER-DRIVEN MARKET OF VIBRANT, LIVABLE, AND SUSTAINABLE COMMUNITIES

Look at some of the most exciting recent large development projects around the country, and you will see that many of them have something in common: They are built around transit stations, which serve as a hub to connect residents, workers, and visitors to the surrounding area—and help to ensure that people, rather than vehicles, are the focal point of communities.

Transit-oriented development (TOD) is far from a new phenomenon, but it is an increasingly popular design trend as the country becomes more urbanized. Furthermore, individuals and communities are recognizing the value of dense, mixed-use, walkable areas that buzz with activity nearly around the clock.

“A lot of places have historically not used their transit centers as a real hub for redevelopment,” says Peter Kasabach, executive director of New Jersey Future, a smart growth policy and advocacy organization that has pushed for TOD in the state for years. “That has been the drive for TOD—how do you take these centers and create a much more intense development environment around them? That typically means more infrastructure, bigger buildings, and a greater mix of uses.”

“It is a traditional downtown development feel, with open spaces, public spaces, retail, residential, office space, all of these things,” Kasabach adds. “You are weaving these things together by making the community as pedestrian- and bike-friendly as possible, and making cars secondary.”

WHAT IS TOD?

The Federal Transit Administration (FTA) defines TOD simply as development that “includes a mix of commercial, residential, office, and entertainment centered on or located near a transit station.”

But how to make TOD a success? The FTA says, “Successful TOD depends on access and density around the transit station. Convenient access to transit fosters development, while density encourages people to use the transit system.”

Generally, TOD projects occur within half a mile of a tran-

sit station, according to Kasabach. Also he notes, although the “transit” typically refers to train service, developments can also be built around bus terminals or even ferry terminals. In addition to serving the residents who live in or adjacent to them, TOD communities can serve as “regional collectors” that people use as hubs to connect to other areas served by the transit service.

Craig Sklenar, senior urban designer for Stantec’s Urban Places Group, says that the defining characteristic of a TOD community is its organic feel.

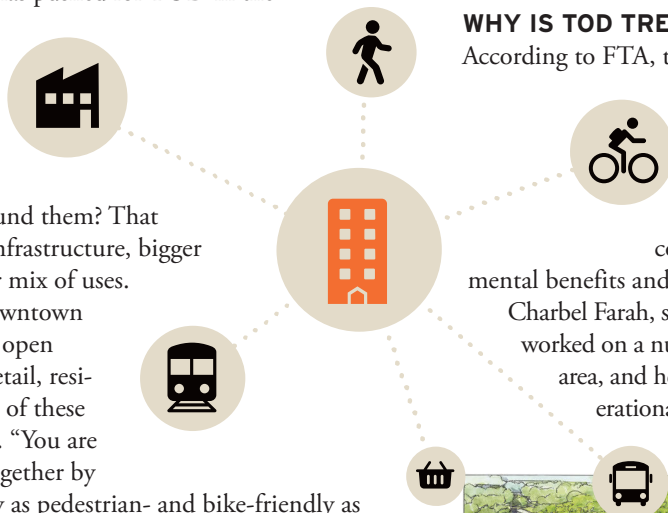
“You are able to make decisions once you arrive at a station,” he says. “Do I need to catch a cab? Transfer to a bus? Can I take a bike home from here? Do I need to pick anything up before heading home?” A well designed TOD allows you to organically make those decisions in an urban context rather than have to navigate through car-oriented spaces like crossing a large parking lot, or over a long pedestrian bridge across a busy highway to get to the next place. It just feels seamless to the urban experience.”

WHY IS TOD TRENDING NOW?

According to FTA, the benefits of TOD include increased ridership for transit systems, revitalization

of neighborhoods, increased affordable housing, economic gains for surrounding landowners and businesses, improved safety for pedestrians and cyclists, and congestion relief as well as associated environmental benefits and community revitalization.

Charbel Farah, senior principal at Syska Hennessy Group, has worked on a number of TOD projects in the Los Angeles area, and he points to both regulatory changes and generational shifts as drivers of transit-focused projects.



Riverside TOD is a new community situated on an existing park-n-ride facility in Newton, Massachusetts. This new community prioritizes “life in the streets” as its organizing theme, centered around public transportation and mixed-use buildings.

TOD in Action

These prominent transit-oriented development (TOD) projects show what is possible when engineers and developers work with municipalities and transit agencies to create compact, mixed-use projects centered on high-quality transit.



Hudson Yards

New York

Hudson Yards in Manhattan—where the MTA sold development rights at its former train yards in Manhattan for \$1 billion to build an entirely new neighborhood on top—has been called “perhaps the largest TOD project in American history.”

In addition to a new subway line extension underneath the project, Hudson Yards features parks, a forest of mixed-use high-rises, and the famed beehive-shaped Vessel landmark.

Journal Square

Jersey City, New Jersey

Jersey City is a national leader in TOD, taking advantage of its proximity to New York and high-quality transit options to reduce citizens’ reliance on automobiles and encourage mixed-use development. Zoning has been key to promoting TOD in the city; for instance, many projects are subject to parking maximums but not minimums, meaning that developers often are not required to create any parking spots at all.

Journal Square includes a PATH and bus station, and in 2010 the city adopted the Journal Square 2060 redevelopment plan to foster the development of new housing, office, commercial, and open public spaces within walking distance of these facilities. Since then, Journal Square has seen development including the first tower of a planned 2.3-million-square-foot complex called Journal Squared.

The Domain

Austin, Texas

Opened in 2007 and located approximately a mile from the Kramer Station on the Capital MetroRail commuter line, The Domain is a high-density office, retail, and residential center that has been described as “a second downtown” for Austin.

Despite not being built directly next to the train station, the community is also served by bus lines and has spurred other nearby TOD projects. For instance, a developer is moving forward with a mixed-used project at a 66-acre site adjacent to The Domain, fueled in part by new zoning and a planned future rail station at the edge of the property.

In 2016, Los Angeles voters approved Measure JJJ, which requires developers to add affordable housing or else pay a fee. Measure JJJ also resulted in the Transit Oriented Communities Affordable Housing Incentive Program, which gives developers benefits for adding affordable or mixed-income housing to projects within a half-mile of a major transit stop.

According to Farah, millennials in Los Angeles want to live near their workplace—a marked shift in preference compared with previous generations.

“Millennials do not want to live in the suburbs,” he says. “They do not want to commute. They want a work place, Starbucks, stores, attraction, gym, entertainment, and other amenities available to them in a walking distance. Not only these developments are answering their demands, but they are also revitalizing the community and bring in economic growth.”

OPPORTUNITIES FOR ENGINEERING FIRMS

With the public quickly embracing walkable, transit-oriented communities—and with private sector developers jumping to meet the demand for quality urban spaces served by transit systems—engineering firms have a plethora of opportunities to work alongside public and private stakeholders to ensure these projects meet people’s needs and integrate seamlessly with surrounding neighborhoods.

Farah and Syska Hennessy assisted from the earliest stages of development with Metropolis, an in-progress mixed-use megaproject on a 6.33-acre site in downtown Los Angeles, which sits within walking distance of the Metro Rail. The firm came on board during the master planning process, helping the development team figure out how to bring utilities to the project site.

“We started with infrastructure, and then engaged in the building concept design—the mechanical, electrical, and plumbing,” Farah says. “After that, we became more of an owner advisor and peer reviewer.”

Meanwhile, Stantec has assisted with TOD projects in Montreal, Chicago, Boston, and Calgary, among others.

When it comes to TOD and transit design, “Engineers are often leading the conversation,” Sklenar says. Ideally, engineers would work alongside designers and planners from the very beginning of TOD or transit corridor projects to ensure that infrastructure and the design of buildings and communities complement each other, he adds.

“Optimally, the process would look at the who, the why, the where, and the how—understanding that a TOD project is really about the people who are using it and where they want to



“Millennials do not want to live in the suburbs. They do not want to commute.”

CHARBEL FARAH
SENIOR PRINCIPAL
SYSKA HENNESSY GROUP



“Optimally, the process would look at the who, the why, the where, and the how—understanding that a TOD project is really about the people who are using it and where they want to go.”

CRAIG SKLENAR
SENIOR URBAN DESIGNER
STANTEC'S URBAN PLACES GROUP

go,” Sklenar says. “I had a mentor tell me, if you do not understand the ‘transit’ in ‘transit-oriented development,’ you are not able to do anything else.”

IMPORTANCE OF PARTNERSHIPS

For a TOD project to be successful—or, in many cases, for one to even get off the ground—developers, transit agencies, and municipalities must all be on the same page. This is because dense, mixed-use developments often require zoning changes that increase height limitations, eliminate or even reduce parking minimums, and otherwise accommodate projects that may be more urban in their character than existing laws allow.

“The key is the partnership between the city or town and the development community,” Kasabach says. “If the developer is going to try to turn a town into something else on their own, that can be risky. It can be driven by either side, but there has to be a meeting of the minds, where people are saying, ‘We want something better in our community.’”

GETTING TOD RIGHT

According to Kasabach, one of the greatest pitfalls of TOD is when stakeholders continue to design for cars rather than truly making people and transit the focus of their projects.

“The biggest mistake is that they are bringing a suburban mentality to an urban design issue,” he says. “That is how we end up with all these strange hybrids that are not going to hold

up over time.” He points to projects near transit stations that are essentially just office buildings plopped in the center of large parking lots, and he says that these areas are typically dead after work hours and, therefore, not truly communities.

Kasabach also advises that TOD projects should incorporate affordable housing and find ways to keep local businesses and historic buildings in place.

“As you get into this cycle around TOD, values will begin to get pushed up, and that may push out residents and small businesses,” he says. “We forget that what makes these places so special is the authenticity. And that authenticity can be trampled by good intentions.” ■

Calvin Hennick is a business, technology, and travel writer based in Milton, Massachusetts.



COURTESY OF TIM SCHENCK

An upper level view through the Vessel, the centerpiece of Hudson Yards in Manhattan, which has been called “perhaps the largest transit-oriented development project in American history.”

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ACEC CO-HOSTS VEGAS FORUM TO UNDERSTAND

CANDIDATE INFRASTRUCTURE PLANS

BY CRAIG A. RUARK

DISCUSSION FOCUSES ON THE FUTURE OF AMERICA'S INFRASTRUCTURE AT

America is leaking and crumbling—literally. Four Democratic presidential candidates agreed on that premise during the first-ever Candidate Infrastructure Forum, “Moving America Forward,” but they did not reach a consensus on how to pay for the needed repairs.

The event, held Feb. 16 at the University of Nevada, Las Vegas, was sponsored by the bipartisan nonprofit group United for Infrastructure, with ACEC a member of the Forum Host Committee, which included labor unions and other organizations involved in the design, construction, and transportation of America's infrastructure and goods.

The Forum was designed to help shine a light on infrastructure issues. Moderators were *Wall Street Journal* Executive Washington Editor Jerry Seib and Deputy Washington Bureau Chief Jeanne Cummings.

Presidential candidates from both parties were invited to participate, but only four attended—all Democrats: former Vice President Joe Biden, and three who have since suspended their campaigns: former Mayor Pete Buttigieg, U.S. Sen. Amy Klobuchar, D-Minn., and billionaire businessman Tom Steyer.



“Certainly, all four candidates have demonstrated that they understand the need for infrastructure and the significant spending that is going to be required to bring the current infrastructure up to some acceptable level.”

MITCHEL W. SIMPLER
CHAIRMAN
ACEC





Former Democratic Presidential Candidate Peter Buttigieg (center) greets ACEC President and CEO Linda Bauer Darr (left) and Chairman Mitch Simpler during the Presidential Candidate Forum on Infrastructure in Las Vegas. ACEC was a member of the Forum's Host Committee, which included labor unions and other organizations representing millions of voters.

