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NOVEMBER/DECEMBER 2010

THE AWARD-WINNING BUSINESS MAGAZINE

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Engineering Inc. promotes the advocacy and business interests of ACEC by offering news, legislative analysis and business practice information to member firms, clients, opinion leaders and policy makers.

From ACEC to You

Engineering America's New Energy Landscape

The recent ACEC survey of Member Firm CEOs ranks energy infrastructure as the decade's most-pressing engineering need *(see page 4)*.

As advances in traditional and alternative energy production create a new energy landscape, ACEC Member Firms are at the forefront of this transformation.

In traditional areas of power, such as coal, hydroelectric, nuclear power and natural gas, Member Firms are developing cleaner, more efficient ways to harvest our most abundant energy sources. Many of these same firms are also at the forefront of alternative energy, such as wind, solar, biomass and geothermal.

Alternative energy's share of the U.S. power mix is projected to nearly double by 2035. Experts say $93 billion in alternative energy infrastructure is needed to meet the demand. At the same time, major investments are needed in traditional power, such as natural gas. Merely replacing current gas pipelines to maintain existing capacity will cost approximately $19 billion; an additional $42 billion will be necessary to satisfy new demand for gas. And, of course, much higher figures are contemplated for nuclear.

The Council continues to advocate public policy actions that advance both traditional and alternative energy production. This issue of *Engineering Inc.* provides an in-depth look at the U.S. energy picture *(see page 8)*. A special Multi-Project feature highlights recent Member Firm efforts in renewable-energy production *(see page 20)*.

Gerald Stump
ACEC Chairman

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Chinese Traffic Jam Not Likely Here, But U.S. Congestion Crisis Growing

STR/AFP/GETTY IMAGES)

In analyzing the multiweek traffic jam on the busy highway connecting Inner Mongolia to Beijing, traffic engineers at the Texas Traffic Institute (TTI) asked the question: Could a 60-mile-long backup lasting several weeks happen in the United States?

Their conclusion was no, but that doesn't mean that serious congestion is not already prevalent on the overburdened U.S. highway system—and experts predict the situation is only likely to get worse.

Shawn Turner, a senior research engineer at TTI in College Station, Texas, said the traffic tie-up on the Beijing-Tiber Expressway almost defied imagination as vehicles moved forward at a rate of a half-mile per day. "What happened in China was a failure caused by a string of events—a perfect storm," he said.

Construction to handle coal-truck deliveries began on the only major road connecting Mongolia to Beijing, and then a series of accidents occurred, bringing traffic to a standstill. China's lack of a good traffic information system in its rural areas and few—if any—secondary roads exacerbated the problem.

The latter two factors differentiate the United States from China, said Turner. The U.S. nationwide traffic monitoring structure and fully developed secondary roads system go a long way toward preventing the kind of catastrophic traffic jams experienced in China.

He cautioned, however, that the combination of increasing traffic and deteriorating highway infrastructure in the United States could lead to "similar crises of lesser magnitude" in the future.

"When roads are at or near capacity, it doesn't take much to push traffic into a frozen, jammed state," he said.

The National Surface Transportation Commission reported in 2009 that between 1980 and 2006, the total number of miles traveled on U.S. highways increased by 97 percent for automobiles and by 106 percent for trucks. Over the same period, the total number of highway lane miles grew by just 4.4 percent—meaning that more than twice the traffic was and is still traveling on essentially the same roadway capacity.

Statistics also show that traffic congestion in many of the nation's metropolitan areas already is endemic, with the cost of congestion—including lost time, wasted fuel and vehicle wear and tear—topping $78 billion per year for the nation's 437 urban areas.

It is estimated that revenues raised by all levels of government for capital investment in the nation's highways and transit systems total only about one-third of the roughly $200 billion necessary each year to maintain and improve the nation's highways and transit systems.

CEOs Call Energy Infrastructure Shortfall Decade's Top Engineering Challenge

Expeditious development of renewable and traditional energy infrastructure was named the decade's most critical engineering challenge by top engineering firm leaders, according to a new survey by the American Council of Engineering Companies (ACEC).

The survey of 323 U.S. engineering CEOs, chairmen and presidents completed in August ranked the top six engineering challenges of the decade.

Remedying the nation's inadequate renewable and traditional energy infrastructure was ranked No. 1 by the largest group of respondents (30 percent), followed closely by upgrading deficient transportation infrastructure (29 percent).

Energy infrastructure topped the list, even though only 4 percent of respondents identified energy as their firm's primary area of expertise, compared with transportation (30 percent) and water/wastewater (22 percent).

Engineering executives with principal operations in the South and West gave greater priority to energy than those in the Northeast and Midwest, who ranked transportation as the most critical challenge.

Other choices included expanding the nation's inadequate water, wastewater and flood-control infrastructure (21 percent); securing U.S. social and economic infrastructure against cyberattacks (11 percent); implementing sustainable building designs to reduce environmental degradation (5 percent); and improving the national electric grid (5 percent).

"This unique survey of top engineering leaders underscores the necessity of putting energy and transportation higher on our national list of priorities," said ACEC President and CEO Dave Raymond. "The extraordinary fact is that we, as a nation, are not anywhere close to adequately addressing either of these problems."

CEO Rankings by Region of Top Two Survey Choices

	Energy Independence	Obsolete Transportation Infrastructure
Northeast	25.6%	38.6%
(ME, NH, RI, CT, VT, NY, NJ, PA, MA)		
South	34.8%	27%
(MD, DC, DE, VA, NC, SC, GA, FL, WV, KY, TN, AL, OK, TX, AR, MS, LA)		
Midwest	23.5%	30.3%
(MI, OH, IN, IL, WI, MN, IA, NE, SD, ND, MO, KS)		
West	32.1%	26.1%
(CA, NV, UT, AZ, NM, CO, HI, MT, WY, ID, WA, OR, AK)		

Source: ACEC 2010 CEO survey

BY JOE SALIMANDO

Power Demand Leads to New Opportunities for Member Firms

Even without the smart grid, the introduction of electric vehicles (EVs) and additional wind and solar power generation to the national energy infrastructure will require extensive expansion, renovations and rehabilitation of existing power networks.

Much of the nation's power future remains in question. The federal government jump-started national smart-grid investment with $4.5 billion in stimulus money to fund numerous demonstration projects. But no one knows what might comprise the "second act."

It's highly possible that as use of EVs grow, local distribution systems will require re-engineering and other significant upgrades. One commonly described scenario involving the advent of EV home chargers could mean severe strain on local power networks not properly retrofitted to handle added capacity. Subsequent network expansions should increase opportunities for engineering firms.

Power Construction: Actual Spending
(Dollars in billions)

Period	Total Construction	Nonresidential Construction	Natural Gas Power	Power as % of Nonres
Calendar 2003	$915.74	$213.88	$27.93	13%
Calendar 2004	$1,027.74	$235.11	$27.74	12%
Calendar 2008	$1,072.13	$350.08	$68.70	20%
Calendar 2009	$939.06	$252.16	$77.00	30%
Jan-July 2009	$521.99	$136.90	$43.49	32%
Jan-July 2010	$480.31	$136.90	$39.74	28%

Spending is real, not seasonally adjusted.
Source: Reports at www.census.gov/const/www/prpage.html

Power Construction: Spending Forecast
(Dollars in billions)

Year	Total Construction	Power
2010	$885.84	$94.02
2011	$921.30	$102.48
2012	$1,009.84	$112.73
2013	$1,094.82	$125.12
2014	$1,190.86	$142.64
Gain, '10 to '14	**+ 34.4%**	**+ 62.3%**

Source: FMI Corp. Q2 Construction Outlook, downloadable (16p PDF) from www.fminet.com/assets/research/Outlook_2Q10.pdf

Extra-High Voltage

Another offshoot of the projected increase in power demand is the need for long-distance extra-high voltage (EHV) transmission lines for large solar and wind power generation facilities. These would be brand-new power lines designed to transport massive amounts of electricity—estimated at 345 kV, compared with the current 35 kV or 100 kV—from optimal desert generating facilities to population centers.

The need to construct EHV power lines—an expensive proposition that is national in scope—has already been endorsed in speeches by Bush administration Energy Secretary Spencer Abraham (2001–2005) and current Energy Secretary Stephen Chu.

Workforce Issues

The anticipated increased power need is also renewing interest in electrical engineering, which had been in decline, experts say.

At the September GridWise Global Forum, Mohammad Shahidehpour, an Illinois Institute of Technology professor, said his classes are now drawing 75 or more students, compared with 10–15 students just a few years ago. A Portland State University professor also reported that his two-semester smart-grid class, originally capped at 50 students, attracted 125 enrollments—with 16 listing Ph.D.s after their names.

Wanda Reder, past president of the IEEE Power & Energy Society, noted that the electric utility industry expects to lose more than 50 percent of its power engineers in the next five years.

Opportunity In the Trillions?

Many encouraging signs are present for engineering firms regarding expansion and redevelopment of the national power grid—none, however, more encouraging than cost, which industry watchers project will reach the trillions.

Speaking at an investment conference in September, Jim O'Neil, president and COO of Quanta Services, a leading power transmission and distribution contractor, said, "We believe the outlook for the electric power market is robust. The U.S. utility industry will have to invest between $1.5 trillion and $2 trillion between 2010 and 2030 to maintain current levels of reliable energy service for customers throughout the country.

"This includes $880 billion for the nation's transmission and distribution systems and $85 billion for advanced metering infrastructure, and energy-efficient demand response programs."

On the low end, $1.5 trillion over two decades means $75 billion a year annually for 20 years!

Joe Salimando writes on construction at www.electricalcontractor.com. Reach him at ecdotcom@gmail.com.

House Passes ACEC-Backed 9/11 Liability Relief Legislation

The U.S. House of Representatives passed ACEC-endorsed legislation in September that provides liability relief for engineering firms involved in the response and cleanup of the ground zero site following the 9/11 attack on the World Trade Center.

Under the legislation, individuals who lived or worked near ground zero and accept compensation for related health problems must relinquish their right to sue. In paying any remaining claims, engineering firms' liability will be capped by the limit of their professional liability insurance policy as of Sept. 11, 2001.

ACEC is urging the Senate to act on the legislation later in the fall.

ACEC Sees Challenges, Opportunities In Republican Election Wave

The Republican takeover in the U.S. House of Representatives, together with major gains in the Senate, will create significant new opportunities—and challenges—for ACEC's legislative agenda.

A more business-friendly Congress in 2011 will curtail the resurgent labor movement that opposed contracting out and called for increased regulation. At the same time, emphasis on deficit reduction will test the Council's efforts to pass long-stalled infrastructure funding initiatives, such as a new six-year surface transportation program.

"Our success hinges on our continued ability to work with both parties in a highly charged political atmosphere," said ACEC President Dave Raymond.

Several key Democratic committee chairmen lost their seats, but ACEC has strong relationships with the anticipated new chairmen. House Transportation and Infrastructure Committee Chairman Jim Oberstar (D-Minn.) was an unexpected casualty on election night, as were House Budget Committee Chairman John Spratt (D-S.C.) and Armed Services Committee Chairman Ike Skelton (D-Mo.).

Rep. John Mica (R-Fla.) is expected to take over as chairman of the Transportation and Infrastructure Committee, while Reps. Howard "Buck" McKeon (R-Calif.) and Paul Ryan (R-Wis.) are poised to take the gavels of the Armed Services Committee and the Budget Committee, respectively.

ACEC enjoys a strong relationship with all three, as well as with the three congressmen most likely to succeed Oberstar as the senior Democrat on the Transportation Committee: Reps. Nick Rahall (D-W.V.), Peter DeFazio (D-Ore.) and Jerry Costello (D-Ill.).

