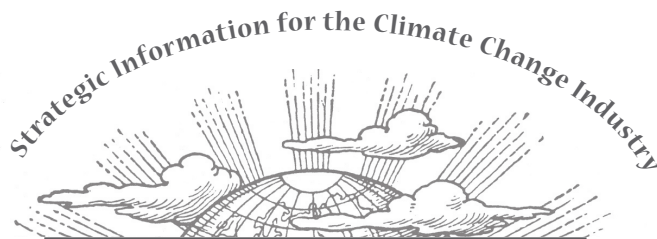


# Insights and Commentary from Dentons

The combination of Dentons US and McKenna Long & Aldridge offers our clients access to 1,100 lawyers and professionals in 21 US locations. Clients inside the US benefit from unrivaled access to markets around the world, and international clients benefit from increased strength and reach across the US.

This document was authored by representatives of McKenna Long & Aldridge prior to our combination's launch and continues to be offered to provide our clients with the information they need to do business in an increasingly complex, interconnected and competitive marketplace.



# CLIMATE CHANGE BUSINESS JOURNAL®

Volume IV, No. 1

January 2011

## CCBJ Recognizes Climate Change Industry Leadership and Achievements in 2010

Climate Change Business Journal is proud to announce its second annual business achievement awards. Industry pioneers often remain unsung, and the CCBJ awards mark our attempt to honor companies, technology developers and entrepreneurs for doing what it takes to build a sustainable business in the climate change industry.

In this second awards issue, CCBJ winners are recognized either for business performance in the form of revenue growth, or for gaining traction in new service practices, new technology or signature projects. The aggregation of CCBJ winners along with the executive Q&As that follow offer perspective and insight into parts of the climate change industry that experienced the most activity in 2010.

So CCBJ congratulates the winners and thanks the companies that submitted nominations, inviting them and CCBJ readers to San Diego for our official awards ceremony and executive meeting at the Ninth Annual Environmental Industry Summit, March 9-11, 2011 at the Hotel Del Coronado. This year's three-day meeting features keynote presentations by Terry Tamminen and James Strock, both authors and former Secretaries of Cal EPA, industry panels on a variety of topics, networking opportunities, wine tasting, golf and more.

## 2010 Executive Review & CCBJ Awards

*In this Executive Review issue, CCBJ's 2010 Business Achievement Awards recognize more than a score of high achievers, and prominent executives and climate change industry experts share their perspectives.*

### Q&As Inside this Issue:

*12: WSP F&K on trends in energy efficiency and green building*

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## Business Achievement: Growth

### Gold

**E**nerNOC, Inc. (Boston), the leading U.S. demand response company for growth of 57% through the first three quarters of 2010 to revenues of \$257 million, up from \$164 million in the same nine months in 2009. In Q3 2010 EnerNOC passed a significant milestone of 5,000 megawatts under management sooner than expected and increased its network to over 5,100 megawatts under management across over 3,500 customers

and 8,200 sites as of September 30, 2010. EnerNOC describes its value proposition as unlocking the full value of energy management for utility and commercial, institutional, and industrial customers by reducing real-time demand for electricity, increasing energy efficiency, improving energy supply transparency in competitive markets, and mitigating emissions. Trademarked applications include DemandSMART in demand response, SiteSMART in energy efficiency, SupplySMART in energy price and risk management, and CarbonSMART in en-

## CLIMATE CHANGE BUSINESS JOURNAL®

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## About the CCBJ Business Achievement Awards

In October-December 2010, Climate Change Business Journal solicited the climate change industry and the environmental industry via email, website and word-of-mouth for nominations for the second annual CCBJ Business Achievement Awards. Nominations were accepted in 200-word essays in both specific or unspecified categories. Final awards were determined by a committee of CCBJ staff and CCBJ editorial advisory board members. Award nominations were open to any firm or organization in the climate change industry, and companies were permitted to submit their own nominations.

The 2010 CCBJ Business Achievement Awards will be presented to recipients in attendance at a special ceremony at Environmental Industry Summit IX at the Hotel del Coronado in San Diego, Calif. on the evening of March 9, 2011. The Environmental Industry Summit is an annual three-day event (March 9-11) hosted by Environmental Business International, Inc., the publisher of CCBJ and Environmental Business Journal. Congratulations to the 2010 award winners. CCBJ encourages all interested companies to participate next year.