FIRST-EVER CANDIDATE INFRASTRUCTURE FORUM

"It (infrastructure) isn't always sexy—but it is important," said Buttigieg, who proposed a \$1 trillion plan, which included working with states, cities, and other local governments, to build sustainable infrastructure.

"A bridge just doesn't fall down in the middle of America," Klobuchar said in support of her ideas, recalling the day the

I-35W bridge collapsed just eight blocks from her home in Minneapolis. She detailed her "trillion-dollar plan" and pledged to make infrastructure a top budget priority during the first year of her presidency.

According to documents distributed to Forum attendees, underperforming and aging infrastructure continues to negatively impact the national economy and cost every American family \$3,400 per year. Industry data also revealed \$3.9 trillion in losses to the U.S. GDP, \$7 trillion in lost business sales, and 2.5 million lost American jobs by the year 2025 due to failing infrastructure.

Overall, the discussion among the candidates was well-received by Forum attendees, which involved many from ACEC including ACEC President and CEO Linda Bauer Darr, Chairman Mitch Simpler, Senior Vice President of Advocacy Steve Hall, Vice Chairman John Carrato, Vice President, Communications and Marketing Jeff Urbanchuk, and Harvey Floyd, executive vice president and chief knowledge officer at KCI Technologies.

"I was impressed that they all have a good understanding of infrastructure, the need for funding, and ideas about how to go about it. I haven't heard a lot of those until now," said Carrato, who is also president and CEO of Benesch. "The needs are incredible, but they are talking about looking at things in a different way and how do you integrate it with national policy, which is what I think we've been missing."

Former Vice President and Democratic Presidential Candidate Joe Biden (left) responds to an infrastructure question from *Wall Street Journal* moderators Jerry Seib and Jeanne Cummings.





ACEC Chairman Mitch Simpler has a captured audience, including former Vice President Joe Biden, while backstage during the Presidential Candidate Forum on Infrastructure in Las Vegas.

PAYING FOR REPAIRS AND IMPROVEMENTS

Moderators pressed each candidate on what to do about the rapid depletion of the Federal Highway Trust Fund and the prospect of raising the federal fuel tax, which, despite inflation, has remained at 18.4 cents per gallon for gasoline and 24.4 cents per gallon for diesel since 1993.

Simply raising the fuel tax had no support from the candidates, who noted objections from both the voting public and their congressional representatives. However, they did have alternative infrastructure funding ideas.

"We're not going to be able to raise the gas tax," Biden said. "We might be able to index it down the line. I don't think we are going to be able to raise the gas tax from what it is now to what it would be if we raise it for inflation."

Biden, whose campaign platform includes a \$1.3 trillion infrastructure plan, advocated raising the corporate tax rate from 21 percent to 28 percent. "I think we can get some Republicans to support that as well," he said. "Increasing (the corporate tax rate) raises \$740 billion over 10 years."

Biden indicated he would sign a bill to increase the passenger facility charge at airports to pay for infrastructure maintenance, and touted both light rail and high-speed rail as ways to get cars off the highways.

"That (fuel tax) is a super politically sensitive thing," Steyer said. "What we are definitely going to have to do is raise taxes, and the question is whether it will be on consumers or businesses. My goal in this is not to do a regressive consumer tax but to undo the tax giveaways of the last 40 years. I have a plan for a wealth tax—to treat investment income on the exact same schedule as earned income. If we do that, you get trillions of dollars."

Buttigieg was the only candidate to raise the prospect of a vehicle miles traveled tax but hedged his endorsement on the ability to "address the Big Brother issue" on what criteria to base the tax.

"We're going to have to graduate from the gas tax because we are going to have to graduate from gas," Buttigieg said. "We know it is not a viable, long-term funding mechanism for our highways."

Klobuchar proposed creating an infrastructure financing



U. S. Senator Amy Klobuchar, D-Minn., a former candidate for the Democratic Presidential nomination, joins officials from other Forum Host Committee organizations, including ACEC Chairman Mitch Simpler (rear, third from right).



"The needs are incredible, but they are talking about looking at things in a different way and how do you integrate it with national policy, which is what I think we've been missing."

JOHN CARRATO
PRESIDENT AND CEO
BENESCH



"I was impressed with the level of detail that each of the candidates was able to get into, and it shows you that they recognize that this is a bread-and-butter issue."

LINDA BAUER DARR
PRESIDENT AND CEO
ACEC

authority, which would work with states and local governments to leverage public and private funds.

"I would take those Trump tax cuts where the corporate tax rate went down from the mid-30s to 21 percent," Klobuchar said. "Every point it went down was \$100 billion. So, you could still have reduced it and used a bunch of money for transportation. I would take the first four points of it and get \$400 billion out of that."

Klobuchar also mentioned the possibility of bringing back "Buy America" bonds, which worked during the 20th century world war eras.

INFRASTRUCTURE AND THE ENVIRONMENT

Each candidate reminded attendees that climate change is an essential part of his or her presidential platform and linked that to plans to rebuild America's infrastructure.

"I would rejoin the Paris Agreement on day one," said Buttigieg, who also planned to propose the adoption of carbon pricing.

Steyer said he would declare a "climate emergency" his first day in office. "Everything that we are going to do will be from the standpoint of climate," he said. Steyer added he would, "change the rules under which private corporations are allowed to generate energy, the kinds of cars they are allowed to produce, and the kinds of building efficiency rules they have to operate under."

One of his ideas would be a cash-for-clunkers plan where the government would buy polluting vehicles to help families upgrade to new fuel-efficient or electric cars. Steyer also advocated for high-speed rail and included the nation's affordable housing shortage as an infrastructure issue.

Both Klobuchar and Biden expressed their concerns for the environment and identified clean water as one of the crucial

elements of their infrastructure agendas.

"It (water) is not always the bright shiny object in terms of ribbon-cutting like rail and roads but needs to be addressed," said Klobuchar.

In addition to their funding and environmental plans, the candidates reiterated support for the Davis-Bacon Act of 1931 and prevailing wages on all public infrastructure projects under their administrations.

TAKE-AWAYS

Floyd said he was very impressed with their knowledge of the issues: "Some of them spoke about green infrastructure, which I think is something that we are all going to have to deal with, more than we have in the past."

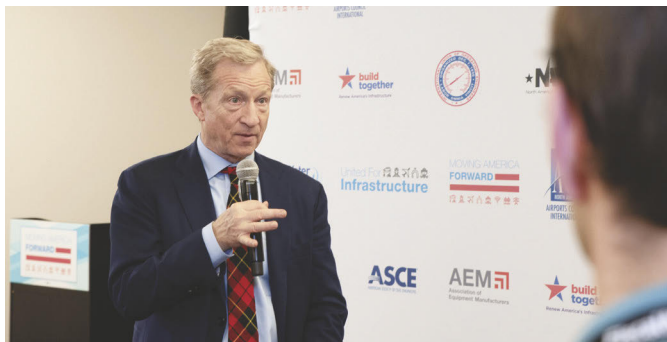
But, Floyd added, "One thing that I was a little disappointed in is that none of them would discuss or even touch the subject of raising the gas tax. I think that is something that needs to be done in the short term. Some of them talked about vehicle miles traveled as a new way to fund transportation infrastructure in the future, but that is down the road and is not going to happen yet."

ACEC President and CEO Linda Bauer Darr and ACEC Chairman Mitch Simpler, thought this first-ever forum was a positive step in bringing forward the need for a robust infrastructure plan.

"I was impressed with the level of detail that each of the candidates was able to get into, and it shows you that they recognize that this is a bread-and-butter issue," said Darr. "Because it affects everyday Americans' lives in lots of ways—quality of life, death due to neglect—it's all about money, about getting it done." Infrastructure spending will be a big factor in getting them elected, she added.

"Certainly, all four candidates have demonstrated that they understand the need for infrastructure and the significant spending that is going to be required to bring the current infrastructure up to some acceptable level," said Simpler. "But I think that each of them had a different perspective on how to fund it—which I appreciate—but the fact is we have to do something, and it has to get done."

ACEC's Policy Priorities for Engineering a 21st Century Infrastructure Agenda can be found on its website. For more information visit: <https://www.acec.org/default/assets/File/ACEC%20on%20Infrastructure.pdf>. ■



Former Democratic Presidential Candidate and hedge fund financier Tom Steyer conducts an interview backstage during the Presidential Candidate Forum on Infrastructure.

Craig A. Ruark is a freelance writer with The Vegas Bureau. He is based in Las Vegas.

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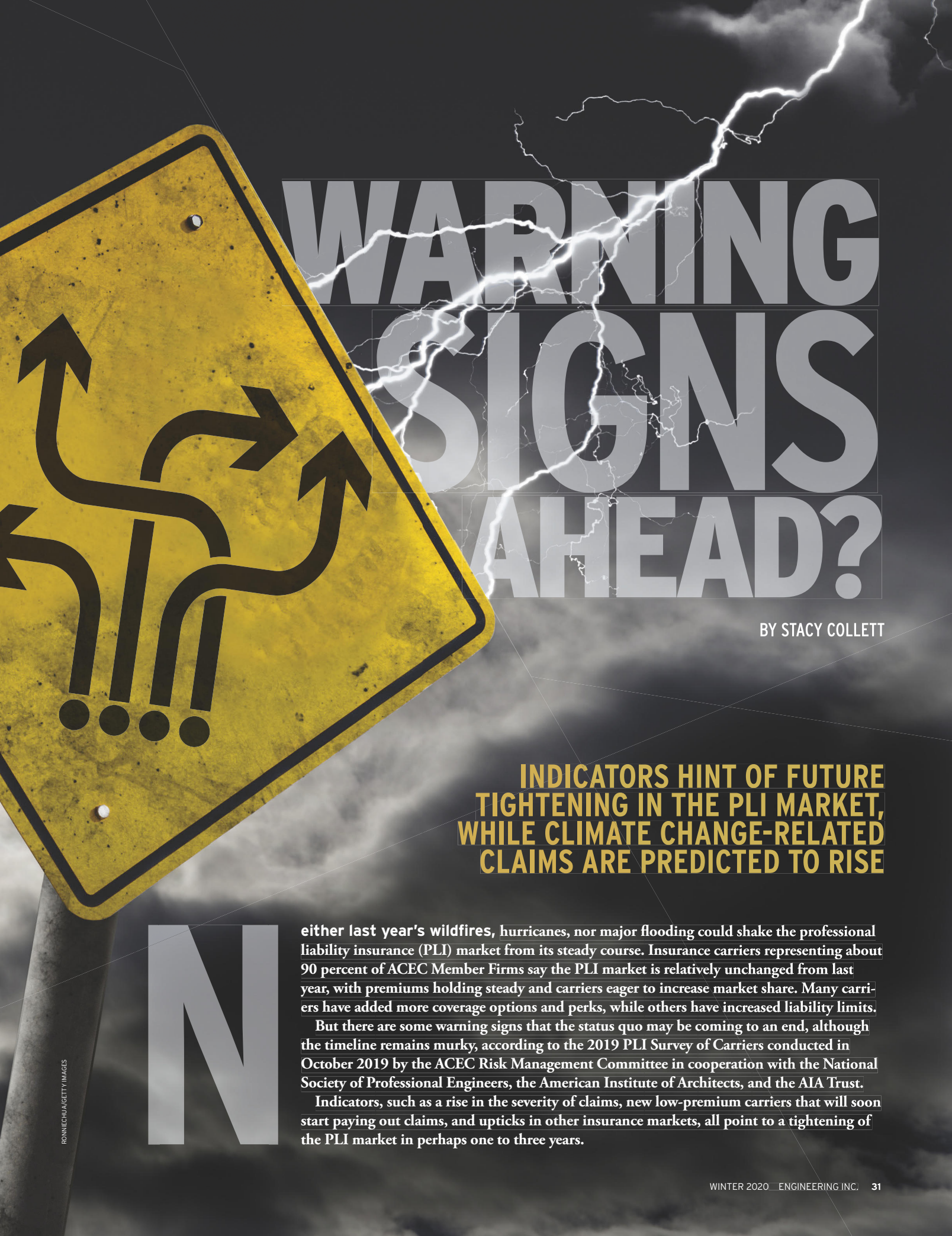
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WARNING SIGNS AHEAD?