In other election news, the Minuteman Fund helped two State Organizations win important infrastructure funding initiatives.

Voters in Houston approved Proposition 1, a ballot initiative that would create a dedicated fund for street and drainage improvements and implement a pay-as-you-go system rather than use municipal bonds. This measure is expected to generate $9 billion for infrastructure over the next 20 years.

"The contribution of the ACEC Minuteman Fund was pivotal in this effort," added Steve Stagner, executive director of the state organization.

ACEC/Colorado helped defeat three ballot initiatives that would have gutted the Colorado state budget.

The initiatives would have reduced vehicle fees and income taxes, eliminated other taxes, required voter approval of property tax increases and prohibited the state government from borrowing funds.

Rep. John Mica (R-Fla.), right, during a fundraiser in his honor at the 2010 Annual Convention in Washington, D.C. Also pictured are ACEC President Dave Raymond (center) and former ACEC Chairman Tim Psomas. Mica is poised to become the next chairman of the House Transportation and Infrastructure Committee.

"These ballot initiatives were unprecedented in Colorado in the extent to which they sought to reduce revenues that would directly impact on infrastructure funding," said ACEC/Colorado Executive Director Marilen Reimer. "We thank the Minuteman Fund for aiding in this critical effort to protect state infrastructure funding and the public good."

ACEC Continues to Target Repeal of New 1099 Mandate

ACEC is working with a coalition of business groups to identify ways to repeal an onerous tax-filing mandate in the health care law. Under the new law, firms will be required to file IRS Form 1099 for purchases of any goods and services valued at more than $600 annually. This mandate would take effect in 2012 and would burden engineering firms of all sizes with excessive filing obligations.

SCOTT J. FERRELL/CONGRESSIONAL QUARTERLY/GETTY IMAGES

Sen. Mike Johanns (R-Neb.) offered an amendment to repeal the onerous tax-filing mandate.

ACEC also submitted comments to the IRS highlighting numerous and serious implementation issues, from problems related to credit card purchases to concerns that such a mandate would prompt companies to consolidate purchases among fewer vendors, thereby harming small businesses.

ACEC Urges Senate to Act on Renewable Energy

ACEC is backing bipartisan legislation in the U.S. Senate to create a national Renewable Electricity Standard (RES). The Council has called on Senate leaders to act on a renewable-energy bill before the end of the year.

The bipartisan bill, introduced by Sens. Jeff Bingaman (D-N.M.) and Sam Brownback (R-Kan.), would require electric utilities to produce a percentage of their electricity from renewable sources, including wind, solar and geothermal energy.

The bill is co-sponsored by Sens. Byron Dorgan (D-N.D.), Susan Collins (R-Maine) and Tom Udall (D-N.M.).

"A vigorous RES is essential to developing the vast reserves of natural renewable energy resources that exist in the United States," said ACEC President Dave Raymond in his letter to Senate Majority Leader Harry Reid (D-Nev.) and Minority Leader Mitch McConnell (R-Ky.). "It's an important piece of a comprehensive energy strategy that is so critical to our nation's economy."

RES language was initially part of a larger energy bill passed by the Senate Energy Committee last year with broad bipartisan support, and is part of an energy and oil-spill response package yet to be considered on the Senate floor.

ISSUES ON THE MOVE	WHAT'S NEXT
Liability relief for 9/11 structural firms	Possible Senate action in November
Aviation, water and surface transportation	Possible action on aviation and water before end of the year
Expiring tax rates	House and Senate votes expected after Election Day

GOP Wins Add Momentum To Tax Rate Extension

Republican success at the ballot box is expected to put greater pressure on Congress to extend the 2001 and 2003 tax cuts when it returns for a "lame duck" session in November and December. On Jan. 1, 2011, individual income-tax rates will rise unless Congress acts. In addition, capital gains and dividends tax rates will increase and the estate tax will return.

Higher tax rates would have a significant impact on firms organized as pass-through entities, such as S corporations or partnerships that pay business income taxes at individual rates.

The point of disagreement is whether to extend all of the tax cuts or just those for individuals earning less than $200,000 and families earning less than $250,000. A compromise could entail extending the tax cuts temporarily and revisiting the issue when the economy is stronger.

In addition, Congress has yet to act on the business tax extenders, such as the R&D tax credit and brownfields expensing provision, which expired at the end of 2009. There is also interest in extending portions of the stimulus law, including the Build America Bonds program.

'Industry Victory' in Lifting Of Gulf Coast Drilling Ban

With encouragement from ACEC and other business groups, the Obama administration recently lifted the moratorium on deepwater drilling in the Gulf of Mexico.

In August, after assessing the ban's adverse impact on Member Firms along the Gulf Coast, ACEC President Dave Raymond contacted U.S. Energy Secretary Ken Salazar to urge an expedited review of the deepwater rigs in the Gulf and a "speedy end" to the moratorium.

The moratorium was imposed on May 30 following the explosion of the BP Deepwater Horizon platform on April 20.

Kam Movassaghi, president of C.H. Fenstermaker and Associates, Inc., in Lafayette, La., said, "While it will take time to mobilize offshore activity, lifting the moratorium is a huge boost to the regional economy and to firms along the Gulf Coast. This is a big victory for ACEC and our industry."

For More News

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Power Play

By Samuel Greengard

In the drive for U.S. energy independence, what's really needed? And who's going to pay?

Takeaways

>> Despite the lack of a comprehensive national energy policy, alternative power production is expected to nearly double over the next two decades.

>> Growth in domestic natural gas production—due to advances in horizontal drilling and hydraulic fracturing techniques that bring shale gas more cost-effectively to market—will result in a decline in U.S. imports of natural gas from 13 percent in 2008 to just 6 percent by 2035.

>> To achieve an enhanced level of energy independence, the federal government must develop a coherent energy plan—one capable of spanning presidents and political cycles.

Tessman Road Landfill on the outskirts of San Antonio would seem an unlikely place to behold the future of renewable energy generation. But the private municipal solid-waste facility, which serves hundreds of thousands of residents and local businesses, employs high-strength geomembrane materials and flexible photovoltaic panels to produce electricity and has emerged as the world's first renewable-energy solar park built on top of a landfill.

The project, which went live in March 2009, generates 130,000 watts of solar energy—enough to power 5,500 homes—and is capable of eliminating as much as 1,700 metric tons of atmospheric carbon dioxide a year. "It's helping turn a brownfield site green and contribute to the nation's energy needs," says Mark Roberts, vice president of HDR Engineering, Inc., in Alexandria, Va., the firm that designed

C.J. BURTON

and installed the project's award-winning geomembrane system.

Roberts notes that the project represents one of the few known certainties facing the United States as it moves toward an optimistic but uncertain energy future. "As we move forward, we need to become smarter about harnessing energy," he says.

From coast to coast, the movement toward more efficient energy usage is catching on. Despite the absence of a comprehensive national energy policy, renewable energy production is expected to nearly double over the next decades—to 17 percent of the U.S. electricity market by 2035, compared with 9.1 percent today—according to the U.S. Department of Energy's (DOE's) 2010 Annual Energy Outlook.

U.S. utilities are investing in wind, solar, biomass, geothermal and other power facilities, while private investors are stepping up with necessary funding to build much-needed infrastructure—including transmission lines—that will carry power across states and regions. The National Renewable Energy Laboratory estimates the additional infrastructure necessary to meet the growing demand for renewable energy sources will require an investment exceeding $93 billion.

Significant advancements have also been made among more conventional power sources, including hydroelectric, nuclear power, natural gas and coal, which will remain critical to the nation's future energy picture.

"Meeting the nation's future energy needs and progressing toward energy independence requires a balanced energy portfolio—one that includes increased power generation from clean, renewable sources, combined with more efficient use of traditional sources already at our disposal," says Ralph Christie, vice chair of ACEC's Energy Subcommittee and chairman of Merrick & Company, an Aurora, Colo.-based engineering firm specializing in energy projects.

To achieve an enhanced and balanced level of energy production, the federal government must first develop a coherent energy plan—one capable of spanning presidents and political cycles, says Barry Worthington, executive director of the United States Energy Association (USEA). "The United States doesn't compare well to many other countries when it comes to a clear policy," Worthington says. "Funding further improvements, including the estimated $93 billion to build new renewable distribution systems and transmission lines, is a necessity. And that means getting Congress on board."

Time for Change

Experts say the nation's energy landscape—Americans account for less than 5 percent of the world's population, but consume 26 percent of its energy—is proof that the current system is unsustainable. In addition, U.S. dependency on foreign energy sources such as oil makes the country more vulnerable to economic upheaval in the event of war or political strife.

New, stricter environmental laws and growing public sentiment for cleaner use of fossil fuels is forcing utilities and businesses to adapt.

"Meeting the nation's future energy needs and progressing toward energy independence requires a balanced energy portfolio—one that includes increased power generation from clean renewable sources, combined with more efficient use of traditional sources already at our disposal."

RALPH CHRISTIE
MERRICK & COMPANY

Coal, Nuclear, Natural Gas

Though renewable energy holds promise for the future of U.S. power generation, traditional power sources will continue to be vital to the nation's energy mix for the foreseeable future.

Coal, for example, is the least expensive and most abundant domestic energy resource, with supplies for the next two centuries. More than half of the electricity generated in the United States currently comes from coal. But coal is not without its problems—mainly that, when burned, it's a source of harmful carbon-dioxide emissions.

Proponents of the resource say that soon could change. Rapid advancements in clean-coal technologies—from carbon capture techniques to sequestration processes, whereby harmful $C0_2$ gas is captured and piped below the Earth's surface for permanent storage—are making coal more attractive.

More than 30 new coal-fired power plants have been built since 2008 or are under construction. A new 682-megawatt coal-fired power plant in Omaha, Neb., features state-of-the-art emission control systems and is one the most efficient coal-fired plants in the world.

The U.S. nuclear power industry also is gearing up for higher projected demand. After nearly three decades of stagnant construction, more than two-dozen utilities have submitted plans to build new or expand existing nuclear reactors. These plants—projected to cost between $8 billion and $16 billion each—would complement the 104 U.S. reactors already in operation, providing up to 20 percent of the nation's electric power and nearly three-fourths of all carbon-dioxide-free electricity in the United States.

"The nation's future energy picture has to include nuclear," says Merrick & Company's Christie. "The current administration has embraced reviewing licenses, which is a start to a long process of expanding nuclear capacity. It will be engineers who must develop new technology to make nuclear plant construction more cost-effective, such as the concept of smaller reactors."

Experts say natural gas might represent the most "potential" of any domestic traditional energy source. "Natural gas is the best energy story of 2010," says USEA's Worthington. "Shale gas development is truly phenomenal."

U.S. DOE projections indicate that higher domestic production of natural gas—primarily advances in horizontal drilling and hydraulic fracturing techniques in cost-effectively bringing shale gas to market—will result in a decline in U.S. imports of natural gas from 13 percent of total supply in 2008 to just 6 percent by 2035.

"We have gone from a 30-year to a 100-year supply of domestic natural gas," adds Worthington. "There is a dire need, however, for more pipeline construction."

Nearly a quarter of the nation's gas pipelines are now more than 50 years old, according to the Interstate Natural Gas Association of America. Approximately $19 billion of investment is needed for replacement of current pipe to maintain existing capacity, while nearly $42 billion is needed for new pipeline and storage projects to meet anticipated future demand.

Renewable Energy

Although alternative or renewable energy sources promise to be a big part of the nation's future energy consumption, industry watchers say much is needed to reap the benefits of these emerging power options.