(Disclaimer: Company audits were not conducted to verify information or claims submitted with nominations.) Separately, CCBJ solicited senior executives to submit bylined articles or participate in Q&A interviews for this executive review issue. Opinions expressed in the articles and Q&As reflect those of the respondents and not CCBJ.



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terprise carbon management. EnerNOC's Network Operations Center (NOC) continuously supports these applications across its thousands of customer sites throughout the world.

## Business Achievement: Growth

### Silver

**A**meresco (Framingham, Mass.) for achieving 49% revenue growth for the nine months that ended Sept. 30, 2010. One of the leading U.S. energy service companies (ESCOs), Ameresco went public in July 2010, raising about \$60 million gross proceeds (shareholders sold an additional \$27 million worth of shares). While the opening price of \$10 per share was less than the company hoped for, its share price by year-end was in the \$15 range. Ameresco's Q1-Q3 revenues grew from \$295 million in 2009 to \$439 million in 2010 while the U.S. economy was sluggish. Ameresco's growth was primarily organic with only one acquisition in 2010, Quantum Engineering and Development, for \$6.2 million. Like other ESCOs, Ameresco earns a large portion of its revenues through performance contracts in which ESCOs and third-party lenders fund the design and installation of energy efficiency equipment then get paid based on energy cost savings, which are often guaranteed in the contract. Ameresco has been one of the leaders in expanding this model to develop renewable energy projects (for which it receives revenue from energy sales) including landfill and digester gas, biomass, geothermal and solar projects. By Q3 2010, Ameresco's nine-month revenue from renewable energy (including a PV sales and integration division) more than doubled from \$54 million in 2009 to \$115 million in 2010. Ameresco ended Q3 with a backlog of \$593 million.

### Silver

**C**omverge, Inc. (Norcross, Ga.), another demand response leader for growth of 42% to \$82 million in

revenues through the first three quarters of 2010. Comverge describes itself as leading provider of intelligent energy management solutions for residential and commercial and industrial customers. Third quarter revenues grew 56% to \$52 million compared to \$33 million in 2009 (excluding revenues from its residential Virtual Peaking Capacity contracts, which are deferred and recognized in the fourth quarter). Comverge has more than 500 utility and 2,100 commercial customers, as well as five million deployed residential devices, and more than 3,500 megawatts under management.

### Silver

**I**tron (Liberty Lake, Wash.) for growth of 36% through three quarters of 2010, putting it in pace to hit \$2.3 billion in revenues in 2010. Itron is the global leader in smart meters with 85 million units shipped in North America and a 46% share. Itron delivers end-to-end smart grid and smart distribution solutions to 8,000 electric, gas and water utilities with product offerings including electricity, gas, water and heat meters; network communication technology; collection systems and related software applications; and professional services.

## Business Achievement: Growth

### Bronze

**S**unpower (San Jose) for achieving 31% revenue growth for the nine months ending Oct. 3, 2010, an increase that caps five years (2005 to 2009) during which SunPower's revenues grew by 1836%, said Deloitte, which ranked the company number seven in the clean technology segment of its Fast 500 2010 rankings. A vertically integrated solar PV manufacturer and installer with revenues expected to be \$2.2 billion in 2010, SunPower boasts "the highest conversion efficiency... of all the global solar cells available for the mass market." SunPower is a dominant vendor to U.S. utilities, a customer segment that has become more active since the

Energy Improvement and Extension Act of 2008 allowed investor-owned utilities to qualify for the 30% PV investment tax credit. Either SunPower or First Solar have "been involved in every one of the 11 largest operating projects in the country," noted GreentechMedia. According to SunPower, 44% of its 2010 revenues were generated by deals with utility and power plant customers, 56% from residential and commercial customers. SunPower will likely face increasing competition for the utility segment—as many as 55 project developers have signed at least one utility PPA, according to GreentechMedia. Global PV players will increasingly target U.S. utilities as European markets reach saturation. For its part, SunPower has been expanding aggressively in overseas markets, most recently with the March 2010 \$282 million acquisition of European PV project developer SunRay. While German sales declined in 2010, Italy was a booming market for SunPower in the third quarter, representing 38% of global revenues, up from 30% in 2009.