BY STACY COLLETT

INDICATORS HINT OF FUTURE TIGHTENING IN THE PLI MARKET, WHILE CLIMATE CHANGE-RELATED CLAIMS ARE PREDICTED TO RISE

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either last year's wildfires, hurricanes, nor major flooding could shake the professional liability insurance (PLI) market from its steady course. Insurance carriers representing about 90 percent of ACEC Member Firms say the PLI market is relatively unchanged from last year, with premiums holding steady and carriers eager to increase market share. Many carriers have added more coverage options and perks, while others have increased liability limits.

But there are some warning signs that the status quo may be coming to an end, although the timeline remains murky, according to the 2019 PLI Survey of Carriers conducted in October 2019 by the ACEC Risk Management Committee in cooperation with the National Society of Professional Engineers, the American Institute of Architects, and the AIA Trust.

Indicators, such as a rise in the severity of claims, new low-premium carriers that will soon start paying out claims, and upticks in other insurance markets, all point to a tightening of the PLI market in perhaps one to three years.

STEADY FOR NOW

A buyer's market continues for A/E firms, according to John Farrar, vice president at Clark Dietz, Inc., and a member of the ACEC Risk Management Committee. All PLI carriers surveyed indicate the market is still saturated with capital, and more capital is entering the market every day.

A small number of newer insurers—those considered less than seven years old—continue to drive down premiums in the pursuit of market share, keeping rates artificially low and, many say, unsustainable when considering the growing severity of claims. Some markets are already feeling the effects.

"Within the last 12 months we have seen some Lloyd's [of London] syndicates pull out or pull back in professional liability as a result of inadequate rates, claims activity, and underwriting experience. It is unprofitable, so they are walking away," says Timothy Corbett, founder and president of SmartRisk and an ACEC Risk Management Committee member. "In my opinion within the next 12 to 36 months, we will see additional shakeout in the insurance marketplace."

As another indicator, the Professional Underwriters Agency (PUA) reports that commercial and automobile rates are increasing, and that PLI typically follows approximately 2.5 years behind.

Still, more than half of the carriers plan to continue to offer the relatively flat rates they have for the past few years. As evidence, just six carriers surveyed expect to increase rates in 2020, according to the survey results.

While rates stay the same or increase slightly, the actual PLI premium is often going up because of increased volume of work over the last few years. One carrier indicated that A/E industry design fees have been growing by five to six percent over the last several years.

FREQUENCY OF CLAIMS STEADY, SEVERITY RISES

The frequency of claims has been relatively stable over the last several years. At Victor US, formerly Victor O. Schinnerer & Co., which rebranded in November 2019, on average one out of every five firms in the program sees a claim each year.

"That number has varied slightly, but when you look at it over the long-term—it shows a rather stable consistency of claims," says Kevin Collins, senior vice president at Victor US. However, when Collins looks at the severity of those claims, he sees a bit of an increase.

Over the last 18 months, severity has significantly increased for services and claims in the 2015 and 2016 policy periods for some carriers, meaning those payouts may be coming soon.

"We are seeing large claims on large infrastructure projects,"

says James Schwartz, U.S. A/E focus group leader and underwriter at Beazley. "The most severe claims are rooted in technical areas, but there are also claims involving general project management of these very large infrastructure projects."

Claims severity is also inflating because the cost to defend is increasing, according to Schwartz. The influence of social inflation, or how society views politics, plaintiffs, and insurance companies, often magnified through marketing, also affects claims.

"We are seeing larger jury awards because of some of those factors," Schwartz says.

Design-build and public-private partnership (P3) projects also play a role in claims severity, according to Daniel Cecchi, president of Collins Engineers, Inc., and an ACEC Risk Committee member.

"Part of it is everything just costs more these days. Just the size of construction projects, even large developments are increasing," Cecchi says. "Then if you throw in the design-build and P3s, you get a lot of the design-build contractors looking to recover their losses from their designers."

COMMON CLAIMS

In the broader market, the most common claims continue to be from condominiums and residential properties and projects, particularly in Arizona, California, Florida, New Jersey, New York, Pennsylvania, Texas, and Washington.

Victor US reported condo claims running about \$3 for every \$1 of design exposure. Numerous other carriers had an even worse loss ratio on condos, some up to \$10 to \$1. Almost all PLI carriers mentioned that residential homes were the worst risk in frequency, and condos in severity. However, a few reported higher severities from structural claims.

The most problematic design disciplines for higher-than-average claims involved architects as well as geotechnical, structural, and civil engineering firms. Specifically, structural engineers continue to be a problem with both frequency and severity. One PLI carrier reports these claims averaged \$750,000 for a firm.

As for geotechnical or structural engineering, claims have become more severe due to the higher cost of fixing a structure and recouping lost profitability when a foundation design or ground analysis is proven to be flawed, according to Collins.

Several carriers are looking more closely at the rate for traffic engineers, pointing to increases in large highway claims. More highway accidents are evolving into lawsuits against all those involved with the design and construction of the road. Plaintiffs take a shotgun approach to suing every entity that might be involved. A large portion of the bodily injury claims are settled



"We are seeing large claims on large infrastructure projects."

JAMES SCHWARTZ
U.S. A/E FOCUS GROUP LEADER AND UNDERWRITER
BEAZLEY

by trial rather than mediation, and this tends to raise both legal and total claims in the case.

Some carriers are successful at winning those cases, but losses still occur. One carrier, for instance, was successful in winning a claim against a traffic engineer that involved two deaths and one person with a brain injury; however, the legal fees to win the case were \$500,000.

Finally, mechanical engineering firms have also been in the crosshairs of more claims, according to the survey. Water infiltration claims on schools, single-family residences, parking garages, and hospitals represent a majority of the claims, and many involve leaks and mold growth.

CONDITIONS OF BLAME

A boom in A/E business over the last several years has contributed to the growing frequency and severity of claims, according to the survey.

PUA reports that before the recession, 25 percent of claims were attributed to design errors. By 2011 when the market was in recovery and business picked up, design errors made up 41 percent of claims. Today, design errors are reportedly the source of 57 percent of claims.

Insurance carrier AXA XL has seen a noticeable increase in technical errors in its claims. “Our claims professionals are telling us that these errors are not some vague notion of who is responsible but, rather, fairly discrete and clear technical design or specification errors,” says Albert Rabasca, director of industry relations, AXA XL.

While they do not yet have the data to fully identify the cause, anecdotally it appears to be tied to the economy, the limited availability of qualified engineers, and the inappropriate level of team training and supervision for design and construction phases, according to Rabasca.

“Basically, the quality control process is either lacking or not drilling down to the folks who are on the ground,” he says.

According to Farrar, design errors may be increasing because A/E firms also are facing staffing problems that often lead to inexperienced people working on complex tasks with less supervision and more senior people retiring, causing a decrease in QA/QC review.

“During the last recession, a lot of engineers left the industry. Now this next generation is younger, and there is not that middle management level to help guide and teach them,” Cecchi adds.

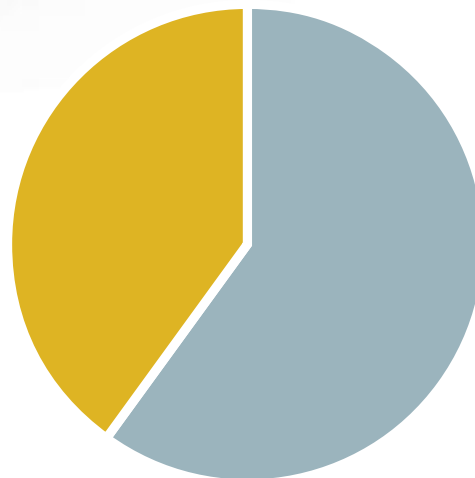
Poor contracts and poor communication between an A/E firm and the project owner were listed again this year as major causes of client claims. Even where a design error may be the cause of the claim, good communication can minimize the payout, Farrar adds.

PLI IN THE FORECAST

Weather-related concerns came to the forefront for the first time this year as a source of potential future claims against design firms. With 100-year storms occurring two or three times in a decade, questions may arise over the standard of care, according to Corbett.

“Future weather uncertainty could result in significant exposure for architects and engineers,” Corbett says. “More claims

Have Your Rates Increased, Decreased or Remained Flat Over the Past Three Years?



Increased 40% Flat 60% Decreased 0%

Source: 2019 ACEC/AIA/AIA Trust/NSPE Professional Liability Survey of Carriers (10 of 15 firms responding).

How Do You Expect Your Rates to Change in 2020?



Increase 45% Flat 36%
Flat/Level or Slight Increase 9% Decrease 0%
Flat/Level or Slight Decrease 9%

Source: 2019 ACEC/AIA/AIA Trust/NSPE Professional Liability Survey of Carriers (11 of 15 firms responding).

around weather change will center on allegations that the architect and engineers should have anticipated that the code would not be sufficient to protect the property from flooding. Right now, we have building codes that are not being updated.”

Crediting an expert on FEMA flood-proofing and other disaster projects, Rabasca suggests that when design professionals use FEMA maps to determine flood elevations, those maps should only serve as a starting point for design.

“Flood design is not just about elevation. The velocity, debris-impact risk, rate of rise for the water, duration of flooding, and



“Developing a long-term relationship with your insurance carrier is especially important in the event your firm has a period of claim activity.”

JEFF CONNELLY
SENIOR VICE PRESIDENT
GREYLING INSURANCE BROKERAGE & RISK CONSULTING

wave heights are additional factors that might influence design decisions. Accordingly, design professionals must also investigate what is happening locally with climate change before design and construction in order to lower their risk exposure,” Rabasca says.

Furthermore, design professionals should be wary of signing certifications for flood-proofing, according to Rabasca.

“When a designer signs the certificate, in essence they are warranting not only that they have designed to that requirement but also that the *contractor has constructed* the building to that requirement,” he adds. In cases of recertification, Rabasca further advises that “they must also ascertain that no changes have been made to the structure since the initial certification, which might jeopardize the integrity of the original flood-proofing design and construction.”

CYBERSECURITY SPINS OFF

Cybersecurity coverage remains a requirement for most firms, carriers say, especially with the rise in ransomware and its payoff demands.

But this year, nearly all carriers surveyed recommended that A/E firms have a separate, stand-alone policy for cybersecurity because stand-alone coverage is cheaper and often better than what PLI carriers can offer.

Furthermore, any claims would not count against PLI policy losses.

WITH GROWTH COMES OPPORTUNITY

With premiums at competitive rates and carriers adding new extras and improved policy forms, A/E firms should avoid shopping every year and instead acquire quotes every three to five years.

“This should be done just to see what the market looks like,” says Jeff Connelly, senior vice president at Greyling Insurance Brokerage & Risk Consulting.

An engineering firm’s coverage needs also may have changed. For example, new services being offered by the firm that a carrier is not comfortable insuring, a complex project that requires unique coverage, or a need for higher liability limits that the current carrier cannot provide, Connelly adds.

If a current carrier is not as responsive when handling a claim, that could mean it is time to take another look at the market.