The modular nature of wind farms and solar installations, for example, along with the challenges associated with routing power lines to connect these facilities, frequently leads to long project completion times and high, sometimes unsustainable costs. "In some cases, there's no guarantee that a transmission system will be available for a project," says John Olander, associate vice president at Burns & McDonnell, a Kansas City, Mo.-based engineering firm.

Though renewable fuel is essentially free, the cost of building a facility typically exceeds the expense of traditional power generation. Technical challenges exist as well. "Wind and solar projects do not provide consistent levels of generation. When these sources are not fully available to support the load, load-sharing or traditional generation backup must be used," explains Olander. Large-scale battery systems, which could help alleviate these problems, are still in the early stages of testing and development.

"Tremendous opportunities exist for engineering firms. Despite a downturn in the economy, the development of alternative energy sources will likely continue unabated for the next 10 to 15 years."

JACK HAND
POWER ENGINEERS

Power Forward

Despite these challenges, demand for alternative energy is on the rise—particularly as venture capitalists continue to fund high-tech systems development. Solar, wind, hydroelectric, biomass, geothermal and hydrogen fuel cells have emerged as options.

A prime example is Portland General Electric (PGE), which supplies power to more than 822,000 customers in Oregon. The U.S. DOE rates it the No. 1 utility in the country for customer participation in a renewable power program. PGE operates a total of 217 wind turbines, which generate a maximum of 450 megawatts (MWs) of power. The utility expects to generate 9 percent of its energy mix through renewable sources by the end of 2010 and 15 percent by 2015. The goal, says PGE CEO Jim Piro, is to balance "environmental impact, cost and reliability."

Beyond the Meter

Much of the renewable-energy industry's progress can be attributed to private firms developing wind, solar and geothermal farms as well as transmission lines—sometimes on their own and sometimes as part of a partnership with utilities. TransWest Express Transmission Project, for example, calls for the construction of a $3 billion, 3,000 MW, 600 kilovolt HVDC transmission line from Wyoming to Las Vegas. The line would carry renewable energy produced in Wyoming, including wind and solar, to the Southwest. The private company began development in 2005 and hopes to commence construction in 2013.

Several other projects are in the works. In New Mexico, Tres Amigas Super Station would provide a transmission hub with an eventual 30-gigawatt capacity that would carry solar and wind energy to Arizona and California. The first phase of the project will cost an estimated $600 million. Financing for the development phase was provided through a combination of private investors and strategic partners, including American Superconductor (AMSC), which acquired a minority equity interest in Tres Amigas for $1.75 million in cash and AMSC stock.

"Government-funded grants and tax credits—many created by the Energy Policy Act of 2005—are also spurring innovation, development and adoption," says Paul Boyce, vice president of engineering for P.W. Grosser Consulting, Inc., a Bohemia, N.Y.-based firm specializing in environmental services. Unfortunately, many of these tax credits and incentives are scheduled to expire in 2012. Without them—and with today's sagging economy—experts say many renewable energy projects are in danger of being put on hold—and, in some cases, abandoned.

Getting Involved

For engineering firms looking to tap into the energy boom, ramping up knowledge is essential. "Tremendous opportunities exist for engineering firms," says Jack Hand, CEO of Power Engineers, a Hailey, Idaho-based firm that specializes in alternative energy. He believes that, "Despite a downturn in the economy, the development of alternative energy sources will likely continue unabated for the next 10 to 15 years."

Many utilities view energy projects as one-off propositions and need outside expertise. As an example, over the next decade, Hand also expects a heavy emphasis on building out a national smart grid. "Today, the power flows where the load is. We need to interconnect the existing U.S. grids and make lines bidirectional," he says. "This will allow us to move power more efficiently."

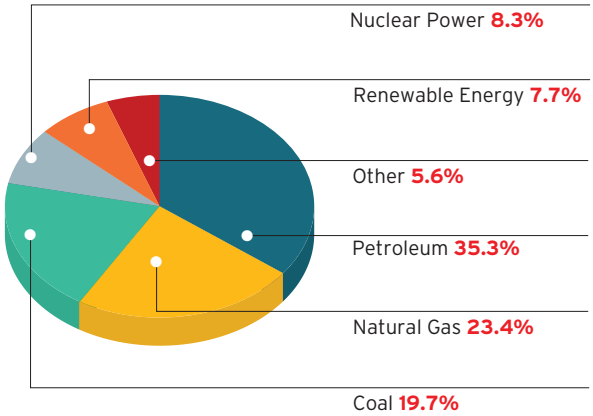
Christie says all stakeholders, including firms, utilities and policymakers, must do a better job of coordinating development and infrastructure across sectors and agencies. "Right now, the environment is extremely entrepreneurial and energy production isn't necessarily matched with demand. There must be a focus on building out systems and infrastructure to support these technologies."

One of the biggest challenges is how to negotiate a complex web of approval and permitting processes. "The process is slow and it creates delays," says Hand. "Many of the projects currently proposed are six to 12 months behind schedule. Engineering and construction firms are sitting around waiting for work to commence."

Bureaucratic morass aside, it's clear the country's energy landscape is evolving—and engineering firms and other stakeholders looking to take advantage must be prepared to adjust. "It takes a strong commitment to move these projects forward in our current political, regulatory and economic environment—especially when projects involve multiple states or regions," says Burns & McDonnell's Olander. "But, as we usually do in this country, we'll find a way to get things done." ■

Samuel Greengard is a business and technology writer based in West Linn, Ore.

U.S. Energy Sources (2009)



Source: U.S. Energy Information Administration (http://www.eia.doe.gov/aer/pecss_diagram.html)

Renewable Energy At a Glance

Biomass: Accounts for approximately 15 percent of the world energy supply. Used primarily for heating and electricity. Examples: wood, ethanol, biodiesel, methane.

Wind: Makes up about 2 percent of worldwide power. It's among the fastest-growing renewable segments, though it's not suitable for many areas. It also creates infrastructure challenges because it requires transmission lines to remote areas and is non-dispatchable–meaning that the power must be tapped when it is available or it is lost.

Geothermal: This power-generation technology is limited to areas where natural geothermal activity exists. However, it is used in two-dozen countries, including the United States (which has 77 existing power plants).

Hydroelectric: About 20 percent of the world's power supply comes from hydroelectricity, and it accounts for 88 percent of the electricity extracted from renewable sources. There is no direct waste, and CO_2 output is extremely low.

Hydrogen and Fuel Cells: A fuel cell converts a source fuel, such as hydrogen, into electrical current. Although this technology shows tremendous promise (it has no moving parts and produces zero emissions), it is currently used on a limited basis, mostly because of high manufacturing costs.

Hundreds of attendees listen to MSNBC's Joe Scarborough during the Fall Conference Keynote Luncheon.

Fall Conference Delivers 'On Target, Timely' Business Advice

From the CEO and CIO Roundtables to more than two dozen educational sessions, ACEC's 2010 Fall Conference in Puerto Rico hit hard on the business issues that affect Member Firms' bottom lines.

"The programs and speakers were informative; the sessions were on target—timely for the industry," said Ted J. Aadland, president, AGC of America. "Our two organizations are closely aligned," he added.

Keith Lee Hobson, a first-time attendee from FOX Engineering Associates, Inc., in Ames, Iowa, said, "The sessions have been a confirmation of things we're doing at the firm, and others have presented new ideas that we can take back to the firm."

"I always get a lot of pertinent information when I come to the Fall Conference," stated Robert Morcom, president of TSP in Rapid City, S.D. "It's an opportunity to get up-to-date with companies across the country and to learn about the issues that are affecting our industry."

ACEC Chairman Jerry Stump welcomes attendees. (below) Kenny Smith, president and CEO of T. Baker Smith in Louisiana, greets MSNBC's Joe Scarborough. Smith, a member of the ACEC/PAC Capitol Club, was recognized at the Conference for creating a unique offshore boom system that captured oil along the Gulf coast.

MSNBC's Joe Scarborough Praises ACEC on Infrastructure Efforts

Joe Scarborough, host of MSNBC's *Morning Joe*, told Fall Conference attendees that infrastructure funding may be one of the few areas that the political parties will agree on in the next Congress.

"ACEC has done a great job in promoting the need for rebuilding America's infrastructure," said Scarborough. "There is no debate now that our infrastructure is crumbling."

Scarborough, who served in Congress from 1994 to 2000, predicted big gains for Republicans in the midterm elections, which he said "will change how Washington operates."

He decried the partisanship that has paralyzed Capitol Hill in recent years. "We have to realize that we're in the boat together," he said. "We have to wake up as a country. Our leaders have got to wake up.

"While we're shouting at each other about social issues, our competitors are figuring out how to beat us."

If the two parties can't come together, Scarborough said, voters may make a third choice for president. "I think an independent could very well be elected, and sooner than you think," he said.

Other Conference Highlights:

- **King Gee**, associate administrator of the Federal Highway Administration, briefed attendees on FAR compliance.
- **The ACEC Board of Directors** approved amendments to the Strategic Plan that extend the deadlines for ACEC/PAC and national membership targets to 2015, in consideration of the economic downturn.
- **ACEC/PAC** fundraising events generated more than $100,000 and provided a critical boost to the Council's political program prior to Election Day.
- **G. Tracy Mehan**, a water policy expert, citing a long-term funding gap of "half a trillion dollars," said Congress must soon act on water infrastructure legislation.
- **Barry Worthington**, executive director of the prestigious U.S. Energy Association, said Congress needs to focus on energy legislation that emphasizes incentives for nuclear, renewable energy and traditional sources.
- **Geoffrey Yarema**, a member of the National Surface Transportation Infrastructure Financing Commission, warned attendees that the nation faces "the most serious transportation funding crisis in our lifetime."
- **Daniel Altschuler**, former director of Puerto Rico's National Astronomy and Ionosphere Center's Arecibo Observatory, discussed possibilities of extraterrestrial life in the universe.

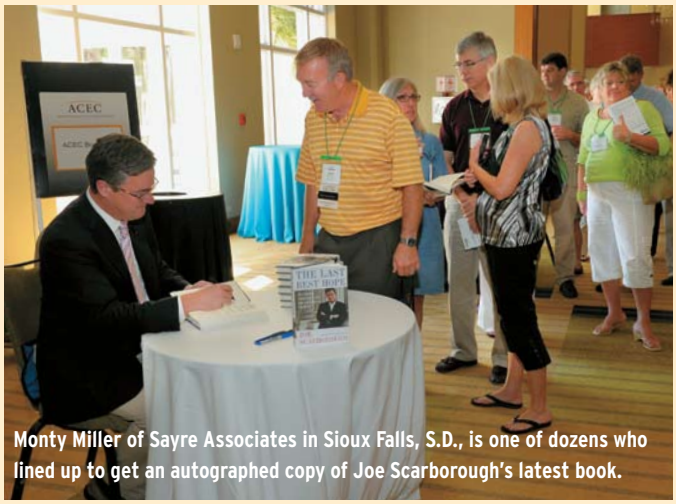
ACEC/PAC Scores Big in Puerto Rico

Fall Conference fund-raising events brought in more than $100,000 for ACEC/PAC, providing a critical boost to the Council's political program.

The events included two sold-out sweepstakes drawings, an evening cruise and the ACEC/PAC Golf Tournament.

Abe Swidan of Janssen & Spaans Engineering in Indiana won the ACEC/PAC sweepstakes drawing's $10,000 grand prize; Terry Helms of Helms & Associates in South Dakota won the $5,000 second prize; Tom Collins of Collins Engineers in Illinois took the $2,000 third prize; and Joan Delorey of Ames & Gough in Massachusetts won the $1,000 fourth prize. ACEC/Arizona Executive Director Janice Burnett won a special drawing for an Apple iPad.