### Bronze

**P**owerit Solutions (Seattle) for achieving 30% revenue growth in 2010 and 28% growth in employment, adding to Powerit's 1,810% growth over the prior five years in energy management systems. Powerit is a leader in advancing the OpenADR (automated demand response) standard developed by Lawrence Berkeley National Laboratory. Powerit is also one of the first providers to offer a Smart DRAS (demand response automation server) client in a commercial product. One client, Calif.-based Mission Produce, cut its annual electricity usage by 24%, reduced its monthly energy bill by up to 33%, and made 500 kW controlled load shed available for demand response supply, according to Powerit. In May 2009, Powerit closed a \$6 million Series B funding round from Siemens Venture Capital and global steel company ArcelorMittal's Clean Technology Fund.



## Business Achievement: Growth

### Honorable Mention

**L**PB Energy Management (Dallas) for 2010 market penetration and revenue growth for its utility invoice processing business, through which LPB helps corporate and government clients identify and take action on energy efficiency and cost-saving opportunities. The number of client utility invoices processed by LPB increased by 102% for the 12 months ending September 30, 2010, driving revenue

growth of 91%, according to company data reported to CCBJ. The firm acquired “large, national clients who either previously processed utility invoices in-house or through another third-party outsourced provider,” according to the company. New and existing clients are enjoying enhancements in LPB’s “capabilities to measure, manage, and benchmark utility cost and consumption.” Although LPB does not disclose revenues, CCBJ estimates its revenues for these 12 months at \$30 million. The company employs 140 people.

## California and China are Regional Winners in Capital Raising

**I**n 2010, China accounted for a remarkable 68% of cleantech initial public offerings (IPOs), according to the **Cleantech Group** (San Francisco). Overall, 2010 was a record year for cleantech IPOs globally, with 93 companies raising a combined \$16.3 billion during 2010. The largest IPO was for **Enel Green Power**, the renewable energy unit of Italian utility Enel, which raised \$3.6 billion on the Madrid Stock Exchange. The vast majority of global activity was in China, which accounted for 68% (63) of the IPOs completed and 61% (\$10.0 billion) of the total amount raised. The focus of the IPO activity in China was the small to medium sized board on the Shenzhen Stock Exchange, known as ChiNext, which has seen a remarkable rise since its launch in October 2009. In a positive sign for public financing, the final quarter of 2010 was the most active quarter ever for cleantech IPOs, with 30 companies raising a combined \$8.3 billion. In addition to Enel, wind turbine manufacturer **China Goldwind** raised \$920 million on ChiNext in Q4 2010.

China took over leadership in cleantech IPOs the previous year. In 2009, clean technology public offerings totaled an estimated \$4.7 billion in 32 IPOs, said Cleantech Group, with by far the largest being the \$2.2 billion raised by **China Longyuan Electric Power Group**. About 72% of money raised in public markets in 2009 was in Asia, while its average over the three years prior to that was less than 10%. Almost half (47%) of the companies that went public were in China. In 2008, clean technology public offerings totaled \$5.1 billion in 16 IPOs, with the majority of the amount raised in Europe, largely as a result of the \$2.4 billion raised by **EDP Renewables**, the world’s second largest generator of wind energy behind Iberdrola that operates in the U.S. as Horizon Wind Energy.

In venture investing, California accounted for a remarkable 38% of clean technology capital raised in 2010 as tracked by Cleantech Group. Cleantech reported clean technology venture investments in North America, Europe, China and India totaled \$7.8 billion across 715 deals in 2010, up 28% from 2009 but still behind 2008’s \$8.8 billion. North American companies raised \$5.3 billion in 2010, up 45% with 391 investment rounds. California led the way with investments of \$3 billion or 58% share in North America. California’s largest deals were the \$350 million invested in **Better Place** (see awards), \$175 million in thin film company **Solyndra** that replaced a planned IPO, and \$150 million in a Series D funding of utility-scale solar thermal power plant developer **BrightSource Energy**.