“Developing a long-term relationship with your insurance

carrier is especially important in the event your firm has a period of claim activity,” Connelly says.

While a lower premium is usually the goal of most firms, those rates are often short-lived as carriers begin paying out on claims.

“Historically, newcomers try to drive down prices 10, 15, or 20 percent, and usually they are out of business in three to five years because architects and engineers have losses,” says Chris Poole, principal at Poole Professionals Ltd. and president of the Professional Liability Agents Network (PLAN). “People who are usually coming in at a lower price point do not have the established claims management staff or risk management services, and inherently that drives up claim costs for both the insurer and insured.”

However, smaller firms without complex projects could still benefit from these newer low-cost carriers.

“Some in the last five years are very good,” says Mark Jackson, president of a/e ProNet and founding partner of JCJ Insurance. “Staff is very experienced and comes from other A/E specialty insurance carriers.”

RISK MANAGEMENT ADVICE

The entire firm, from junior staff through senior executives, needs to be sensitized to risk management topics, according to Poole. For starters, everyone involved in a project should read a contract before it is signed.

“It is the junior-level person who often commits the firm to something or does not read the contract to understand that the scope of services was limited in a particular area, but goes on providing those services,” Poole says.

Firms can also reduce their liability risk by working with repeat clients and through better due diligence in selecting new clients, according to Jackson.

“Firms that are more selective on who they work for and the project type are going to have better results than those who just go after the money,” he says.

Ultimately, carriers want an engineering firm’s business and are offering broader coverages and adding services to assist firms in lowering risk and improving claim outcomes. As quickly as things change it, it makes sense to review a policy against others being offered every few years. ■

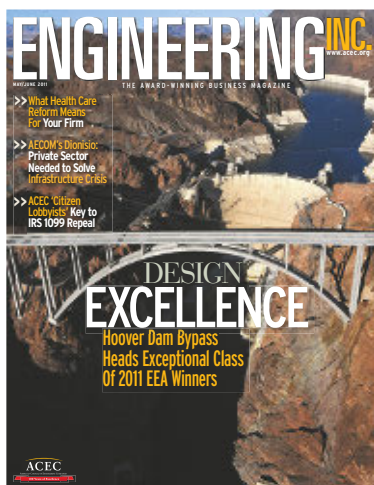
Stacy Collett is a business and technology writer based in Chicago.





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ACEC OKLAHOMA

Nurturing a Spirit of Growth and

GETTY IMAGES/TRAVELER116



Emerging from its legendary pioneering past, which included the infamous “Land Rush” and the “Oil Boom,” the state of Oklahoma is today enjoying an economic renaissance.

The once agriculture- and oil-based economy has become vibrant and diverse, augmented by professional, scientific, and technical services; finance and insurance institutions, and healthcare.

ACEC OKLAHOMA leaders and members are enjoying the economic reinvention.

“We have built a new arena that houses the (NBA’s) Oklahoma City Thunder. There is a new streetcar line downtown. There are massive renovations at the state fairgrounds and huge public works projects that have seen a revitalization of not only downtown OKC but various neighborhoods around the downtown area and suburbs,” says James F. Sullins, CAE, president and CEO of ACEC OKLAHOMA. “ACEC Member Firms in

Oklahoma have had their hands in all of these projects.”

ACEC OKLAHOMA members also were involved in the new Scissortail Park where this past September, 28,000 Oklahoma City residents and visitors turned out to dedicate the 70-acre, \$132 million urban oasis that stretches from the center of downtown to the banks of the Oklahoma River.

It features the dazzling Skydance bridge—a design inspired by the state bird, the scissor-tailed flycatcher, that soars over Interstate 40 and will connect the 40-acre upper park to a 30-acre lower park set to open in 2021.

The park, along with a new Convention Center and 600-room hotel, both slated to open in late 2020, are the latest jewels in the renaissance that has been taking place in Oklahoma City and in state over the last 20 years. A penny sales tax, part of the Metropolitan Area Projects Plan (MAPS) capital improvements program, has been responsible for much of the projects’ funding. An additional phase, MAPS 4, was just approved by city voters in December, funding 16 civic

projects at an estimated cost of nearly \$987 million.

Tulsa, the state’s second largest city, has also experienced a renaissance over the past few years.

ACEC Member Firm Meshek & Associates, a 55-person Tulsa-based firm, has developed the floodplain hydraulic analyses on a low-water dam in the Arkansas River that will retain water permanently to create a water attraction as well as a recreational flume for tubers and surfers.

“We have been a leader in hydrology and hydraulic projects for the city of Tulsa, including several master drainage plans and flood mitigation projects,” says Brandon Claborn, CEO of Meshek & Associates. The firm’s work is credited in large part for keeping city structures dry after heavy rains caused massive flooding of the Arkansas River in May 2019 that lasted weeks.

The renaissance also includes the construction of a new downtown arena named the Bank of Oklahoma Center, a renovated convention center, and a new 67-acre park known as the Gathering



**A KEY STATE IN
THE ORIGIN OF THE
AMERICAN COUNCIL
OF ENGINEERING
COMPANIES, ACEC
OKLAHOMA ALSO
HAS BEEN KEY TO ITS
STATE'S RENAISSANCE**

OKLAHOMA

Collaboration BY STACY COLLETT

Place. Opened in September 2018, the award-winning park is located alongside the Arkansas River that runs through Tulsa.

Although the park was primarily privately funded, the city of Tulsa provided \$65 million in infrastructure improvements to ensure access to and from the park while enhancing existing walking and biking trails to link to the park.

“Oklahoma City and Tulsa are becoming first-class cities, and people are noticing,” says Martin Hepp, president of Oklahoma City-based CEC Corp., which did the MEP work on both Scissortail Park and the convention center hotel parking garage. “Oklahoma is continuing to push growth. It is a good day to be doing engineering in the state.”

ACEC'S OKLAHOMA ROOTS

Founded in 1954, ACEC OKLAHOMA has a long history of leadership in ACEC. It was one of the 10 founding state organizations that subsequently formed the national Consulting Engineering Council of the United States in 1956, a predecessor of the ACEC national asso-

ciation that exists today.

The first meeting of the 10 founding state organizations was hosted in July 1956 in Tulsa. The chairman appointed to lead that meeting, Charles Pate from Oklahoma, three years later became the president of the Consulting Engineering Council of the U.S. That organization merged with the American Institute of Consulting Engineers in 1972, and William Holway, a member from Tulsa, became the first president of the new merged organization, which formally became the American Consulting Engineers Council, and later ACEC.

ACEC OKLAHOMA's 68 Member Firms employ nearly 2,000 engineers, architects, land surveyors, scientists, and other professionals and are responsible for about \$250 million worth of design for private and public works projects annually in Oklahoma and throughout the nation. The majority of Member Firms specialize in civil engineering and range in size from a single registered professional engineer to full-service, multidisciplinary engineering and architectural/engineering firms employing

ACEC OKLAHOMA AT-A-GLANCE

ACEC OKLAHOMA's 68 Member Firms employ nearly 2,000 engineers, architects, land surveyors, scientists, and other professionals

ACEC OKLAHOMA is led by James F. Sullins, CAE, who will retire in 2020 as president and CEO after 32 years of Council leadership

Each year, **ACEC OKLAHOMA** members are responsible for approximately \$250 million in design services for projects in Oklahoma and throughout the nation

hundreds of professionals.

ACEC OKLAHOMA is led by Sullins, who marked his 32nd anniversary as president and CEO on Feb. 1, 2020. A self-described one-man band for all of his tenure, Sullins has led the organization's growth in both size and influence throughout his more than three-decade tenure.

“When ACEC OKLAHOMA was formed in 1954, and even through into

the early 1990s, the organization was strictly for owners of firms—‘a good ole boys club’ if you will. Only the senior principal(s) attended meetings and our mailing list was around 125 individuals,” he said. “Since then, we have convinced ‘owners’ that ACEC OKLAHOMA is important to employees at all levels of their firms, and we have expanded our mailing list to well over 500 employees, which continues to grow almost daily.”

MAJOR LEGISLATIVE ACHIEVEMENTS

Over the decades, the 65-year-old state organization has blazed many new and critical trails to enhance the marketplace for state engineers, including landmark engineering industry legislation that would serve as a blueprint for other states.

In 1967, ACEC OKLAHOMA achieved passage of the state’s first Statute of Repose—which provides protection for engineers, architects, and construction companies from lawsuits 10 years after “substantial completion of the project,” marking an absolute end of any available lawsuit. (Some states require a different period of time.)

The statute’s strength was tested in 1989 and again in 1992 when two cases went to the Oklahoma Supreme Court. The Statute of Repose in both cases was upheld as constitutional.

“These were major victories,” Sullins says. “Some other states had Statutes of Repose that were turned back by their Supreme Courts, so that was huge for the profession here.”

In 1984, ACEC OKLAHOMA led an industry coalition effort that made Oklahoma the first state to approve legislation protecting architects and engineers from third-party liability under workers’ compensation laws—the same protection that had been extended to property own-



ACEC OKLAHOMA was one of the 10 founding state organizations that subsequently formed the national Consulting Engineering Council of the United States in 1956, a predecessor of the ACEC national association that exists today. The first meeting of the 10 founding state organizations was hosted in July 1956 in Tulsa. Members of CEC’s first board of directors and executive committee included: (seated left to right) William C.E. Becker, Charles Pate, John K.M. Pryke, Bernard Dornblatt, and Edward Wolfe. Standing left to right are Thomas Roche, Ralph Westcott, George Paulson Jr., Howard Ecklin, and Kenneth Murry. Pate, from Oklahoma, later became president of the Consulting Engineering Council of the U.S.

ers, general contractors, and contractors. Today, about 45 states now have the same language in their workers’ compensation statutes.

Oklahoma also was one of the first group of states to bring Qualifications-Based Selection (QBS) laws to the state level in 1982—some 10 years after Congress adopted the officially titled Brooks Act, which mandated that federal departments and agencies select engineering and architecture firms based upon their competency, qualifications, and experience rather than by lowest price.

“The QBS law goes top to bottom here,” Sullins says. “We have been successful in extending it to the city, state, county, municipal work, trusts, state schools, etc.”

MARKET REMAINS STEADY

Business has remained steady for ACEC OKLAHOMA Member Firms over the

years, particularly in the transportation sector, due in large part to the state ROADS Fund (Rebuilding Oklahoma Access and Driver Safety), legislatively approved in 2005 to ensure a dedicated revenue source for the maintenance and repair of state highways and bridges.

The fund guaranteed an annual apportionment equal to the previous year plus an additional \$59.7 million until it reached a cap of \$575 million. Those funds helped repair 1,067 functionally obsolete or structurally deficient bridges on the state’s highway system, with about 100 more bridges scheduled to be repaired over the next couple years.

The ROADS Fund reached its \$575 million annual cap in FY 2019. When combined with gas and diesel fuel tax revenue, Oklahoma has a long-term, sustainable funding source to support the state’s transportation needs.

As with many states, Oklahoma has

not been without its budget challenges, especially with an economy that still depends heavily on the volatile oil and gas industry. As an example, the 2014 collapse of oil prices led to a \$1.3 billion state budget deficit in 2015, followed by a \$600 million deficit in 2017, and a \$167 million budget shortfall



“The QBS law goes top to bottom here. We have been successful in extending it to the city, state, county, municipal work, trusts, state schools, etc.”

JAMES F. SULLINS, CAE
PRESIDENT AND CEO
ACEC OKLAHOMA

for FY 2019. The funding of transportation projects slowed a bit as a result.