Thomas Pulse (second from left) of Ayres Associates in Eau Claire, Wis., and his wife, Geri, greet Sia Kusha of HNTB Corp., Tampa, Fla., and his wife, Judi.



Monty Miller of Sayre Associates in Sioux Falls, S.D., is one of dozens who lined up to get an autographed copy of Joe Scarborough's latest book.

Marsha Bomar, president of Street Smarts, Inc., in Duluth, Ga., dances with a stilt performer at Local Color Night.

Attendees enjoy a grand fireworks display following Local Color Night festivities.

At the CIO Roundtable (from left to right): Jim Walsh, chief technology officer, AECOM; Tom Lynch, vice president, URS; Brad Vaughan, CIO, Black & Veatch; and Chris Pinckney, CIO of Psomas.

ACEC President Dave Raymond introduces energy expert Barry Worthington (center) and water expert G. Tracy Mehan III.

Geordie Aitken of the Aitken Leadership Group addresses the Senior Executives Institute workshop.

ACEC Thanks the 2010 Fall Conference Sponsors

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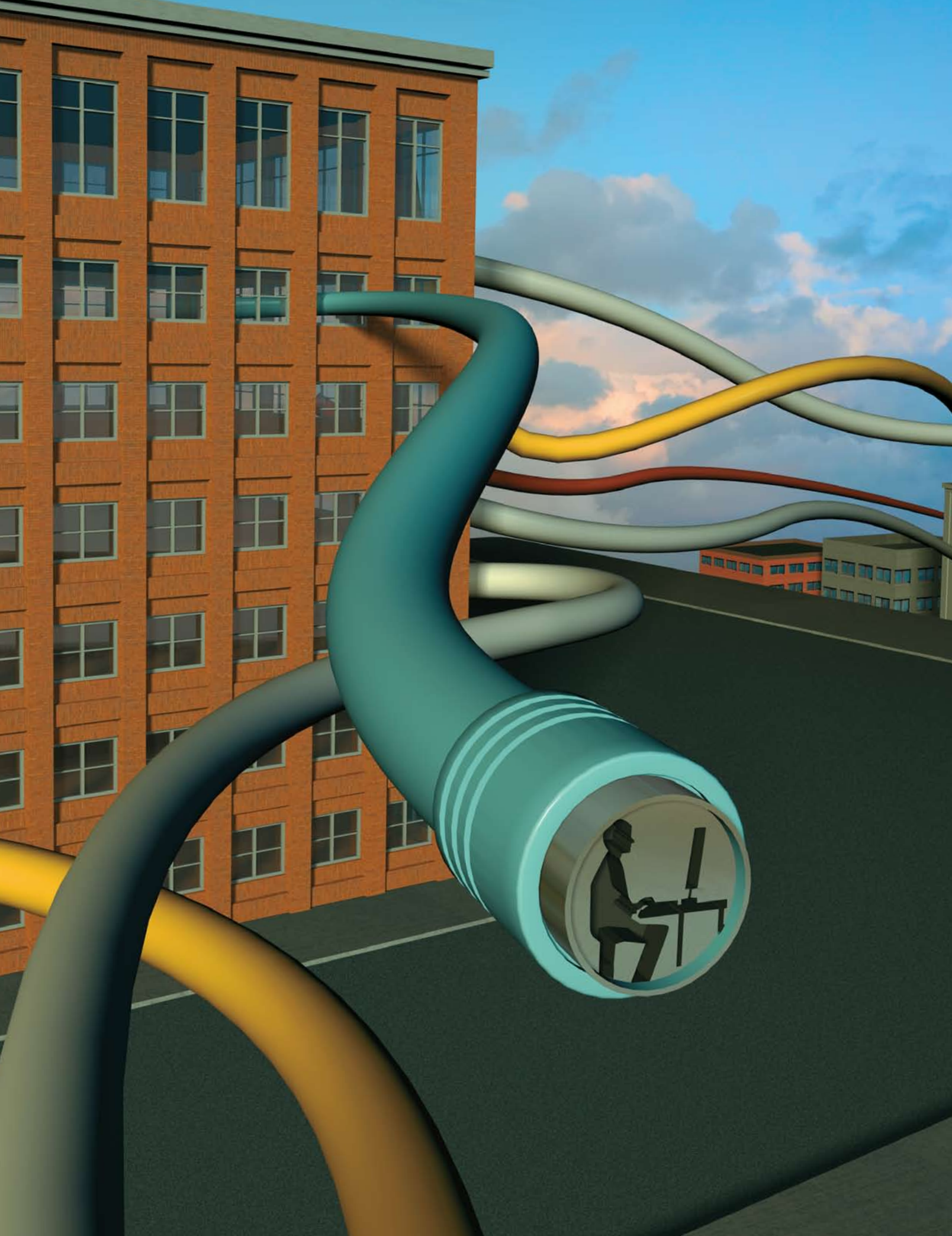
2010 College of Fellows Inductees

Fifteen newly elected ACEC Fellows were honored at the Fall Conference:

- **Reginald Benton**
  Benton & Associates, Inc.
- **Ronald Billstein**
  DOWL HKM
- **Frazier Christy**
  Hatch Mott MacDonald
- **Lowell Christy**
  Christy/Cobb, Inc.
- **Kimberlee DeBosier**
  Bayside Engineering, Inc.
- **Peter Mesha**
  Wight & Company
- **Rosalie Morgan**
  EMCS, Inc.
- **James Pappas**
  Stantec Consulting Services, Inc.
- **Bennett Reischauer**
  Stanley Consultants, Inc.
- **Jane Rozga**
  CH2M HILL
- **Peter Strub**
  TranSystems
- **Kenneth Wightman**
  David Evans and Associates, Inc.
- **Doris Willmer**
  Willmer Engineering Inc.
- **Roger Helgoth**
  Michael & Associates, Inc.
- **Michael McMeekin**
  Lamp, Rynearson & Associates, Inc.

- Lennox Nishimura, president of ECS, Inc., in Honolulu, received the 2010 ACEC Chairman Emeritus Award for years of exemplary service to the Council.
- ACEC Community Service Awards were presented to **Michael Sutton**, president and CEO of Infrastructure Engineering, Inc., Chicago; **Marco Avila**, senior supervising engineer at Parsons Brinckerhoff, Baltimore; and **Marsha Bomar**, president of Street Smarts, Inc., Duluth, Ga.



By Stacy Collett

Ins & Outs

Small and medium-size firms contract out for expertise and cost control. But experts say the practice isn't right for everyone.

Takeaways

- The practice of contracting out noncritical business functions has grown in popularity among small and mid-size firms. According to the *2010 ACEC Industry Trends Survey* of Member Firms, 38 percent outsource payroll services, 32 percent outsource information technology and 16 percent outsource accounting services.
- Proponents of contracting out say it incorporates valuable third-party perspectives and enables existing staff to focus on projects that grow the business.
- Beginning in 2011, as part of reports on most commonly outsourced business services, *Engineering Inc.* will include a special state-by-state compilation of vendors, which provide those services and have been endorsed by Member Firms.

When Karen Friese launched her engineering firm in 2003, she needed back-office expertise—and fast. The decision then to contract out specialized functions fit her needs.

"In the beginning, we outsourced just about everything that required administrative expertise," including accounting, payroll processing and information technology, says Friese, president of K Friese and Associates, Inc., in Austin, Texas.

Slowly over seven years, Friese brought in full-time employees with back-office experience to fill the void, even though such tasks are not part of their official job description. "For example, if we hired a new technician and he had some IT experience, he or she would also take over

RANDY LYHUS

some of those IT duties," she explains. The expectation of a shared workload is typical, especially at smaller firms.

Today, with 15 employees and a positive economic outlook, the firm continues to pull more back-office expertise in-house while still outsourcing other functions.

Friese credits outsourcing with providing the firm with affordable expertise, particularly in its startup days. "It definitely costs less than a full-time employee," she says of the practice. "As we grow, when that cost grows to match what we could pay someone full-time, then we will move that function in-house. Right now, though, it's just one of the necessary costs of doing business."

"We like the third-party review of monthly profit/loss statements for security reasons; it is nice to have that outside review of monthly operations. It's too easy to be too close to the day-to-day operation and miss some larger issue."

GREGG S. TEN EYCK

LEONARD RICE ENGINEERS, INC.

Indeed, the practice of outsourcing, commonly referred to as contracting out, noncritical business functions has grown in popularity among small and mid-size firms. According to the *2010 ACEC Industry Trends Survey* of Member Firms, 38 percent outsource payroll services, 32 percent outsource information technology (IT) and 16 percent outsource accounting services.

Though firms can save money by hiring outside contractors and eliminating the cost of a full-time employee's (FTE's) vacation pay and health care, proponents say the benefits of outsourcing often go beyond traditional cost savings. Outsourcing incorporates valuable third-party perspectives and enables existing staff to focus on projects that grow the business. "For the same cost base, a 20-person firm can dedicate one more FTE to doing project work and serving clients, as opposed to that one person sitting in the backroom doing payroll," says Scott Braley, partner at Braley Consulting and Training in Atlanta.

Leaders at firms that don't outsource say keeping functions in-house and cross-training existing employees ensures everyone stays busy and reduces the potential for staff layoffs.

Experts and outsourcing veterans agree that small firm owners should take a close look at a firm's objectives, critical infrastructure, budgets and in-house expertise before deciding to outsource.

Who Should Outsource?

Firms with fewer than 25 employees are the best candidates for outsourcing functions such as bookkeeping, insurance and information technology maintenance. "If you have got fewer than 20 people, you ought not to have a dedicated in-house person for any one of those functions," Braley says.

At 25 to 30 employees, Braley suggests, it's time to start thinking about part-time employees for specific jobs. "You should have someone who does not only accounting but bookkeeping, payables, HR issues, reception and office management," he says. But Braley cautions that keeping outside contractors for these functions as the company grows into a mid-size or large firm can reach a point of diminishing returns, and eventually might deprive the company of valuable mentoring and leadership opportunities. "When you outsource, you're losing the ability for someone in your firm to help the function grow and to mentor younger employees. You can outsource the back-room stuff, but maintain the strategy and leadership component to continue growth in your firm," he says.

Leonard Rice Engineers, Inc., a Denver-based firm with 53 employees, outsourced many functions and double-tasked employees when the firm was in its fledgling stages. But at 40 employees, it was time to hire a full-time network manager and a human resources (HR) manager.

"Our best move was to hire an HR professional when we got to 40 people," says Chairman Gregg S. Ten Eyck. "We should have done that when we were 25 or 30 people. It makes such a difference to have a professional that knows, understands and is passionate about HR matters, which in turn frees up our principals to work with clients and staff on project matters. The consistency of our policy message has improved, too."

What Should Be Outsourced?

Firms typically outsource functions that are not critical to business strategy, but amid a troubled economy and a rapidly changing industry, determining what functions should be deemed "noncritical" is difficult.

Braley says business leaders should consider asking this question: "What business are we in?" "The perennial answer is: not in the accounting or payroll business," he says. "So those tasks can most easily be outsourced."