## Business Achievement: Finance

### Gold

**C**annon Power (San Diego) for closing the sale of a 20-year, \$547 million pre-paid power purchase agreement (PPA) with Southern California Public Power Authority (SCPPA), which sold tax-exempt bonds to buy the power on behalf of two of its 12 member agencies: Los Angeles Department of Water and Power and the City of Glendale. The PPA represents over approximately 70% of the expected annual production from Cannon Power’s 262 MW Wind Flats wind project in Goldendale, Wash. SCPPA obtained a discounted power price for the pre-paid block of power, and the agency will buy the balance of the wind farm’s output at a formula-based price. SCPPA also received an option to purchase the project after five years.

The project, an expansion of an existing wind farm called Windy Point, also received \$220 million in ARRA stimulus funding; it is slated to enter commercial operation in 2011. “This uniquely structured transaction is a true win-win for both parties,” Cannon President Gary Hardke said in a statement. “It combined SCPPA’s low-cost, tax exempt bond financing with the federal stimulus grant program to produce a very attractive long-term cost of renewable power.”

Cannon Power Group has developed wind energy projects in the U.S., India, Switzerland, Spain, Italy, Turkey, Greece and Croatia. In addition to Windy Point/Wind Flats, Cannon Power’s other major project in development is the 1,000 MW Aubanel wind project in Baja California.

## Business Achievement: Finance

### Silver

**T**esla Motors (Palo Alto, Calif.) for a year of financial accomplishments that included in January finalizing its loan guarantee agreement with U.S. DOE for up to \$465 million, its \$226 million IPO in July, an approximately \$60 million deal

with Toyota to develop a powertrain system for an electric version of the RAV4, and receiving a \$30 million investment from long-time battery technology collaborator Panasonic in November. Tesla also completed the \$42 million purchase of the former New United Motors Manufacturing plant in Fremont, Calif. where it will make its mass-market Model S.

Tesla's IPO was the first by an American automaker since Ford went public in 1956. After closing its first day at \$24 per share, Tesla's stock has been on a wild ride but ended the year around \$28 per share. While its financing merits award, some analysts are skeptical about Tesla's long-term prospects. In late December 2010, Capstone Investments analyst Carter Driscoll warned that "premium cost and range anxiety" would limit adoption of EVs in general, and that Tesla is further handicapped by the high sales price (\$110,000 less \$7,500 in tax credits) of its Roadster model. He also questioned whether the firm can hold onto its edge in battery technology. "Their battery packs are among the best and lowest cost in the industry [but] we are skeptical Tesla can drive the next leg of growth as they must convince OEMs to utilize their powertrain technology as well as battery packs."

Tesla has made no secret that it will lose a lot more money before it makes a profit, noting in its Q3 report that operating costs will "increase significantly in future periods as we, among other things, design, develop and manufacture our planned Model S and electric powertrain components, build and equip new manufacturing facilities to produce the Model S and electric powertrain components, open new Tesla stores with maintenance and repair capabilities, incur costs for warranty repairs or product recalls, if any, increase our sales and marketing activities, and increase our general and administrative functions to support our growing operations." All of the above underscores that the automobiles business is one of the

toughest around, and Tesla deserves credit at least for getting this far.

## Business Achievement: Finance

### Bronze

**B**etter Place (Palo Alto, Calif.), a provider of electric vehicle services, for raising \$350 million in a Series B funding round led by HSBC, valuing Better Place at \$1.25 billion. New investors in the round were Morgan Stanley Investment Management and Lazard Asset Management, and returning investors include Israel Corp., VantagePoint Venture Partners, Ofer Hi-Tech Holdings, Morgan Stanley Principal Investments, and Maniv Energy Capital. Better Place is developing an electric car network in which customers will be able to lease batteries for a monthly fee and be able to charge their batteries at home for free or swap out batteries at designated locations. The company says it's on track to launch two test projects in Israel and Denmark in 2011. Better Place's first major round of private financing was in October 2007 when it raised \$200 million.