"Funds to make up that deficit were taken from ODOT [Oklahoma Department of Transportation] and other state agencies that would employ consultants, engineers, and architects," Sullins says. "Luckily, it appears that we are now back on track, and the future is looking brighter."

At the same time, regional and national engineering firms are flocking to Oklahoma looking for a piece of the lucrative transportation pie and a chance at the MAPS projects. "There used to be 10 firms putting in for the job, and now there are 50," Hepp says. "It is just a different market, and so we have to adapt."

NAVIGATE THE CHANGING LANDSCAPE

Since its establishment, ACEC OKLAHOMA has strived to help Member Firms navigate the changing engineering landscape. That help includes educating firms and the community on industry-impacting legislative issues and being a primary source for tools and resources to help members take advantage of market trends and grow their business.

One Member Firm success story is CEC Corp., which in the early to mid-2000s had between 30–35 employees working on small transportation and municipality projects when it witnessed an increase in out-of-state firms coming into the state in pursuit of the larger projects.

"With the help of ACEC (OKLAHOMA), we were able to really start developing a relationship with our main transportation client, ODOT. It became one of the enviable relationships between contractors, engineers, and the transportation owner in the entire nation," Hepp says.

Today, CEC employs about 215 professionals with three offices in the state and one in Texas.



"I love the spirit of collaboration we have in the industry—big and small firms—to help us meet the needs of clients and help our companies grow."

BRANDON CLABORN
CEO
MESHEK & ASSOCIATES

But the relationship now faces another transition, according to Hepp. As leadership retired from ODOT and the Oklahoma Turnpike Authority, many went to consult for regional engineering firms that are now vying for the same work. At the same time, state agency vacancies have been replaced with new leadership.

"We are now finding ourselves in the position of having to rebuild trust all over again as some do not fully understand how our businesses operate," Hepp says. "What is needed is a 'restatement of vows' that were initiated through ACEC nearly 20 years ago through its partnering document with ODOT, and from there determine what problems we need to solve that are specific for our industry."

Meshek & Associates' Claborn credits ACEC OKLAHOMA with helping him

navigate his new role as a principal at his firm through "Leadership for Engineers" training. "They do not teach engineers about business in engineering school, and the class proved tremendously valuable," he says.

ACEC OKLAHOMA also provided Claborn with guidance on how to, and the importance of building relationships and networks with fellow statewide engineering professionals.

"I love the spirit of collaboration we have in the industry—big and small firms—to help us meet the needs of clients and help our companies grow," he adds.

Sullins explained how ACEC OKLAHOMA's prominence has paralleled with the maturation of the state's engineering industry.

"We are seeing individuals who were design engineers or project managers 20 years ago now leading their firms," Sullins said. "Since we got them involved earlier in their careers, they already know of ACEC OKLAHOMA and our importance to their firm's continued success even before they have their name over the door."

"In my 32 years, we have groomed a new generation of leaders who have taken over from the previous 'founding' generation," Sullins continued. "And now, through our 'Leadership for Engineers' program and other ventures, we are helping groom and train yet a third generation of leaders, who in the next 10–15 years will be taking over leadership positions in their firm and in ACEC OKLAHOMA." ■

Stacy Collett is a business and technology writer based in Chicago.



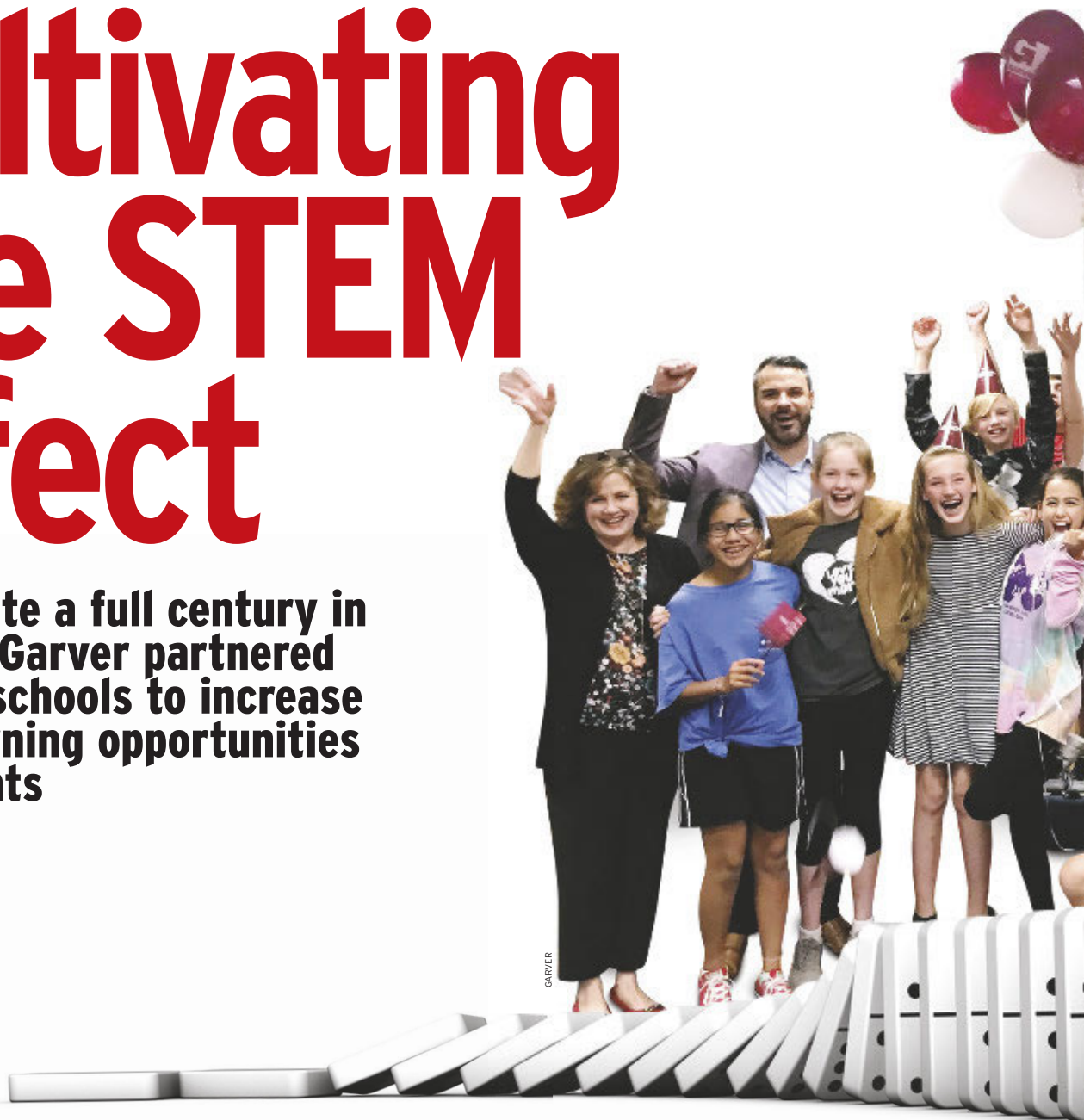
Phase one of Scissortail Park, a 70-acre, \$132 million urban oasis that stretches from downtown Oklahoma City to the Oklahoma River, opened in September 2019.

DOUG HONE

Cultivating the STEM Effect

To celebrate a full century in business, Garver partnered with 100 schools to increase STEM learning opportunities for students

BY CALVIN HENNICK



Turning 100 is no small feat. It is a milestone that Garver, a multidisciplinary engineering company, decided to celebrate in a decidedly unconventional way.

The North Little Rock, Arkansas-based company, which founder Neal Garver started as a one-man shop in 1919, issued a challenge to students at 100 different schools: Build the most complex and imaginative Rube Goldberg contraptions you can conceive. As part of its Chain Reaction Challenge, the company donated chain reaction kits to the chosen schools and even offered a \$1,000 prize to each of the top five most creative submissions.

“The best way we can give back is to use our talents for STEM education and career exploration,” says Laura Nick, corporate communications leader for Garver. “It just really seemed natural that this was the way we were going to celebrate.”

The students sent back videos of marbles making intricate loops around classrooms on their way to knock down dominoes, balls rolling down ramps on their way to trigger balloon inflation devices, and paper cups zip lining across kite string to start toy cars on a trip through a loop-the-loop.

“It has been fun to see how doing something simple like creating a Rube Goldberg machine can turn into something bigger,” says Dan Williams, chairman emeritus at

Garver. “I do not think we thought through how this effort was going to impact our folks and the clients we involved.”

Ultimately, the entire initiative ended up someplace completely unanticipated—establishing long-term relationships with teachers and students and working alongside students who have visual impairments to create special STEM kits for schools for the blind.

THE CHAIN REACTION CHALLENGE

For the Chain Reaction Challenge, Garver tapped its employees to nominate schools from the 12 states and more than 30 communities where the firm has offices.



Wallace Elementary School students in Dallas celebrate their Garver Chain Reaction Challenge win after creating an elaborate Rube Goldberg machine that ran continuously for two full minutes.

Garver planned to give out a \$1,000 prize to each of the top five videos sent by schools, but the company received so many quality submissions that it ultimately gave out **nine \$1,000 prizes**—plus a special Grand Champion award

Some employees nominated schools where their children attend, some picked a facility where their spouse works, and some even chose schools that they themselves attended as children. Then, employees delivered STEM kits—which included items ranging from ramps and balls to rubber mallets and sink strainers—and worked with students to show them the basics of creating a chain reaction. Garver also provided schools with stipends to purchase any needed additional materials, and then students set out to design and build their

E-Week kickoff event at Pat Henry Elementary School in Lawton, Oklahoma, the first of 100 schools to receive a STEM kit from the firm.



GARVER

own Rube Goldberg devices in the following weeks.

Lacee Stanley, a transportation project engineer in Garver's Tulsa, Oklahoma, office, nominated the middle school she attended. The school was chosen to participate, and Stanley was able to hand-deliver a STEM kit to her former fifth-grade teacher and work hands-on with students at her old school.

"It was a lot of fun," Stanley says. "It was interesting to work with the students and try to get them to think outside the box. At first, they were unsure if they could do it, but we told them there were no rules." It was not long before they started getting creative and thinking about how they could attach something to the ceiling or use other items in the room, she notes.

Initially, Garver planned to give out a \$1,000 prize to each of the top five videos sent by schools, but the company received so many quality submissions that it ultimately gave out nine \$1,000 prizes—plus a Grand Champion award.

One of those nine honorees was Pat Henry Elementary in Lawton, Oklahoma. The project gave Doris Biegler, a STEM teacher at the school, a chance to teach her students practical lessons on topics



"The best way we can give back is to use our talents for STEM education and career exploration."

**LAURA NICK
CORPORATE COMMUNICATIONS LEADER
GARVER**

such as kinetic energy, force, and Newton's Laws of Motion.

The project also provided an important lesson that transcends engineering and science: the value of perseverance. Biegler says that when Garver employees came to the school to demonstrate how chain reactions work, their own device malfunctioned on the first try.

"It was nice for the kids to see that even professionals in the field have mess-ups," Biegler says. "Then they reset it, and it worked the second time."

Biegler's students worked in three groups to create portions of the chain reaction, and then other students connected the different parts. When it was time to record the device in action, Biegler says, it took more than 40 attempts to get it to work right.

"Students loved it," she says. "They were very proud of themselves, and they wanted everyone in the school to be able to see what they had done and what they had made."

Garver also held a few larger events as part of the initiative, inviting some of its clients to attend. Marc Williams, deputy executive director for the Texas Department of Transportation, served as a judge at a multischool event at the Austin Public Library.

"It sounded like fun," he says.

But that is not the only reason he got involved.