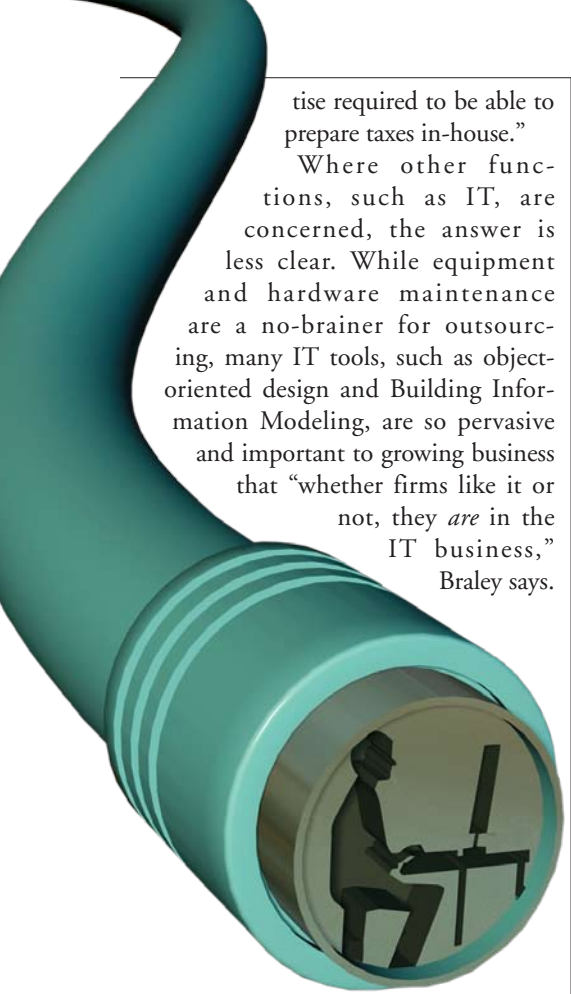
Outside experts can also help on the financial side, providing a fresh pair of eyes on billings and statements for firms of any size, as well as expertise in frequently changing state and federal tax regulations.

"Don't just hand everything over. Really check your references, and make sure you choose someone that you think is really good. And check up on them."

KAREN FRIESE

K FRIESE AND ASSOCIATES, INC.

"We like the third-party review of monthly profit/loss statements for security reasons; it is nice to have that outside review of monthly operations," Ten Eyck says. "It's too easy to be too close to the day-to-day operation and miss some larger issue. We use our accountant about four hours a month for those services." Also, "state and federal tax regulations are always changing, and we can't imagine what it would be like to try to develop the exper-



tise required to be able to prepare taxes in-house."

Where other functions, such as IT, are concerned, the answer is less clear. While equipment and hardware maintenance are a no-brainer for outsourcing, many IT tools, such as object-oriented design and Building Information Modeling, are so pervasive and important to growing business that "whether firms like it or not, they *are* in the IT business," Braley says.

Some firms go on to develop their own proprietary software, then patent it and make money off royalties, he says. "That's an emerging thought for business owners."

Over the years, environmental and water engineering firm McKim and Creed has increased its in-house IT staff to handle upgrades, maintenance and help-desk functions. But some specialized IT projects remain outsourced. When the firm adds customized features to its project management software, for instance, it typically outsources that project to a software specialist. "We've also outsourced website design, and we have offsite data hosting," says Phyliss Elikai, chief people officer at the Wilmington, N.C.-based firm. "It's not cost-effective for us to have someone sitting around with that expertise on staff all the time, so we just get it as we need it."

At K Friese and Associates, an IT contractor maintains the firm's systems when needed. "They handle the more infrequent, larger issues, such as software and server upgrades, connectivity, significant maintenance and repair issues, while in-house staff performs routine connectivity maintenance, hardware purchases and basic fixes, or about 70 percent of routine IT work," Friese says. "With bookkeeping and accounting functions, over time, we have successfully brought about 60 percent of the effort in-house."

Firms with specialized needs are beginning to hire FTEs who not only understand critical or specialty software, but also know how to perform upgrades, repair IT problems and keep projects moving without having to wait for an IT specialist to fix problems.

Firms that find an IT expert who understands the software, software programming, writing code and communicating its functions to engineers and clients should make every effort to hire and keep him or her, Braley says. "The economy has driven most wizards out of the practice and into the hands of the vendors." His advice: Hold on to those in-house people with specialized IT skills and be willing to pay them a bit more instead of outsourcing to save money.

Finding a Contractor

Most firms find outsourcing contractors by networking with other firm owners and asking people with experience.

Beginning in 2011, as part of reports on most commonly outsourced business services, *Engineering Inc.* will include a special state-by-state compilation of vendors that provide those services and have been endorsed by Member Firms.

ACEC's HR Forum also features an e-mail listserv where participants can offer advice and feedback on outsourcing firms they have used. The resource provides "good word-of-mouth experiences about service firms," Elikai says. Getting engaged and being active in other engineering and HR organizations is also helpful. And help doesn't have to come from within engineering-only circles. Going outside the industry sometimes yields fresh perspectives.

Once a firm settles on a contractor, experts say, leadership must communicate with that person clearly and often. Make sure the outside contractor knows exactly what the firm expects of him or her. Then give the contractor room to do the job. Friese describes this practice as "trust, but verify."

Elikai advises that firms know all the costs up front, especially when outsourcing 401(k) benefits. "You don't always see what the hidden fees are, or your employees don't get serviced well—so you constantly have to deal with problem issues. I think that's also very true in outsourcing health benefits administration. If you don't have a good firm that you can rely on for advice and expertise, you're almost shooting yourself in the foot, because you constantly have to intervene. It almost feels like just doing it ourselves would be easier."

No firm should become so comfortable with the outsourcing arrangement that it loses control of what the contractor is doing, especially when they are handling core accounting functions. "Don't just hand everything over," says Friese. "Really check your references, and make sure you choose someone that you think is really good. And check up on them." ■

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

When Firms Choose NOT to Contract Out

Not every firm chooses to outsource noncritical business tasks. At Wyoming-based Engineering Associates, which has about 28 employees across three offices, staff members are cross-trained in back-office, IT and other critical business functions.

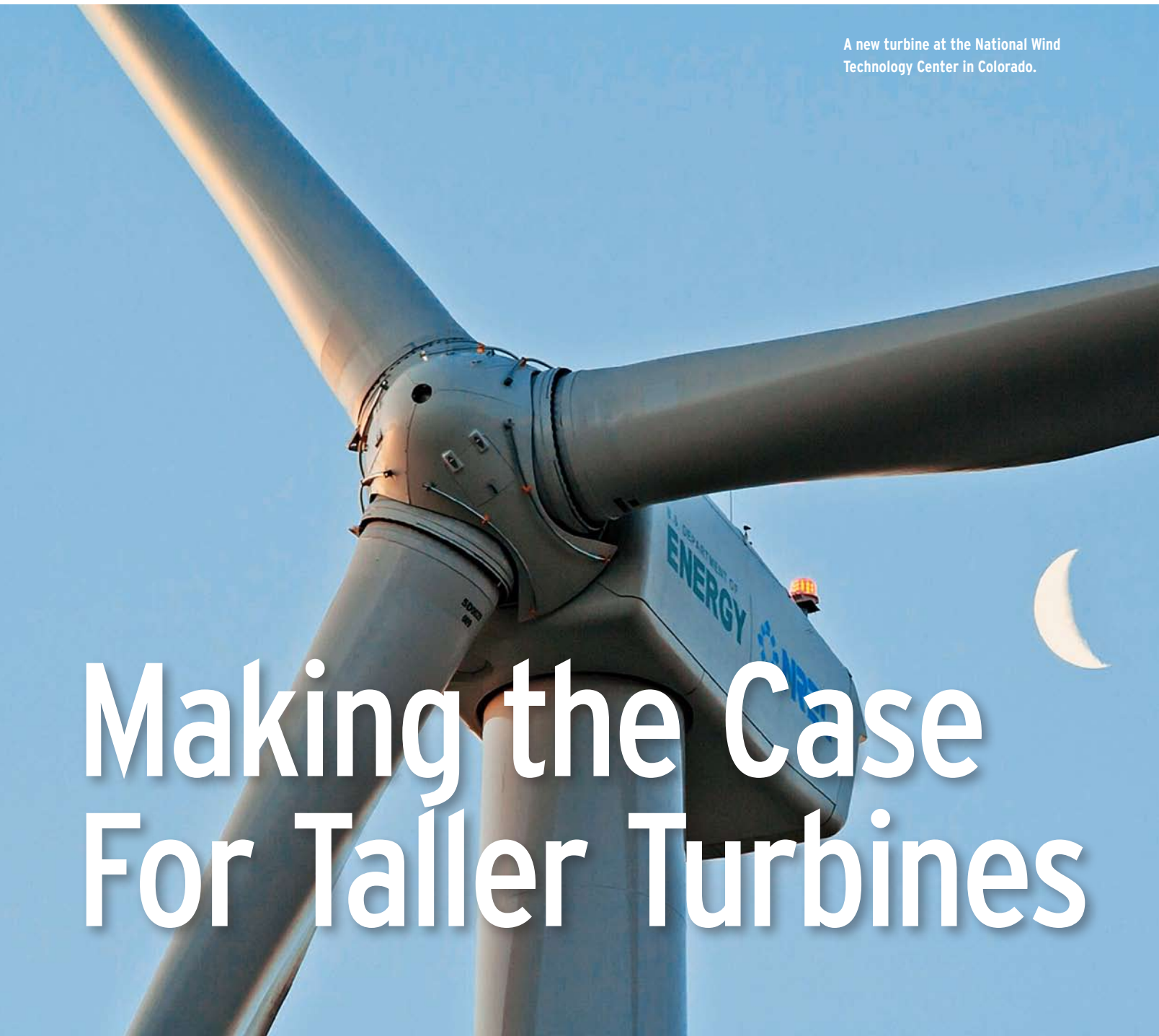
The firm had considered outsourcing some back-office tasks, but decided to keep those functions in-house. "We've always felt that having everything happening under one roof gives us a much higher comfort level than sending something across the Internet to some other world," says President Rob Overfield.

"We have a staff member—he's kind of assistant bookkeeper—who does a good job with payroll and payroll taxes, and paperwork like that. The rest of the week he's doing other jobs, whether it's materials testing or helping a survey crew."

Other staff members are cross-trained in drafting and materials testing, as well as surveying and project inspection. "We've been able to keep our people busy that way, and not found ourselves shorthanded or overstaffed," says Overfield. Proof positive that different solutions work for different firms.

Re-Ene

Member Firm innovation fuels advancement in



A new turbine at the National Wind Technology Center in Colorado.

Making the Case For Taller Turbines

By Darlene Bremer

rgized

renewable-energy projects

PROJECT:
National Wind Technology Center Row 4 Turbines Infrastructure, Jefferson County, Colo.

FIRM:
The RMH Group, Inc., Lakewood, Colo.

As alternative energy sources vie for position in the nation's power mix, the National Wind Technology Center (NWTC) in Colorado is committed to ensuring that wind-power generation remains an important part of the conversation.

To speed its adoption and make wind power more commercially attractive, proponents of the technology say they first need to improve the efficiencies of existing wind turbines to generate more robust, consistent power outputs.

Generating more power and studying the underlying challenges of operational downtime was the goal last year when NWTC decided to add two new large wind turbines to its existing test site in Golden, Colo.: one 1.5 megawatt (MW) turbine and one 2.3 MW turbine, with rotors stretching 253 feet and 335 feet in diameter, respectively. To design the power feeders for these additional turbines, the laboratory turned to The RMH Group, based in nearby Lakewood. The firm's responsibilities included increasing the capacity of an existing power feeder on-site and adding a new power feeder with reserve capacity for a potential third turbine.

"In addition to the power feeders, we also designed the data sheds and communications infrastructure that allow the scientists to access the data and control the towers and turbines," says Dan Sandblom, project electrical engineer for RMH.

Initial design work began in January 2009 and was completed that March. The company also served as the project's construction administrator.

Engineers were tasked with delivering a design that would connect the turbines to the existing electrical utility grid responsible for providing power to the Denver metropolitan area.