## Consulting & Engineering

### C&E Climate Change Practice

#### Gold

**A**ECOM (Los Angeles) for achieving a leading position as an advocate and consultant for climate change mitigation and adaptation for private clients in a range of industries as well as governments and institutions. Earning \$6.55 billion in revenues for the year ending September 30, 2010—a year-on-year increase of 7%—the architectural and engineering firm has bulked up its climate change expertise significantly over the last several years through acquisition. Among the acquired firms that added to AECOM's climate change practice: Design and planning firm EDAW (2005), which had 1,200 employees and \$120 million in revenues; Earth Tech (2008), an engineering

and construction firm with \$1.3 billion in revenues and 7,000 employees; A&E firm Ellerbe Becket (2009) with 450 employees; and Spanish A&E firm INOCSA (2010) with 550 employees.

According to data provided to CCBJ, AECOM's climate change practice has executed more than 150 projects including studies and models for adaptation and plans and strategies for mitigation. In Australia and New Zealand, AECOM has prepared 70 adaptation plans for municipalities, utilities and businesses, and is now working with the Asia Development Bank on climate change studies for Indonesia, Laos and Vietnam. In the U.S., AECOM has prepared climate action plans for 30 local governments, universities and private clients. In transportation, AECOM is a leading advocate for and designer of bus rapid transit systems that can increase ridership capacity at a fraction of the cost of rail systems. AECOM is also completing energy and water masterplans for 31 U.S. federal facilities focusing on reducing carbon emissions as well as costs, and it has conducted a nationwide riverine flood study for FEMA (AECOM is recognized separately for this work under Consulting & Engineering: Climate Change Adaptation). AECOM's new book *Climate Design* is a collaboration between its own experts and academics to explore design and planning strategies for the climate change era.

### C&E Climate Change Practice

#### Silver

**E**RM (London) for its large and growing sustainability and climate change practice, which today accounts for roughly 10% of its \$607 million in revenues for the year ending March 31, 2010. Privately held ERM—founded in 1987 by the merger of U.S. and U.K. firms and now headquartered in the United Kingdom—has a global climate change and sustainability practice led by 30 senior staff with more than 225 professionals in

39 countries working on GHG measurement, management and mitigation, according to John Curtis, Global Climate Change Practice Leader. With a PhD-level “knowledge leader” and a global “carbon school,” ERM is rapidly expanding its in-house climate change expertise.

Clients range from consumer packaged goods and retail giants like PepsiCo and Tesco to the oil and gas sector which represents more than 30% of ERM's overall revenues. “We are helping many of our oil and gas clients prepare for the extensive GHG reporting requirements under the recently promulgated Subpart W to EPA's Mandatory Reporting Rule,” Curtis told CCBJ. “We have several large programs underway to assess applicability, evaluate and fill compliance gaps, and develop the programs, tools and systems needed for managing the important data and details related to rule compliance.” Many U.S. clients in unregulated sectors contract with ERM for lifecycle analyses to drive product innovation, eco-design and performance improvement, according to Curtis.

Although ERM's revenues declined in the recession—from \$695 million in the year ending March 31, 2009 to \$607 million for the same period in 2010—the firm sees growth “re-emerging in many geographies and sectors, and issues of regulation, reputation and risk, as well as long-term resource needs, will continue to drive spending in our market,” according to a July 2010 operational report. North America is its largest geographic segment, followed by Europe/Middle East/Africa. Asia Pacific is where the company is growing fastest overall and in terms of energy and climate change work.

## **C&E Climate Change Practice**

### ***Silver***

**E**nviron (Arlington, Va.) for outstanding consulting work around GHG management and mitigation with clients

as diverse as Coca Cola Enterprises, The Home Depot, United Airlines, Kiewit, the City of Los Angeles and consortia of air quality regulators. In October 2010, Environ was named by the Carbon Disclosure Project as one of five Silver consultancy partners—to work with CDP to encourage high quality disclosure of climate change related data from global corporations in the United States.

According to North American Practice Leader for Carbon and Energy Lisa Grice, Environ's domain expertise in oil and gas, food and beverages, marine ports and other sectors has enabled the firm to bring a strategic perspective to clients, integrating GHG management with client's broader goals for growth and profitability. Environ has a large global energy efficiency business, its largest market being Europe where carbon policies have created a strong demand for energy audits and advice to reduce both costs and carbon emissions. “In the United States, sustainability strategy is gaining momentum with a focus on environmental optimization for business efficiency or customer expectations driving lifecycle assessments for a variety of products ranging from stuffed toys to printing inks,” said Grice. Lifecycle assessments for biofuel producers has been a significant market segment, driven by GHG goals in the federal Renewable Fuel Standard. Environ has also assessed GHG emissions associated with land use, producing a methodology manual with the California Association of Air Pollution Control Officers, Northeast States for Coordinated Air Use Management, and National Association of Clean Air Agencies released in August 2010.