"We owe it to our profession to take the time to help reach out to that next generation of professional engineers," Williams says. "We rely on the next generation of



GARVER

Edward Keenan, Garver North Texas plant team leader, oversees Dallas Independent School District students test their contraptions at the Dallas Museum of Art.

students to sustain the work that we do. And enticing them—making the work real, making it fun, making it interactive—is critical if we are going to be successful in replenishing the pipeline.”

AN UNANTICIPATED OUTCOME

At the Texas School for the Blind and Visually Impaired, an obstacle in the Chain Reaction Challenge turned into an opportunity.

Kat Heitman, a teacher at the school, worked with high schoolers to help them create their own chain reaction—modifying the project parameters to give the students as much independence as possible.

“We realized very quickly that using freestanding objects was not working for our students,” Heitman says. “They had to feel around for where the last domino was, and they kept knocking them over.”



Students from the Texas School for the Blind and Visually Impaired assemble accessible STEM kits for other schools with Bill Nguyen, transportation project engineer at Garver and Josh Crawford, aviation leader for central/south Texas at Garver.

Heitman used the Garver stipend to buy implements that were more suited to her students, such as dominoes attached to a track. She wanted all of the students to know immediately when the chain reaction worked, and so as a finale, they launched a toy car into a full-sized gong they borrowed from the music teacher.

“The gong has a beautiful sound,” Heitman says. “It is a very successful sound.”

Garver recognized Heitman’s students with a Grand Champion award, which included additional funding for the school’s STEM programming. Garver engineers visited the school and participated in the students’ woodworking class to help them build chain reaction

kits specifically for students with visual impairments. The kits included bells and other sound-producing elements to help students keep track of their chain reactions as they unfold.

Heitman was drawn to the challenge because of her love of project-based learning. But the effort also introduced students to a potential career path and allowed them to compete alongside their sighted peers, she notes.

“The chain reaction project had a profound impact on the students and teachers alike. It was a powerful lesson in teamwork and self-determination,” Heitman says.

EMPLOYEE IMPACT

And that impact also translates to Garver employees who told company leadership that it is important for them to have opportunities to volunteer in their communities.

“Being able to go back to where I got my start, it made me a little bit emotional,” Stanley says of visiting her old school. “I am very grateful that I work for a company that cares that much about their employees and about the community.”

While Garver has a long history of philanthropy in the communities where it works, most of its efforts have historically been done in a centralized way, with little involvement from employees.

“When I started as CEO seven years ago, I was making most of those decisions,” Williams notes. “I said, ‘This is not working. There have to be more people involved in this process.’”

As a result, in 2015, the company launched GarverGives. The program is organized by committees in each of the company’s offices and supports



“When people began to do things they were passionate about doing in their own communities, that part of the culture grew because more people had their hands on it.”

DAN WILLIAMS
CHAIRMAN EMERITUS
GARVER

OTHER GARVERGIVES INITIATIVES

- In each of the last four years, Garver’s Frisco, Texas, office has mentored high school students throughout a semester, culminating with the awarding of scholarships. Garver has contributed more than \$10,000 in scholarships to the district.
- Garver’s North Little Rock, Arkansas, committee sponsors TinkerFest, an event dedicated to promoting the exploration of engineering and science with more than 40 hands-on activities.
- GarverGives, along with employees at Garver’s Fayetteville, Arkansas, office, donated \$30,000 to a children’s hospital in Northwest Arkansas in 2018.
- Tulsa, Oklahoma, employees held a fundraising drive and pancake breakfast for A New Leaf, a charity that provides developmentally disabled people with life skills and job training.

To view a video about Garver’s Centennial Celebration, visit:
GarverUSA.com/centennial

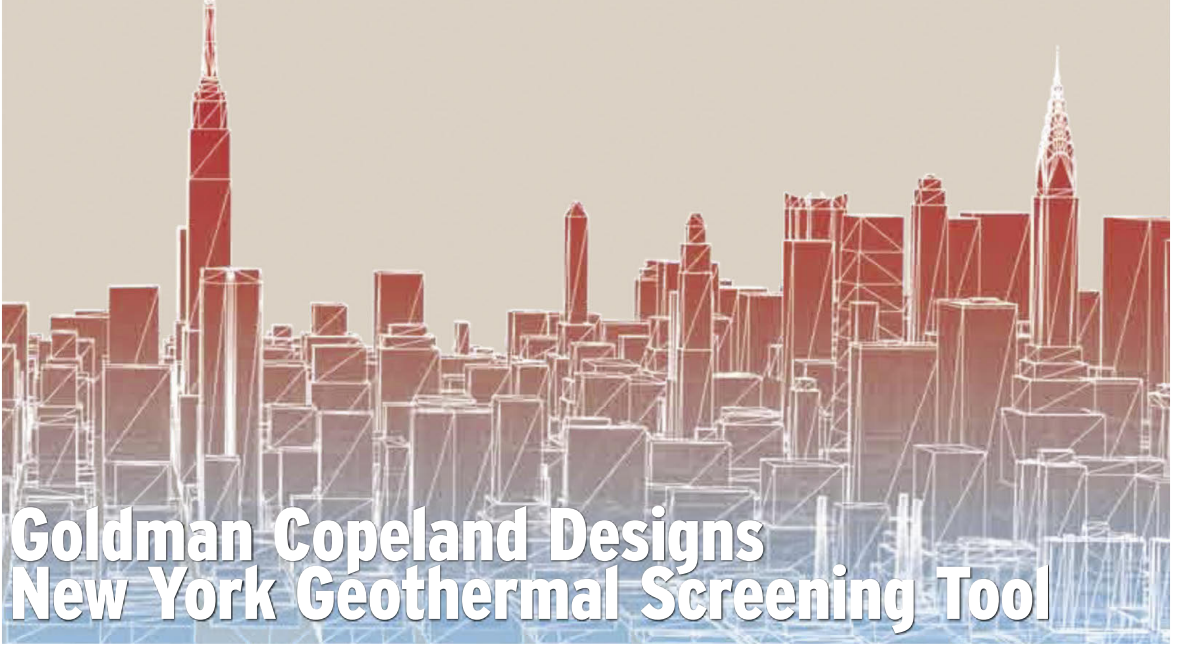
organizations that are important to employees. Since then, GarverGives has supported more than 300 organizations and donated nearly \$600,000—with employees volunteering more than 1,500 hours.

“When people began to do things they were passionate about doing in their own communities, that part of the culture grew because more people had their hands on it,” Williams says. ■

Calvin Hennick is a business, technology, and travel writer based in Milton, Massachusetts.



Charles Copeland



Goldman Copeland Designs New York Geothermal Screening Tool

New York's commitment to reduce its total greenhouse gas emissions by 80 percent by 2050 will require a dramatic rethinking of how the city's more than 850,000 structures will be heated and cooled.

One little-used option has been geothermal systems. Because they require a larger footprint than other systems, geothermal systems pose a challenge due to the city's intense density. Furthermore, the geological features of the area also can be problematic in large swathes of the city. Nevertheless, city leaders believe geothermal will be a necessary component in the long-term energy strategy.

In order to promote the use of geothermal systems, New York contracted with Goldman Copeland Consulting Engineers to produce a publicly available online geothermal screening tool that assesses the potential for using ground-source heat pumps for every building within the city.

"It is a big tool," says Charles Copeland, president and CEO of Goldman Copeland. "Not just because of the number of lots, but also the number of variables. For folks living on a farm in Michigan, installing a geothermal system is relatively easy. It is not the same in New York."

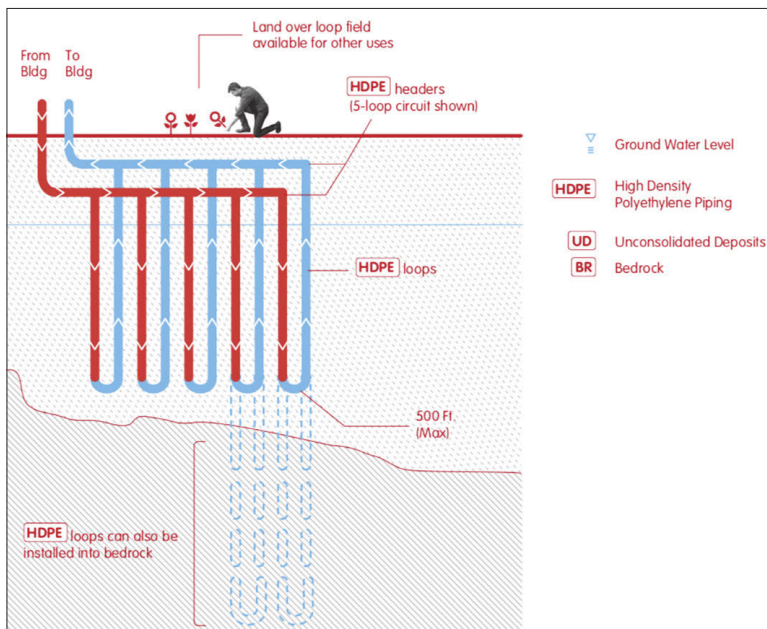
The tool analyzes the potential implementation of four types of geothermal systems (closed-loop, standing column well, open-loop, and hybrid systems) compared with a conventional HVAC system. It organizes every structure in the city into one of 25 types, based on age, size, and occupancy to establish a baseline for thermal load and conventional energy consumption. It also factors in land area availability for thermal storage/extraction and the geology at the Borough-Block-Lot level.

Overall, the tool shows limited geothermal potential in Manhattan and the Bronx because building loads often exceed the potential thermal capacity of the available outdoor space. Staten Island, Queens, and Brooklyn are more promising because there is more outdoor space for drilling, and building loads are generally less intense. However, Brooklyn has a large potable water aquifer, which also limits access to geothermal systems.

The majority of commercial buildings are not feasible because their large heating/cooling loads with limited outdoor space exceed the ground thermal capacity. The most feasible structures are smaller structures like schools, multifamily buildings, or single-family homes. In many cases, a hybrid system can be used, with a cooling tower and additional heating to offset peak loading.

"Building owners or others can find their building or lot on the web-based map and get a feasibility analysis based on the three different geothermal systems," Copeland says. He adds that because the tool uses generic installation costs, "final decisions should be made only after completing an in-depth feasibility study for the site."

Although the tool was designed for New York City, Copeland believes it can be adapted for other areas around the country using U.S. Geological Survey maps and local soil condition analysis.



SOURCE: NEW YORK CITY DEPARTMENT OF DESIGN AND CONSTRUCTION

Benesch Employees and Families Set World Record for Hot Wheels Track

Benesch's Pottsville, Pennsylvania, office set the world record in August 2019 for the longest Hot Wheels track.

Supported by the firm's corporate social responsibility (CSR) program, more than 100 Benesch employees, family members, and friends engineered and built a 2,176-foot-long, 2½-inch-wide track.

The project started in February 2019 when Benesch project engineer John Knecht's son asked how long a Hot Wheels track could be. Knecht went online and found that the Guinness World Record was 1,838 feet.

"I said, 'I think we can beat that,'" Knecht says.

As a member of Benesch's CSR Committee, Knecht floated the idea of the firm supporting the effort to build the world's longest Hot Wheels track. Benesch embraced the opportunity to involve employees and family members in a hands-on engineering activity.

The first step was for Knecht to calculate the grade necessary to keep the car moving at a constant speed and then to find a suitable location for the track. Other engineering considerations included calculating the number of pieces needed and gauging the effects of wind and thermal expansion on the track.

Benesch held two workshops where more than 40 children, parents, and employees assembled track, decorated track markers and building structures, and tested the speed and stability of various cars.

The successful run took 2 minutes and 50 seconds. Benesch received official confirmation of the new record from Guinness on August 24, 2019.