"The two turbines have a combined generation capacity of about 500 MW hours per month, which is enough to power about 830 homes during the windy season," says Sandblom. RMH represented NWTC at meetings with the utility to verify its electrical requirements and to develop a program that would coordinate the utility's power protection relays with the breakers at the turbines. "This way, the new turbines were isolated during power failure, and the grid was protected from the turbines' increased load," explains Bill Green, president of RMH.

Higher towers and larger rotors enable the new turbines to tap into more robust wind patterns at higher elevations. "The project was considered so successful," says Green, "that NREL is now considering the installation of even larger turbines using the RMH-designed infrastructure."

Bill Green

Dan Sandblom

Electricity With an Environmental Conscience

PROJECT:
Holtwood Expansion Project, Holtwood, Pa.

FIRM:
Kleinschmidt Associates, Pittsfield, Maine

Located in Holtwood, Pa., on the Susquehanna River, PPL Holtwood LLC's 100-year-old hydroelectric station has a generating capacity of 108 megawatts (MW). As demand for hydroelectric power has grown, PPL has set about the difficult task of increasing the output of its century-old generator.

Planning for the project began in 2004 when PPL tapped engineers in Kleinschmidt Associates' Pittsfield, Maine, office to perform feasibility studies for an expansion that would increase the plant's generating capacity by 25 MW, roughly enough renewable energy to power an additional 100,000 homes.

Construction on the project, which benefitted from investment tax credits as part of the American Recovery and Reinvestment Act, began in 2009 and is scheduled for completion in the first quarter of 2013.

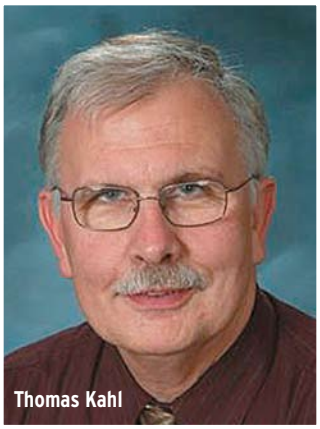
Before construction began, Kleinschmidt worked with the utility in 2004 and 2005 to determine the best approach for the project. Upon receiving the contract award, Kleinschmidt became responsible for designing all of the features of the expansion, including replacement of an upstream skimmer wall, replacement of existing spillway inflatable dam sections with pneumatic actuated steel gates, construction of a tunnel to extend a draft tube, numerous environmental remediations and enhancements, and the excavation of more than 1.5 million cubic yards of rock from the tailrace, forebay and adjacent areas.

"The goal is to expand the hydroelectric generating plant and more than double its existing capacity, as well as to help American shad and other migratory fish adapt to changed water patterns in their annual migration from the Atlantic Ocean and Chesapeake Bay to the Susquehanna and its tributaries," says Thomas Kahl, Kleinschmidt's vice president of hydro engineering.

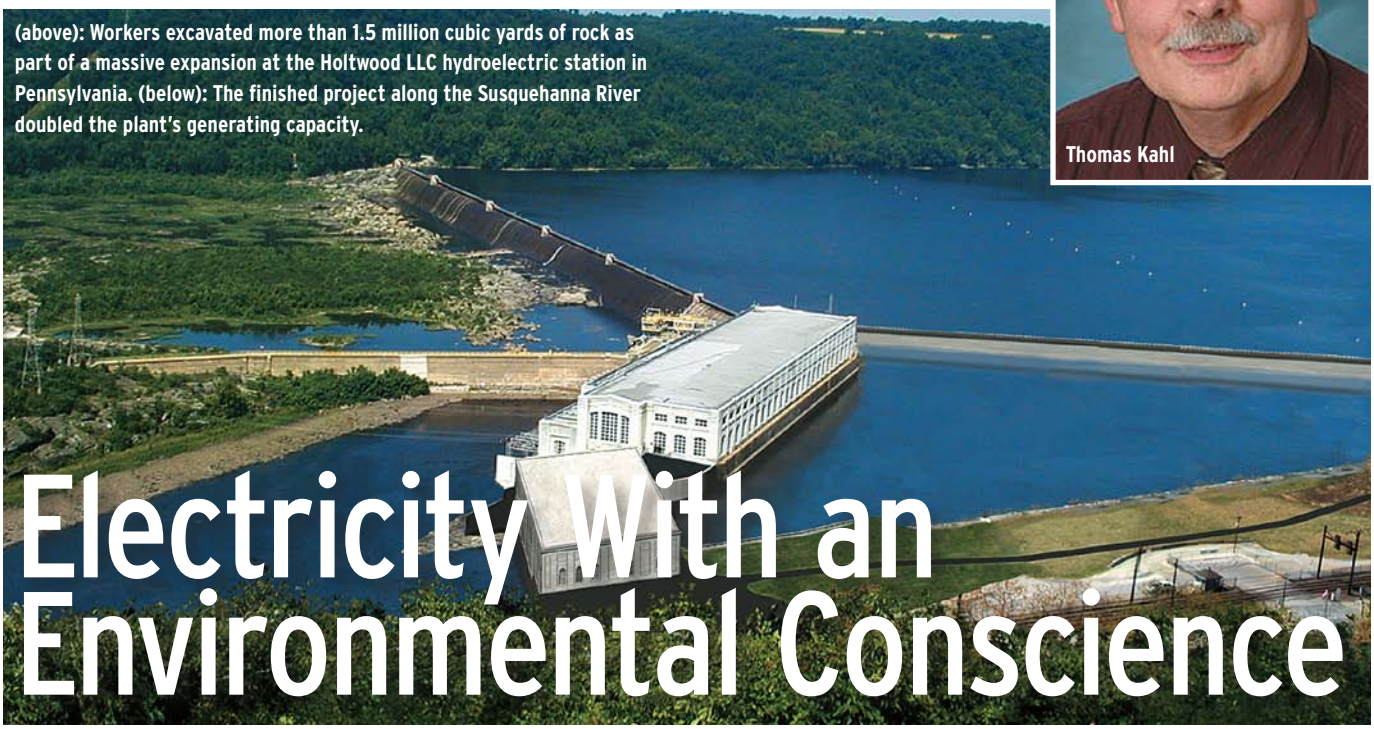
The site posed many environmental challenges. Periods and types of construction, for example, had to be adapted to suit the shad's migratory season. An active bald eagle nest on the site is continuously monitored to ensure the eaglets are not disturbed. "We designed and built an 80-foot tower and equipped it with a camera to keep watch," says Kahl.

There is also an endangered species of American holly on-site. "We are being guided by the Endangered Species Act and have solved the problem by adapting the design to leave as many existing trees untouched as possible; elsewhere, mitigation is being performed by relocating trees and even by beginning a nursery for future transplantation back onto the acreage," Kahl says.

All construction is designed to minimize interruption of the existing plant's operations and to ensure the safety of the site, the coexisting wildlife and the people performing the work, he says.



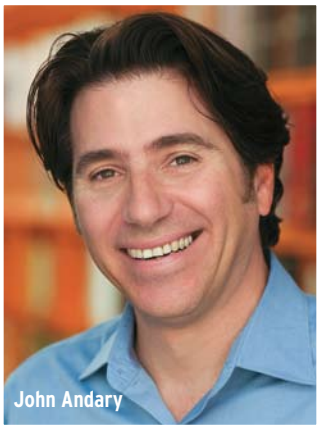
Thomas Kahl



(above): Workers excavated more than 1.5 million cubic yards of rock as part of a massive expansion at the Holtwood LLC hydroelectric station in Pennsylvania. (below): The finished project along the Susquehanna River doubled the plant's generating capacity.

Research Facility Targets Net-Zero Usage

The National Renewable Energy Laboratory Research Support Facility in Colorado is among the nation's largest ultra-efficient buildings.



John Andary

PROJECT:
National Renewable Energy Laboratory Research Support Facility, Golden, Colo.

FIRM:
Stantec, Inc., San Francisco

Completed in August 2010, the National Renewable Energy Laboratory (NREL) Research Support Facility (RSF) is LEED Platinum-certified and has emerged as an industry model for net-zero energy usage.

As part of a design-build team that included several firms, Stantec, Inc., was responsible for designing the mechanical, electrical and plumbing systems for the project and served as its sustainable design consultant, providing ideas for low-energy consumption, modeling and analysis. "Stantec has a history of working on LEED Platinum and zero-energy buildings," explains John Andary, managing principal of the firm's San Francisco office.

NREL's goal was to attain LEED Platinum certification,

but the design team went beyond certification. NREL's RSF is expected to be among the nation's largest ultra-efficient buildings and includes numerous high-performance design features, passive energy strategies and renewable energy technologies.

In addition to daylighting and natural ventilation, a labyrinth of massive concrete structures stores thermal energy and provides additional capacity for passive heating. A fully contained hot/cold aisle data center enables effective low-energy evaporative cooling and captures and reroutes unused heat for more efficient distribution throughout the building.

A fast-tracked design-build schedule forced Stantec to overlap its energy design with actual construction. "We ensured the smooth union of design and construction through continuous communication with the contractors developing the pricing and by designing systems out of typical sequence," says Andary. This meant that contractors installed equipment while the design was refined.

The RSF provides employees with an open space that encourages interaction and collaboration. Employees can open windows when conditions permit; low-profile, modular workstations allow abundant natural light; and high-efficiency computers, laptops, monitors and all-in-one print/fax/scan devices contribute to lower energy usage.

And Stantec took on another challenge: striking a balance between the project's cost model and its innovative, high-performance energy features. Explains Andary, "By essentially taking a lead role on the project, we could better ensure the alignment and integration of the building's architecture with the engineering design to meet NREL's energy performance goals."

Powered by the Sun

Workers install solar arrays on a parking canopy at a military base in Southern California.

John E. Burns

PROJECT:
Canopy-Mounted Solar Panels at Three Military Bases, California

FIRM:
Burns Engineering, Inc., Philadelphia

When the Naval Facilities Engineering Command (NAVFAC) Southwest decided to install solar panels over vehicle canopies at three bases in California, its goal was to improve energy efficiency while making use of funds available through the American Recovery and Reinvestment Act for renewable infrastructure projects.

With construction completed in June, NAVFAC tapped Philadelphia-based Burns Engineering, Inc., to design the electrical, civil, structural and mechanical systems for three solar photovoltaic (PV) arrays. "To efficiently harvest the sun's energy, the design calls for 3-feet by 5-feet solar panels assembled into large arrays of up to 2,200 panels and mounted on the parking areas' canopy roofs," explains John E. Burns, the firm's senior vice president. The panels are connected to an inverter that converts single-phase DC power to three-phase AC power, which is then used to offset purchased power from the local grid or to supply power to the grid when facility demand load is less than solar power production. The firm provided a range of design services for the project, including the PV, electrical distribution and inverter systems; site configuration; the parking canopy structures, working with the steel manufacturer; and ventilation systems for the equipment rooms.

The solar arrays at two of the bases—Marine Corps Air Station Miramar in San Diego and Naval Weapons Station Seal Beach—are capable of producing 200 kW of power, while the array at Marine Air Ground Task Force Training Command Marine Corps Air Ground Combat Center in Twentynine Palms, Calif., generates 500 kW of solar power. "These facilities are now able to reduce their carbon footprints, reduce their dependency on the electrical grid for power and reduce their annual electrical costs in line with the project's goals," says Burns.