## **C&E Renewable Energy Practice**

### ***Gold***

**C**H2M HILL (Englewood, Colo.) for its role as a consultant, owner's engineer and engineering procurement & construction (EPC) contractor for renewable power generation projects and solar PV manufacturing plants. CH2M HILL

is one of the most broadly capable firms in the consulting segment of the wind power industry, performing tasks ranging from upfront analyses of environmental issues and securing permits through wind farm design and engineering, including representing developers in the EPC process as owner's engineer. In 2010, the company successfully obtained permits for the 800 MW Alta Oak Creek Mojave Wind Energy Project in California; the firm also performed due diligence for a 50MW geothermal plant in California and prepared a cost estimate for a 30 MW flashed steam geothermal plant in Utah.

CH2M HILL is active in both PV and concentrating solar power (CSP) thermal projects. Company representatives told CCBJ that in 2010, it worked for developers in Australia, Canada, Middle East/North Africa and the United States as consulting engineer or EPC contractor on projects totaling 1.2 GW. While most clients are confidential at this stage, it's publicly known that the firm is the engineer of CSP developer Brightsource's Ivanpah heliostat assembly building. In the first weeks of 2011, the company won an engineering contract for a 250MW CSP project in Egypt.

CH2M HILL also works on PV manufacturing facilities. In November 2010, REC Group (Sandvika, Norway) celebrated the opening of a 740 MW integrated wafer, cell and module manufacturing plant in Tuas, Singapore, designed and engineered by CH2M HILL's Industrial and Advanced Technology business group. The largest single investment ever made by REC (which had \$633 million in Q3 2010 revenues), according to Solar PV Management Magazine, the \$1.93 billion project is the largest cleantech investment ever made in Singapore and one of the world's largest manufacturing plants of its type. CH2M HILL also provided engineering and design services to PV manufacturing plants representing about 2 GW of capacity, including projects in



Malaysia, China, the Middle East and United States. The firm is also assisting PV manufacturers with the complex process of seeking loan guarantees from the U.S. Department of Energy. Employee-owned CH2M HILL had \$6.3 billion in revenues in 2009 and a staff of 23,500.

## **Renewable Portfolio Development**

**N**extera Energy Resources (Juno Beach, Fla.) for its leadership role in owning and developing utility-scale wind and solar power in North America. With more than 8,200 MW of existing wind power capacity in the United States and Canada, the company, a subsidiary of NextEra Energy, produces roughly 20% of wind-generated electricity in the United States. Nextera Energy Resources is also co-owner and operator of the largest concentrating solar power generating plant in the world, the 310 MW SEGS facilities in California's Mojave desert. In 2010, the company added more than 700 MW of renewable energy to its portfolio. Nextera is also a major fossil and nuclear power producer, with about 6,700 MW of natural gas generation capacity, 800 MW of oil-fired plants and more than 2,500 MW of nuclear power capacity. Nextera Energy Resources also owns 22 hydro-power generating units in Maine with a total of 360 MW of capacity. For future growth of its generation portfolio, Nextera intends to focus most of its resources on solar and wind. "NextEra Energy Resources plans to add approximately 3,500 mw to 5,000 mw of new wind generation and approximately 400 mw to 600 mw of new solar generation in 2010 through 2014," states its Q3 2010 report, noting that renewable portfolio standards in 31 states require electricity providers to secure renewable power for between 10% and 25% of their usage (higher in California) by 2025.

## **CCBJ Technology Merit Awards**

### **Technology Merit: Solar Power**

**A**monix (Seal Beach, Calif.) for sprinting toward the front of the pack of firms seeking to develop and market concentrating photovoltaic (CPV) systems that use lenses to concentrate sunlight on high-efficiency PV cells to produce greater power output per square meter than conventional PV modules. In August, 2010, project developer Cogentrix announced a 20-year power purchase agreement with Xcel subsidiary Arizona Public Service for a 30 MW CPV project in Alamosa, Colo., using Amonix's equipment. If it meets the developers' target for commercial operation in 2012, Alamosa will be the largest CPV installation in the world.