"It was a great introduction to the principles of science and engineering for young kids," says Greg Brennan, chairman of Benesch. "It was great to see almost 50 children there on a Saturday morning."

To view a video of the record run, go to <https://tinyurl.com/rebowao>.



Benesch employees and family members, including, from left to right, Cole Meskunus, Francis Kowalonek, Aspen Tohill (at rear), Coby Fasnacht, and Cooper Fasnacht, enjoyed setting a Guinness World Record for the longest Hot Wheels track.

HDR Fellows Program Helps Employees Pursue Professional Passions

Since 2017, the HDR Fellows Program has encouraged select employees to pursue creative solutions for technical and design issues facing the firm's clients and the industry. Each year, HDR awards three fellowships, giving the fellows funding, time, and institutional support to complete their applied research.

"Our fellows have investigated a range of topics, including cyberphysical protection of buildings, autonomous and connected vehicles, sustainable and healthy materials for buildings, and a model for bridge selection," says Brian Hoppy, a co-director of the HDR Fellows Program.

Each year, prospective fellows complete an application describing what they want to

research and how it will benefit the firm and its clients.

"Our collaborative culture leads to many proposals being put forward, and the competition is fierce," Hoppy says. "The HDR executive leadership team reviews and scores each proposal and selects the best of the best ideas for fellowships."

Lukas Rowland, an electrical engineer in HDR's Portland, Oregon, office, will use his 2019 fellowship to study the role of electrical energy storage in a sustainable energy portfolio.

"The HDR Fellows Program offers employees a chance to dedicate meaningful time and effort to pursuing an idea that aims to advance HDR's position in a particular industry or area of interest," Rowland says. "This advancement may

come in many different forms, but the overall result gives HDR a competitive advantage in the way we serve our clients through the direct application of the outcome of a fellowship project and by demonstrating HDR's commitment to R&D and progressive engineering."

Concerning the other 2019 Fellows, Bryce Figdore, a senior wastewater process engineer based in Bellevue, Washington, will research advanced water treatment technology, and Tom Trenolone, a design director based in Omaha, Nebraska, will research suburban and rural healthcare.

If your firm has an item to submit to *In the News*, please contact Gerry Donohue at gdonohue@acec.org.

Party On, Deal-Makers!

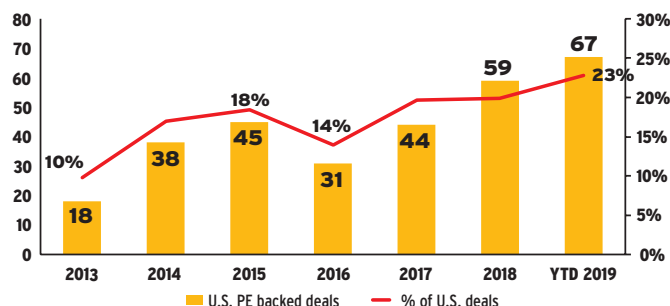
BY NICK BELITZ

Echoing the U.S. economy's record expansion—business activity, employment rate, consumer confidence, and gross domestic product (GDP) growth for more than 126 consecutive months—engineering and environmental sector investments are reaching new peaks.

Morrissey Goodale tracked 294 M&A transactions completed by domestic U.S. deal-makers through December of 2019, up slightly over the 292 deals completed through the same period in 2018. While final numbers will not be available until later in 2020, the number of transactions in the U.S. in 2019 is on pace to exceed 300 deals for the first time, breaking the record of 297 set only 12 months earlier.

For additional party-planning context, consider this: Firms in the A/E industry generated gross revenue of more than \$339 billion in full-year 2018, a 5 percent increase over the prior year, according to SelectUSA, a program run as part of the U.S. Department of Commerce. With the near-term outlook rosy given a growing economy and rising demand for services, the volume of firms in the A/E industry stands tall at nearly 100,000, per SelectUSA. Most of those firms are small businesses, generating design revenue of less than the \$25 million earned by firms at the small end of *Engineering News-Record's* (ENR) Top 500 Design Firms list. Concurrently, Morrissey Goodale data shows the size of the median seller in the industry to range from \$3 million to \$4 million in top-line revenue. Which means the industry is heavily populated by small firms, making a high number of them eligible to be considered sellers in a transaction. Despite the record number of deals in recent years, there

Influence of Private Equity



is plenty of room for the consolidation party to continue.

With that in mind, below is the activity that rounded out 2019.

THE PERENNIAL PARTYGOERS HELD THEIR OWN...

The usual suspects have been at work over the course of 2019, led by ACEC member **NV5** (Hollywood, Fla.). NV5 closed nine transactions in 2019 as of this writing, including the firm's November agreement to acquire the largest full-service geospatial solutions provider in North America, **Quantum Spatial, Inc.** (Sheboygan Falls, Wis.), for \$300 million. NV5 continues to be one of the A/E industry's most prolific buyers, with 31 transactions since 2015, driving the firm's annual top-line revenues over the same period from \$150 million to more than \$500 million.

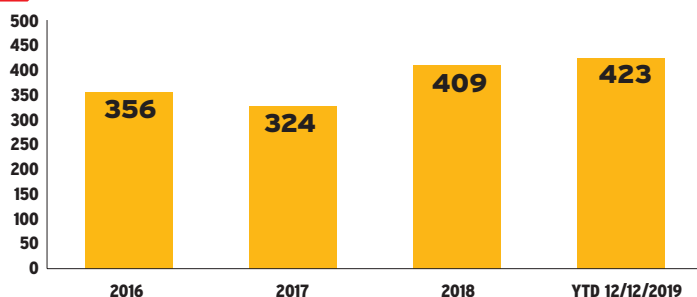
ACEC members **Salas O'Brien** (Santa Ana, Calif.), **Gannett Fleming** (Camp Hill, Pa.), **CHA Consulting, Inc.** (Albany, N.Y.), **Terracon** (Olathe, Kan.), and **TRC Companies, Inc.** (Lowell, Mass.), all continued to use acquisitions as a critical component of their growth strategies and to build reputations as industry leaders in M&A. Each firm completed at least three acquisitions apiece in 2019.

...WHILE NEWCOMERS CRASHED THE GATES

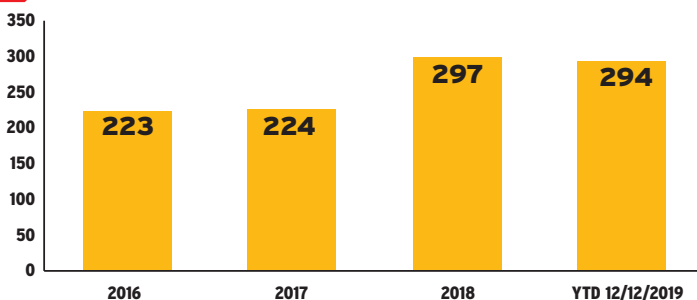
As the demand for engineering and design services has expanded, so too has interest in deal-making from firms not traditionally part of the acquisition push. On the strength of economic growth and ongoing optimism in the industry, multiple well-recognized industry brand names joined the party, including ENR Top 500 firms **LHB** (Duluth, Minn.), **Murraysmith** (Portland, Ore.), **PS&S** (Warren, N.J.), and **Core States Group** (Duluth, Ga.), who all completed their first acquisitions in 2019. For their part, LHB and Murraysmith each completed two.

Adding to the ranks of buyers over the past year is the increasing number of private equity firms knocking on doors in search of an investment platform—meaning a profitable, growing engineering firm—by which to enter the space. Following **Kleinfelder's** (San Diego) headline transaction with **Wind Point Partners** (Chicago) in 2018, 2019 has seen six ENR Top 500 firms transact, or announce a transaction, as of this writing. Four of these

Deals Global Deals



Deals U.S. Deals



deals involved private equity partners, notably ACEC member **STV** (New York). STV announced in October a definitive agreement with industry newcomer **The Pritzker Organization** (Chicago) to recapitalize the firm and position STV for future growth. This transaction marks one of 67 private equity-backed deals in the industry this year, a 14 percent increase over the same period the year prior. That deal count means that private equity or a private-equity-backed engineering firm accounted for nearly 1 in every 4 industry deals in 2019.

As this category of buyers seeks to scale platform investments with bolt-on deals, an even wider pool of engineering firms will emerge as acquisition candidates as investors look for deals that provide complementary services, technology, or geographic diversification. With an industry that has no shortage of such firms, do not expect the party to stop anytime soon.

ADDITIONAL ACEC DEAL-MAKERS NOVEMBER 2019

Public infrastructure engineering firm **Baxter & Woodman** (Crystal Lake, Ill.) acquired **GTC Engineering Corp.** (Orlando, Fla.), marking Baxter & Woodman's second acquisition in Florida during the last three years. Both firms are ACEC members.

Global engineering and construction firm **CDM Smith** (Boston), an ACEC member, acquired **Bioscope Environmental** (Perth, Australia). The acquired firm provides environmental and social services to the mining, industrial, and infrastructure sectors and assumed the CDM Smith name as of the acquisition date.

ACEC member **NV5** (Hollywood, Fla.) acquired the forensics engineering business of global design firm and fellow ACEC member **GHD** (Tampa, Fla.). The acquisition was an all-cash transaction and will be immediately accretive to NV5's earnings.

Multidisciplinary firm and ACEC member **Barge Design Solutions** (Nashville, Tenn.) acquired **Gould Turner Group** (Nashville, Tenn.), a full-service architecture, planning, and interior design firm. The acquisition continues Barge's recent period of rapid growth. The firm added more than 180 employees over the past two years and now employs more than 470 professionals.

Public infrastructure engineering firm **Murraysmith** (Portland, Ore.), an ACEC member, acquired water modeling and planning firm **Aqualyze** (Seattle). The addition of Aqualyze's eight team members expands Murraysmith's water/wastewater expertise and brings the firm to 40 professionals in the Puget Sound area.

OCTOBER 2019

Jacobs (Dallas), an ACEC member, acquired a 50 percent stake in **Simetrica** (London), a research consultancy specializing in social value measurement and well-being analysis.

International telecom engineering firm **Tower Engineering Professionals (TEP)** (Raleigh, N.C.) acquired **Pier Structural Engineering Corp.** (Waterloo, Canada), a telecommunications engineering and inspection firm. TEP is backed by private equity firm and ACEC member **Prairie Capital** (Chicago).

ACEC member **LJA Engineering** (Houston) acquired **DCBA Landscape Architecture** (Plano, Texas), a landscape architecture firm that serves institutions, municipalities, developers, and private clients.

To view the most up-to-date and "live" versions of the M&A heat maps, and to see who are the buyers and sellers in each state, go to www.morrisseygoodale.com.



Nick Belitz is a principal with Morrissey Goodale, LLC, a management consulting firm that specializes in the A/E industry and provides strategic business planning, merger and acquisition, valuation, executive coaching, leadership development and executive search services. He can be reached at nbelitz@morrisseygoodale.com.

Environmental firm **Trinity Consultants** (Dallas) acquired ACEC member **WorkingBuildings** (Atlanta), a specialty consulting firm that provides owners advocate services. Trinity Consultants is backed by private equity firm **Sentinel Capital Partners** (New York).

Engineering consulting and design firm **Ross & Baruzzini** (St. Louis), an ACEC member, acquired **Genesis Planning** (Houston), a medical equipment planning and consulting firm. The transaction is aimed at strengthening the firm's medical equipment and technology planning practice.

ACEC member **LHB** (Duluth, Minn.), a multidisciplinary E/A, environmental, and planning firm, acquired the assets of **Natural Resources Engineering Co. (NREC)** (Superior, Wis.). NREC provides engineering and management services related to the transmission petroleum industry.