Burns' engineers faced several challenges, including optimizing the canopy structures' orientations and tilts for maximum power generation while balancing cost and aesthetic appearance; matching the temperature characteristics of solar PV panels to the local climate and inverter characteristics; developing a revenue-grade metering system; connecting the PV generating system to the utility grid in accordance with state and local rules and regulations; and selecting material and equipment to ensure ease of maintenance and reduction of mean time to failure. "We provided NAVFAC with a system that would generate a minimum of kW generation over 20 years by choosing the correct materials and by balancing the generation potential of every panel with its orientation," Burns says. ■

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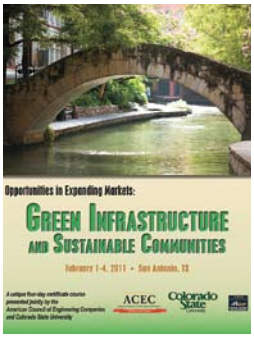
PS Form 3526, September 2007 *(Page 2 of 3)*

Sustainability Market Growing Rapidly

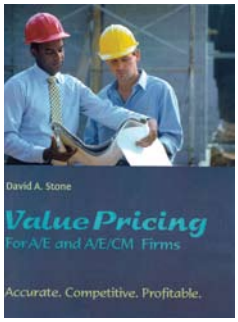


There is growing demand for sustainability considerations to be part of a total design and construction project. ACEC's unique Green Infrastructure and Sustainable Communities course (Feb. 1–4, 2011, in San Antonio) examines key design issues and processes and showcases the growing applications of "green" engineering by some of the leading U.S. practitioners.

Participants will hear about emerging opportunities in sustainable development, become familiar with national and international metrics, understand how to identify future projects through audits and comprehend how to apply life-cycle analysis to proposed projects and programs. The expert faculty will also explore ways to expand business practices in sustainable engineering and facilities planning, especially with regard to transportation, buildings and water projects.

This four-day certificate program includes an afternoon field-trip along the famed downtown Riverwalk in San Antonio, with insights into the bypass channel, floodgates, bald cypress plantings and annual drainage, cleaning and refilling of this unique spur of the San Antonio River. For more information and to register, visit http://www.acec.org/education/index.cfm.

Pricing Firm Services In the New Economy



In an era of increased competition and limited work, pricing a firm's services can be difficult: Set your price too high and risk not getting the job; set it too low, and face financial ruin or diminution of the firm's reputation. For guidance on how best to price services, ACEC recently released *Value Pricing for A/E and A/E/CM Firms* by renowned business consultant and marketing expert David Stone. Stone takes readers through the necessary skills and "profit arithmetic" basics of setting fees through logic and systematic process, instead of through a "throw-a-dart-at-the-wall" exercise or reliance on outdated "rules of thumb." Stone also addresses the issue of types of services, from commodity to value-added business models, describing strategies and market issues to ensure perception matches services delivered, and that fees are justified wherever they fit on the curve. Whether you are a principal, project manager or aspiring project manager involved in pricing services, the skills and insights explained in this book can help you get the price right. To order, go to www.acec.org/bookstore.

Big Value Online Seminars Meet Niche Knowledge Needs—*Conveniently*

One of the most critical challenges facing A/E/C firms is how to keep employees trained and capable of performing, even as technology and business practices change around them. Multi-day courses offer exceptional learning, but sometimes a short burst of knowledge, insight or information is what's required. ACEC's Institute for Business Management produces and presents more than 70 online seminars each year, honing in on bottom-line A/E/C topics that affect firms' day-to-day operations. Increasingly, members and nonmembers are discovering online topics specific to their business and taking advantage of the "single fee for single computer connection" format that encourages staff participation by the roomful in these one-hour to one-and-a-half-hour seminars.

2010 seminar topics included how to write the "perfect" NEPA cumulative impact analysis; engineering the "Smart Grid"; the case for M/E/P firms using BIM; developing and defending overhead rates; and the impact of Hurricane Katrina on floodplain mapping and management. Other topics included post-passage discussion on what the new health care bill means to firms; updating the market status and future of U.S. high-speed rail; and how to develop more persuasive proposals. Courses are presented by ACEC's faculty roster of highly credentialed government, law and A/E business consulting experts. Select online seminars might also be recorded for purchase through the ACEC Bookstore, though live presentations allow for participation and questions from the widely dispersed class of participants.

The ACEC seminar calendar at www.acec.org/education is continually expanding. Already, 2011 is shaping up to provide a mix of updates on industry business basics and of-the-moment topics. Check the calendar and watch for frequent e-mail announcements highlighting upcoming "don't-miss" sessions. ■

The ACEC Institute for Business Management provides comprehensive and accessible business management education for engineering company principals and their staffs.

Visit ACEC's online educational events calendar at **www.acec.org/calendar/index.cfm** or bookstore at **www.acec.org/publications**, or call 202-347-7474, ext. 338, for further information.

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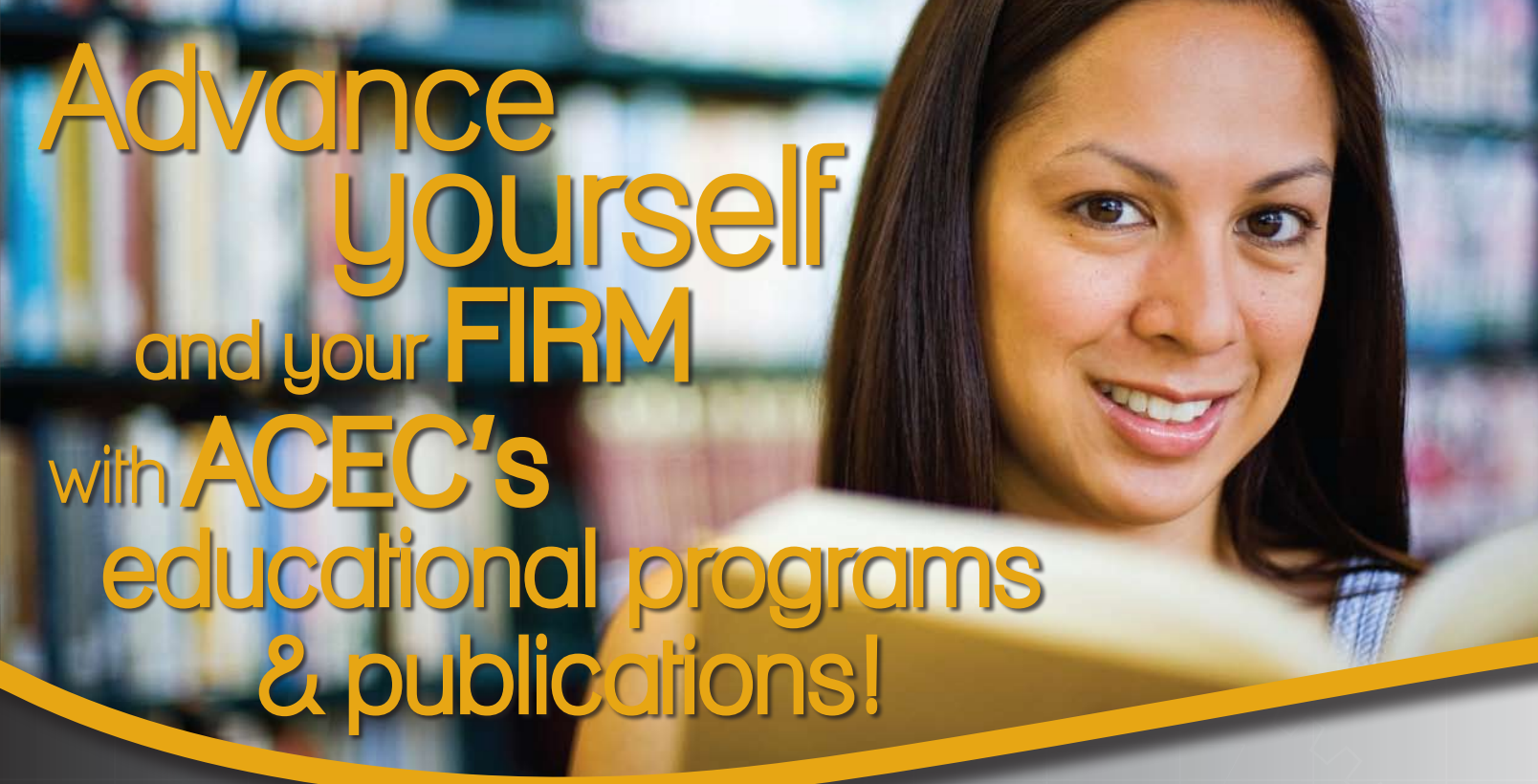

UPCOMING ACEC COURSES:

Green Infrastructure
February 1-4 – San Antonio, TX

The Business of Design Consulting
May 4-7 – Denver, CO

Top Ten Legal Issues Design Firms Face
May 19-20 – Philadelphia, PA

ACEC BOOKSTORE
Your best read on the business of engineering

For more information on these and other upcoming seminars and webinars, go to **www.acec.org/education** and to check out products at the ACEC Bookstore, go to **www.acec.org/publications**

2010 ACEC Young Professional of the Year

Award Winners

ACEC presented five Young Professional of the Year awards at its Fall Conference in Puerto Rico. Selected by the ACEC Fellows, these young engineers were recognized for making significant contributions to the profession early in their careers.

Scott F. Bevan

PAE Consulting Engineers
Portland, Ore.

Bevan has displayed a rare mix of technical ability, communication skills and leadership in his short career.

In 2008, he was promoted to associate after just 15 months with PAE. He was soon managing MEP teams responsible for projects worth more than $100 million in construction while helping PAE navigate the economic downturn and maintain its employee-focused culture. His projects have included six LEED-targeted buildings and a 50,000-square-foot Net Zero Energy building featuring a 250 kW photovoltaic system.

He holds a bachelor's degree in electrical engineering from the University of California, Los Angeles.

John Peronto

Thornton Tomasetti
Chicago

A project engineer, Peronto has exhibited passion and ingenuity in designing complex structures.

His structural designs include the concept study for the 123-story Meraas Tower in Dubai and the 1,001-meter-tall Kingdom Tower in Saudi Arabia. Peronto contributes to educating young engineers by volunteering at Marquette University and has served as a guest lecturer at Cornell University.

Peronto holds a bachelor's degree in mechanical engineering and bachelor's and master's degrees in civil engineering, all from Marquette University. He also holds a master of engineering in civil engineering from Cornell University.

Yurintzy Estrada

AECOM
New York

Estrada has worked on local and international projects, including public-private partnerships in Mexico and design of movable bridge alternatives in Australia.

A structural engineer, she was instrumental in a series of bridge projects in the Bronx, N.Y., and the rehabilitation of the the Mosholu Parkway masonry arch bridge. She led a team that helped provide potable water to a health center in Kenya and implemented an Engineers Without Borders initiative that encourages AECOM employees to donate their time and technical services.

She holds a bachelor's degree in civil engineering from the City College of New York.

Yvana Kuhn

AECOM
San Diego

Kuhn has worked worldwide as a civil and environmental engineer. Her experience includes hydrology and water-quality analyses; stormwater, water and coastal management; and erosion control.

She has provided water resources expertise in California and Michigan and sustainable design recommendations in China and Dubai. Her research on marine mammal abundance was published in *Marine Mammal Science* (2007).

She holds a bachelor's degree in civil and environmental engineering from the University of Michigan and a master's in environmental science and management from the University of California, Santa Barbara.

Craig T. Reinsch

Olsson Associates
Lincoln, Neb.

An associate engineer, Reinsch has provided expertise on water supply and distribution, wastewater collection and treatment, hydraulic modeling and construction services projects.

He recently provided on-site construction services for a community sanitary sewer system, which resulted in more than $500,000 in savings. He chairs Nebraska's Water for People committee and works on development in the Dominican Republic. He is an adjunct lecturer at the University of Nebraska and holds a bachelor's degree in civil engineering and a master's in environmental engineering from the University of Nebraska-Lincoln.