"Currently the largest one in operation in the U.S. is a 1MW CPV project just completed by SolFocus" in 2010], wrote Ucilina Wang on GigaOm.com. SolFocus is also building a 10 MW CPV project in Spain, according to Wang. Amonix had previous deals to supply its CPV systems to an "undisclosed developer for two projects [totaling 14 MW to supply] Tucson Electric Power under power purchase agreements," according to Wang. Then, in November 2010, Southern California Edison signed PPA contracts for 28.5 MW of Amonix CPV capacity at four sites in California that are expected to come online in 2013 and 2014.

Amonix, founded in 1989, also celebrated some financing milestones in 2010. In April it received \$129.4 million in a Series B financing round from Kleiner, Perkins, Caufield & Byers, Adams Street Partners, Angelino Group, PCG Clean Energy & Technology Fund, Vedanta Capital, New Silk Route, The Westly Group and prior investor MissionPoint Capital Partners. Amonix also received \$9.5 million in ARRA stimulus funding under the Advanced Energy Manufactur-

ing Tax Credit program to create a new manufacturing plant in North Las Vegas, which broke ground in October, and a future facility planned in Arizona.

### **Technology Merit: Solar Power**

**S**olarEdge (Hod Hasharon, Israel) for achieving prominence in an emerging segment of PV system components that maximizes output when one or more modules in a PV array—or cells in a module—underperform due to shading, inherent mismatches or premature degradation. According to an August 2009 Scientific American article by editor George Musser, power loss is multiplied with typical PV array configurations because inverters cannot optimize each module individually but need to select identical current to flow through all modules in the underperforming string.

Musser highlighted SolarEdge's technology to optimize the output of modules and arrays when a segment is compromised. National Semiconductor and other companies also market PV optimization gear, but SolarEdge's PowerBox solution has received significant industry notice, including a ranking in the top 10 energy companies (along with FirstSolar, PG&E and Nextera) for 2010 by tech magazine Fast Company. A comparison analysis of six vendors' optimization systems by the German edition of Photon Magazine called SolarEdge's system "mature, provid[ing] additional yield and ... one of the less expensive solutions," according to an excerpt provided by SolarEdge. "The PowerBox monitors the performance of each module for fault detection and remote troubleshooting over the Internet, and provides unique safety mechanisms that cut off voltage and current during installation and fire-fighting," according to SolarEdge, which says it has 30 pending patent applications and has shipped over 250,000 units in over 25 countries in 2010.



### Technology Merit: Solar Power

**C**ogenra (Mountain View, Calif.) for commercializing, at least on a limited basis, a solar energy system that makes use of both solar thermal and photovoltaic energy. The Khosla Ventures-funded startup installed its first large system in November 2010 at the Sonoma Wine Company in Graton, Calif., a contract winery that bottles more than 4 million cases a year. The winery installed 15 of Cogenra's SunBase arrays, which collectively produce 272 kW of electricity and solar hot water.

Calling its technology solar cogeneration (some in this emerging segment call it hybrid PV/thermal or PV/T), Cogenra says it improves system energy production by up to five times over PV-only systems. A story in MIT's Technology Review, describes the Cogenra system as consisting of 3 x 10 meter parabolic dishes that concentrate sunlight onto PV cells. "Heat is collected with a mixture of glycol and water that flows through an aluminum pipe behind the solar cells" then fed to a heat exchanger and hot water storage tank. "Similar hybrid solar systems have failed in the past because the solar cells have overheated. Cogenra uses sensors to monitor the temperature of its solar cells and an automated control system to draw fluid away more quickly if they need cooling down," according to Technology Review, which noted that Cogenra hasn't released cost figures and that the winery installation will serve as an important test site for Cogenra's technology and PV/T in general.