ACEC member **AECOM** (Los Angeles) entered into a definitive agreement to sell its Management Services business to affiliates of **American Securities** (New York) and **Lindsay Goldberg** (New York). The purchase price of \$2.40 billion represents an 11.6x multiple of expected FY 2019 Adjusted EBITDA for the division. The transaction is expected to close during the first half of AECOM's fiscal 2020.

Transportation and infrastructure engineering firm **CONSOR Engineers** (Houston) acquired **TKW Consulting Engineers** (Fort Myers, Fla.), an engineering and inspection firm specializing in water, wastewater, structural, and civil projects. Both firms are ACEC members.

Engineering and environmental consulting firm **Barr Engineering** (Minneapolis), an ACEC member, acquired **High Energy, Inc. (HEI)** (Denver). HEI is a consulting firm providing electrical, civil, and structural engineering services for electric utility and associated utility clients. HEI's offices will become Barr Engineering's second location in Denver.

studio951 (Lincoln, Neb.), an architecture firm serving the commercial, retail, multifamily, and health care markets, joined architecture and engineering firm **Shive-Hattery** (Cedar Rapids, Iowa), an ACEC member.

ACEC member **Houston Engineering** (Fargo, N.D.) acquired **Boundary Engineering** (Dickinson, N.D.), a firm offering civil and construction engineering services to municipal clients.

Architecture, engineering, and planning firm **Bergmann** (Rochester, N.Y.), an ACEC member, acquired **Johnsrud Architects** (Trevose, Pa.), a firm serving the pharmaceutical and biotechnology sectors as well as other highly specialized industries. ■

Peering at Peer Review Risk

BY KAREN ERGER

Despite the obvious utility of peer reviews, some engineering firms are reluctant to perform them. They fear that peer reviews will expose them to liability wildly out of proportion to the fees earned. However, a peer review—the “practice of obtaining an independent, unbiased evaluation of the adequacy and application of engineering principles, standards and judgment from an independent group of professionals having substantial experience in the same field of expertise,” according to ASCE Policy Statement 351 in support of peer reviews—offers an important opportunity to bolster safety and improve project outcomes.

This issue has come into sharp focus with the 2018 failure of the Florida International University (FIU) pedestrian bridge that killed six people and injured ten. Victims of the collapse and their families filed lawsuits not only against the bridge’s general contractor, design engineer, and consulting engineer, but also against the engineering firm retained to provide a state-mandated project peer review for a total fee of \$61,000.

WHAT ABOUT LEGAL PROTECTION FOR THE PEER REVIEWER?

In recognition of both the benefits of peer reviews and the liability concerns of engineers who might otherwise be willing to perform them, the state of Missouri in 2012 passed a first-in-the-nation “peer review law” providing peer reviewers with immunity from civil liability. Kansas followed suit in 2014 and passed a peer review law that not only provides immunity to peer reviewers but protects peer reviews from the discovery process.

To date, no other states have passed peer review laws. In the wake of the FIU disaster, *Engineering News-Record* opined, “Now is the time to seek immunity laws in more states. They will lead to more robust reviews than threats of lawsuits can deliver.” Whether states will see the merit of passing laws that encourage firms to undertake this critically important work or, alternatively, shy away from providing immunity to firms that might serve as an additional source of compensation in the event of a disaster remains to be seen.

HOW CAN PEER REVIEWERS MANAGE THE RISKS?

In the meantime, engineers who perform peer review services will need to use all available means to manage the risks of peer reviews while understanding the limitations of those techniques. Here are some suggestions:

Remember that the standard of care does not change for small-fee projects. When making your go/no-go decision, bear in mind that the standard of care applies to all projects, regardless of fee size. “We were not paid enough” is never a defense to a negligence claim.

Draft a clear scope, and perform it to the letter. When claims arise on peer-reviewed projects, the plaintiffs are likely

to assert that the peer reviewer should have identified the errors allegedly made by the design engineers. A clear and detailed scope can serve as the cornerstone of your defense by establishing which aspects of the project were—and, just as importantly, were not—the subject of your review. However, this only works if you perform the scope as written, so be sure the project team knows its parameters and performs accordingly.

Perform your services in accordance with applicable law. If your peer review is mandated by applicable law, make sure that your scope and your performance are in accordance with the legal requirements. If you have any questions about what the law entails, consult your legal counsel.

Deploy protective contract terms but be realistic about their effectiveness. Contract terms such as limitations of liability and waivers of consequential damages are good to have but are only effective between the parties to the contract—they do not afford protection against third-party claims. Likewise, requiring your client to indemnify you against claims may be prudent practice, but remember that the indemnity is only as good as your client’s ability to pay, and that the anti-indemnification laws in many states may make the indemnity unenforceable.

Ensure compliance with your firm’s in-house review processes. Strict adherence to your firm’s internal quality processes is essential to managing the risk of peer review projects. Do not allow your team to fall into the trap of believing that peer review projects are unlikely to generate large claims and thus do not need to be subjected to internal checks.

THE UPSHOT

Peer reviews represent an important opportunity to improve public safety and the quality of projects by identifying design errors and omissions prior to construction and operation. But engineers who undertake peer reviews must manage their risks through prudent project selection, careful scope and contract formation, and strict adherence to quality assurance procedures. ■

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On the Move

U.K.-based **Wood** appointed **Stephanie Cox** as CEO of its Americas business, succeeding **Andrew Stewart**, who has been appointed executive president of strategy and development for the global business. Cox formerly served as president of Schlumberger's North America land drilling business and is based in Houston. Stewart will be based in Melbourne, Australia.

James Stephenson has been promoted to CEO of **CHA Holdings, Inc.** and president of **CHA Consulting, Inc. (CHA)**, which is based in Albany, New York. He succeeds **Michael Carroll**, who will transition to chairman of the board for CHA Holdings, Inc. Stephenson joined CHA in May 2019 as executive vice president and chief strategy officer.

Dallas-based **RLG Consulting Engineers** announced that CEO

Stuart Markussen will also assume the position of chairman, following the retirement of **David M. Goodson**, who will transition to senior director. Goodson will be involved in select projects and assist in the firm's strategic decisions.

Susan Wisler has been promoted to president of Boston-based **Architectural Engineers, Inc. (AEI)**, succeeding former President **Robin Greenleaf**, who will remain CEO and chair of the board of directors. Wisler has been a principal and the chief mechanical engineer at AEI for 15 years.

Red Bank, New Jersey-based **Maser Consulting P.A.** announced several leadership changes: Founder **Richard M. Maser** will remain executive chairman but is passing CEO responsibilities to company President **Kevin L. Haney**.

Joseph A. Dopico has been named COO. **Leonardo E. Ponzio** will remain executive vice president and CAO.

Matthew Natale has been promoted to COO of Hunt Valley, Maryland-based **Johnson, Mirmiran & Thompson (JMT)**. He formerly served as senior vice president. Natale also serves on the board of directors for ACEC/PA.

Michael C. Isola has joined Iselin, New Jersey-based **Mott MacDonald** as the new COO for North America. Isola previously served as a senior vice president at Parsons Corp. He is based in the headquarters office.

Baltimore-based **Whitney Bailey Cox & Magnani, LLC (WBCM)** announced the following promotions: **Jesse Lindsay** has been named an executive vice president and principal. **James**



Stephanie Cox



Andrew Stewart



James Stephenson



Stuart Markussen



Susan Wisler



Kevin L. Haney



Joseph A. Dopico



Matthew Natale



Michael C. Isola



Jesse Lindsay



James Earle



Jason Rogers

Earle has been promoted to senior vice president of WBCM Construction Services. **Jason Rogers** has been promoted to vice president of WBCM's Maryland Bridge Department.

Kansas City, Missouri-based **HNTB Corp.** announced the following appointments: **Jim Ray** joined the firm as corporate president and executive vice president. Ray previously served as senior advisor for infrastructure to U.S. Transportation Secretary Elaine Chao. He is based in Washington, D.C. HNTB also named three executive vice presidents: **John Friel**, president, Western Region, United States; **Keith Hinkebein**, president, Design Build, providing alternative delivery services nationally; and **Scott Butzen**, enterprise operations officer, overseeing the company's risk management, contracting, and business processes.

New York-based **WSP USA** announced the following appointments: **Rex Brejnik** joined the company as a senior vice president and the west regional market lead for the Transit and Rail Technical Excellence Center. **Sylvia I. Garcia** joined the company as principal consultant for the company's public finance policy business. She is based in the Chicago office. Garcia most recently served as COO and chief of staff at the Chicago Transit Authority.

Kansas City, Missouri-based **TranSystems Corp.**, announced the following appointments: **John Fortmann** has been promoted to senior vice president and principal and is based in the Schaumburg, Illinois, office. **Shawn Turner** was promoted to senior vice president and principal. **Matthew Gehman** was promoted to senior vice president and principal. He is based in

the Charleston, South Carolina, office and is a member of the ACEC-SC Board of Directors where he serves as treasurer.

Jackson, Mississippi-based **Neel-Schaffer, Inc.**, announced the promotion of three new senior vice presidents: **Derek Cheatham**, operations manager, Arlington, Fort Worth, and Dallas, Texas, offices; **Nick Ferlito**, engineer manager of the Baton Rouge, Louisiana, office; and **Steve Twedt**, South Mississippi area manager. The following have been promoted to vice president: **Russ Bryan**, landscape architect leader, Hattiesburg, Mississippi, office; **John Cunningham**; **Saunders Ramsey**, engineer manager for Starkville, Mississippi, office; **Dennis Reeves**, management operations, Pascagoula, Mississippi, office; **Lance Taylor**, Alabama operations manager, based in Birmingham office; and **Doug Wimberly**, civil engineering leader, Hattiesburg, Mississippi, office.



Jim Ray



John Friel



Keith Hinkebein



Scott Butzen



Rex Brejnik



Sylvia I. Garcia



John Fortmann



Shawn Turner



Matthew Gehman



Derek Cheatham



Nick Ferlito



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Crystal Ball Workshop Looks Into the Future



ERIKONA/GETTY IMAGES

In Fall 2019, the ACEC Geoprofessional Coalition participated in the Geoprofessional Business Association's Crystal Ball Workshop (CBW). The CBW included insights from a variety of contributors, including ACEC, GBA, ASCE, Engineering Change Lab, and ADSC. The CBW focused on the exponential rate of technology-driven change in what has been termed the Fourth Industrial

Revolution (<https://www.weforum.org/focus/fourth-industrial-revolution>). Central to this revolution are the roles of big data, machine learning, and artificial intelligence.

The CBW raised three important questions to frame our response to the Fourth Industrial Revolution:

- What are the key business and technology disruptors driving this revolution?
- How can engineering companies confront the changes that this revolution will bring, either leading or quickly adopting to the disruptions?
- What are the steps your company can take in order to lead or adapt?

Be sure to watch for future articles for further discussion on these questions. If you would like to become more involved, join the Geoprofessional Coalition at: www.acec.org/coalitions.

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TOOLS AND PUBLICATIONS THAT GEOTECHNICAL FIRMS CAN USE

Launched in 2018, ACEC's Geoprofessional Coalition (GEO) is dedicated to advancing the business interests of geoprofessionals through education, networking, and advocacy. Its new Business Practices publication library includes:

- GEO 3-1: Go/No Go Decision Template
- GEO 4-1: Health and Safety Plan Checklist
- GEO 4-2: Health and Safety Plan Checklist – Short Form

The Geoprofessional Coalition's publications focus on contracts; education; quality assurance/quality control; health and safety; risk management; and technical tools and documents. Forthcoming publications will include worksheets, templates, and practice guidelines for engineers to use in the daily running of their firms and/or projects.

All GEO-developed products are available at <https://education.acec.org/diweb/catalog>. ■

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