Anniversary

Philadelphia-based **Urban Engineers, Inc.**, celebrated its 50th anniversary this past August. The employee-owned, multidisciplinary planning, design, construction services and environmental consulting firm has grown from a seven-person firm to nearly 500 employees in 10 offices across the northeast and mid-Atlantic states. Urban provides services for ports, transit, buildings, bridges, highways, railroads and airports and has participated in the design and construction management of scores of landmark projects, with more than 60 awards for engineering excellence since 2000. "Fifty years of uninterrupted service, as one company, in our business, is a very long time. It was not due to luck; it happened because each and every day, we made the right decisions for our internal and external clients," said Urban's president, Edward M. D'Alba.

International planning, design and construction management firm **Gannett Fleming** celebrated its 95th anniversary in 2010.

Founded on Aug. 1, 1915, the firm has grown from a two-person Harrisburg, Pa.-based water resources company to an international firm with more than 2,100 professionals operating from more than 60 offices worldwide. "Our projects are like a tapestry that defines us, but to say which threads are the most remarkable is nearly impossible," said William M. Stout, Gannett Fleming chairman and CEO.

William M. Stout

GEI Consultants, Inc., a geotechnical, environmental, water resources, and ecological science and engineering firm, commemorated its 40th anniversary in July. Established in 1970 as Geotechnical Engineers, Inc., the firm is headquartered in the Boston suburb of Woburn and employs 400 staff in 20 offices across the United States. "Throughout GEI's 40-year history, despite changes in markets and the economy, the one thing we could always count on was the loyalty of our clients," said Frank Leathers, president of GEI. GEI specializes in geotechnical testing and engineering services for nuclear power plants, including its current work for Constellation Energy's proposed new nuclear reactor at Nine Mile Point near Oswego, N.Y.

On The Move

Black & Veatch named **Jim Lewis** chief administrative officer (CAO) and president of the company's administrative division. Lewis will oversee day-to-day operations, safety, information technology, project management systems, enterprise risk management and facilities management.

Lisa V. Larrabee was named president and CEO of **Harris & Associates**. Larrabee succeeds Guy Erickson, who retired after 30 years of service at Harris and eight years as the firm's president.

Kimberly Eiring was promoted to CFO of Seattle-based **Sparling**. She will also sit on the firm's executive committee.

Tetra Tech, Inc., named **Dean White** president of **Tetra Tech ENE**, a new unit in the firm's technical support services group. White previously was president of Arlington, Va.-based PA Government Services, Inc., recently acquired by Tetra Tech from PA Consulting Group.

John V. Dougherty was named senior vice president at **Gannett Fleming**. Based in the firm's Jacksonville, Fla., office, Dougherty oversees corporate operations for more than 200 employees among 14 offices in Florida. **W. Arthur Barrett II** was named senior vice president at the firm. Based in the firm's Baltimore office, Barrett oversees corporate operations for the region, which

Jim Lewis

Lisa V. Larrabee

Kimberly Eiring

Dean White

John V. Dougherty

W. Arthur Barrett II

Members in the News

Mergers & Acquisitions

URS Corporation recently acquired **Scott Wilson Group plc**, a London-based infrastructure engineering and construction company. The addition of Scott Wilson expands URS's international presence by adding a network of 80 offices worldwide. "

The acquisition of Scott Wilson opens the door to new opportunities for URS in major international infrastructure markets," said Martin M. Koffel, chairman and CEO of URS. "We have also expanded our capabilities in other key geographies outside of the U.K. and Continental Europe, such as China and India, two of the fastest-growing economies in the world."

Hugh Blackwood, former Scott Wilson chief executive, who joined URS as vice president and senior vice president of international operations, said, "We are looking forward to providing our clients with access to a larger global footprint and the ability to meet their needs across a wider range of services and sectors, including the nuclear power market, a key strength for URS."

Manhard Consulting, a civil engineering firm with offices nationwide, announced a pair of recent transactions: a merger with **White Engineering**, a civil and structural engineering firm in Northern California, and a regional partnership with **Rolf C. Campbell & Associates**, a civil engineering firm in the Chicago area. White Engineering will operate as Manhard Consulting, Ltd. Rolf will continue under its own name. "Our partnership with Rolf continues our strategy of forming alliances with firms that enhance our existing capabilities," said Donald Manhard Jr., president of Manhard Consulting.

Donald Manhard Jr.

Kansas City-based **TranSystems** announced two recent transactions: a merger with Santa Ana, Calif.-based **Rahimian Management and Consulting, Inc., (RMC)** and its purchase of the transportation engineering and surveying arm of Atlanta-based **Long Engineering, Inc.**, which includes offices in Norcross, Ga., and Nashville, Tenn. The separate transactions are expected to bring additional expertise in roadway and bridge design to TranSystems' architectural, engineering and planning lines. "The transaction will enhance our combined ability to serve existing and new clients in Southern California with an expanded array of services," said RMC Principal Tony Rahimian. Added David Jackson, client manager and principal of Long, "We are very excited to become a part of the TranSystems family."

On The Move

includes offices in Delaware, Maryland, Virginia and the District of Columbia. **Fred Bauhof** joined **R. G. Miller Engineers, Inc.**, as executive vice president and manager of the firm's Public Infrastructure Group, responsible for managing client service and project delivery.

Parsons appointed **Anthony "Tony" F. Leketa** president of Parsons Water & Infrastructure, Inc. (PWI). PWI, a primary business unit of Parsons Corporation, provides customers with engineering, construction and management services in water, wastewater and infrastructure development. In his new role, Leketa is responsible for the business unit's global operations.

Roddy Boggus was named a senior vice president at **Parsons Brinckerhoff (PB)**. Located in PB's Dallas office, Boggus will serve as PB's aviation market leader, responsible for managing the firm's planning, engineering and construction services for airports nationwide. The firm also appointed **Vice Admiral Michael K. Loose**, United States Navy (ret.), senior vice president and manager of its Installations & Environment Division for its Infrastructure & Technology group, where he will oversee Parsons' work with federal government clients.

Fred Bauhof

Anthony F. Leketa

Roddy Boggus

Michael K. Loose


Bob Gomes

Stantec, Inc., recently signed letters of intent to acquire two firms: Boston-based **Anshen + Allen**, an architectural firm with more than 200 employees, and Rocklin, Calif.-based **ECO:LOGIC Engineering**, a water/wastewater service provider with six offices and approximately 100 employees. "The combination of Anshen + Allen and Stantec will create a global architecture practice with particular expertise in the design of health care and education facilities," said Bob Gomes, Stantec president and CEO.

More Transactions

Dewberry, a privately held professional services company, has acquired the assets of Denver-based **Integra Engineering**. Dewberry-Integra will continue to operate from Denver, expanding Dewberry's western geographic footprint.

Fleis & VandenBrink, a Grand Rapids, Mich.-based engineering firm, announced its merger with **Gould Engineering, Inc.**, of Grand Blanc and Flint, expanding the West Michigan firm's engineering and construction management services to East Michigan. All the locations will operate under the Fleis & VandenBrink banner.

Geotechnology, Inc., a provider of geotechnical and environmental engineering, materials testing, geophysics and drilling services, announced its purchase of substantially all of the assets of **Hall, Blake & Associates (HBA)**, a geotechnical engineering, construction materials testing and drilling firm in Memphis, Tenn.

New Jersey-based **Langan Engineering & Environmental Services** has acquired **Treadwell & Rollo**, a geotechnical and environmental engineering firm based in San Francisco. The acquisition establishes a nationwide footprint for the company, adding 70 new employees from Treadwell & Rollo's California offices in San Francisco, Oakland, San Jose, and Sacramento.

Parsons Brinckerhoff, Inc. (PB), announced that the **Halsall group**, comprising Halsall Associates, Pivotal Projects, and Loop Initiatives, has become the Canadian Operating Company of PB. The new operating company of PB will be known as Halsall, a Parsons Brinckerhoff Company.

Members in the News

Welcome New Member Firms

ACEC/Alabama

Gonzalez-Strength and Associates, Hoover

ACEC/California

Au Clair Consulting Inc., Folsom

Chandler Koehn Consulting, Cloverdale

Irish's Surveying Services, Oakdale

JMPE Electrical Engineering, Bakersfield

Kelder Engineering, Cloverdale

M. G. Wittgraf and Associates, Bakersfield

Valle & Associates Civil Engineering Consultants, Los Angeles

Water & Wastewater Design Associates, San Diego

ACEC/Colorado

SBSA, Inc., Golden

Yeh and Associates, Inc., Denver

ACEC/Idaho

Power Engineers, Inc., Hailey

ACEC/Illinois

PositivEnergy Practice, Chicago

SPAAN Tech, Inc., Chicago

ACEC/Louisiana

McLin and Associates, Inc., Livingston

ACEC/Nevada

Frohnen Consulting & Associates, Henderson

ACEC/New Mexico

Crawford Engineering, Santa Fe

iina ba Inc., Farmington

ACEC/New York

Lawless & Mangione, Yonkers

ACEC/North Carolina

RC Engineering Consulting Firm, PLLC, Concord

REI Engineers, Inc., Raleigh

Tower Engineering Professionals, Inc., Raleigh

ACEC/South Carolina

F&ME Consultants, Columbia

GEL Geophysics, LLC, Charleston

ACEC/Wyoming

Engineering Design Associates, Casper

CEC/Texas

Apia Engineering Consulting, LLC, Dallas

Cronus Technology, Inc., Houston

Gap Engineering, Inc., Katy

Middleton Brown, LLC, Houston

Pinnacle Structural Engineers, Houston

PSG Engineering, Ltd., Richmond

Shah Smith & Associates, Inc., Houston

Shaw Environmental & Infrastructure, Inc., Irving

Ward N. Marianos, Jr., The Woodlands

Calendar of Events

2010

NOVEMBER

16 Systematic Client Feedback: How to Get It, Use It and Benefit From It (online seminar)

17 Short-Term Economic Outlook: What are the Near-Term Economic, Political and Global Forces That Will Affect Your Business? (online seminar)

18 High Speed Rail: Outlook, Opportunities and Obstacles (online seminar)

DECEMBER

7 What Is the Right Value for Your Firm? (online seminar)

14 If You Haven't Planned It, You Can't Control It (online seminar)

15 Bachelor's + Master's or Equivalent: Background and Impact on A/E Firms (online seminar)

2011

FEBRUARY

1-4 Green Infrastructure and Sustainable Communities: Opportunities in Expanding Markets, San Antonio

7-April 1 Green Buildings and Preparing for LEED Green Associate Exam (online seminar)

MARCH

30-April 2 **ACEC Annual Convention & Legislative Summit, Washington, D.C.**

Additional information on ACEC's events is available at www.acec.org.

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It's health care coverage designed by engineers for engineers.

We wanted to know how to design the most suitable health care coverage plan for engineers. So we talked to engineers.

If you ask an engineer, there's always a better way to do things. That's why ACEC Life/Health Trust – representing the needs of more than 1,100 engineering firms – got together with UnitedHealthcare. We offer our members affordable health care coverage plans, including medical, dental, vision, life and disability.

You and your employees can also get:

- Access to a nationwide network of more than 617,000 physicians and health care professionals, plus 5,010 hospitals and 60,000 pharmacies, so you can get care wherever it's convenient for you
- A vast product portfolio of traditional and consumer-driven health plans, including Health Savings Accounts and Health Reimbursement Accounts
- Strength in numbers, in that coverage is provided to an exclusive group of engineering peers and member firms frequently pay less than the average cost of insurance in their area
- Dedicated sales, service and wellness representatives

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