### Technology Merit: Energy Storage

**I**ce Energy (Windsor, Colo.) for developing and commercializing an elegant energy storage system that can mitigate summer peak demands for cooling that strain electricity grids and increase GHG emissions by requiring the use of ineffi-

cient gas-fired peakers. Designed to work with refrigerant-based direct expansion AC systems common to small and medium-sized commercial buildings, the firm's Ice Bear system freezes 450 gallons of water at night, when demand is low and electricity is cheaper. During peak demand periods, usually from noon to 6 pm, "the Ice Bear unit replaces the energy intensive compressor of the building's air conditioning unit," according to Ice Energy's website. According to VentureBeat.com, "Ice Energy initially started out marketing its product to big-box retailers like Target [then] shifted its strategy to utilities, signing deals with Austin Energy, Toronto Hydro and several Southern California utilities that will install 50 megawatts' worth of the storage systems." In 2010, Ice Energy achieved a number of financing and marketing milestones, including raising \$24 in third round financing from TIAA-CREF, Good Energies and others.

### Technology Merit: Light Rail Manufacturing

**M**obility Division of Siemens Industry for manufacturing zero-emission products and using sustainable practices at its light rail vehicles facility in Sacramento – the only permanent light rail manufacturing plant on US soil. The plant recently added 200 full-time jobs and intends to hire another 250 people, following a \$26 million expansion in 2009. Up to 80% of the facility's energy needs are met with a two megawatt solar power system. VOC waste was reduced by more than 50% while production increased by more than 200% in the last three years. In addition, over 80% of all the non-food/wet waste materials from the entire Sacramento plant are sent for sorting and recycling.

### CCBJ Project Merit Awards

#### Project Merit: Solar Power

**S**unRun (San Francisco) for some 7,000 residential systems installed – a huge customer base considering the start-up had fewer than 100 customers in early 2008 when CCBJ first covered SunRun. The company was just starting to deploy the solar-as-a-service mode – in which a homeowner buys PV-generated electricity through a power purchase agreement while SunRun retains ownership – that had been so successful for commercial PV integrators such as Sun Edison. SunRun had made deals with three California PV installers; now it has 30 in seven states and recently firmed a \$100 million tax-equity financing deal PG&E subsidiary Pacific Energy Capital to install more than 3,500 new rooftop residential solar systems in Arizona, California, Colorado, Massachusetts and New Jersey.

A key to SunRun's business model is effectively monetizing the 30% investment tax credit, renewable energy credits and other income streams flowing from its PV systems. According to a December 2010 story on Xconomy.com by Wade Roush, SunRun succeeded in doing its first tax credit deal— \$20 million with U.S. Bancorp—in the early days of the Great Recession because of "the innovative way the company sliced and diced the tax credits, depreciation, local subsidies, and 20-year power contracts." SunRun also assures performance by monitoring its PV systems remotely and dispatching maintenance contractors when needed to clean or repair units. To ease the sales cycle, it created an online pricing engine "that takes into account everything from local tax laws to the pitch of the homeowner's roof and spits out a price quote on the fly," wrote Roush, noting that consumers have a range of options for how much to pay down versus monthly. "Between January and October [2010], the pricing engine generated 168,000 proposals." SunRun

has raised \$85 million in venture funding from Foundation Capital, Accel Partners and Sequoia Capital. Along with the rest of the solar industry, SunRun rejoiced when Congress extended the grant-in-lieu-of investment tax credit in December. "The program's continuation will enable it to build 36,000 more residential solar installations than it could have otherwise," wrote Roush.

### Project Merit: Solar Power

**A**ECOM (Los Angeles) and its client Solar Millennium (Erlangen, Germany) for obtaining in Q3 2010 final approvals from the U.S. Department of the Interior and California Energy Commission to construct about 1,500 MW of concentrating solar power (CSP) capacity in the California and Nevada deserts. The larger of the two, the nearly 1,000 MW Blythe Solar Power Plant, will be the largest CSP project in the world. Using parabolic trough technology, the plant will consist of four 242 MW solar-thermal power units plants, the first two units of which broke ground in early 2011. Investor-owned utility Southern California Edison has signed a power purchase agreement with Solar Millennium for this first phase of Blythe.

Nearby Palen Solar Power Project will produce an additional 500 MW. AECOM supported Solar Millennium throughout the two-year federal and state regulatory approval process for both projects, performing baseline environmental, biological, cultural resources and impact assessments; groundwater surveys; conceptual engineering; civil design; and drainage analysis; and assisting with evidentiary hearings and stakeholder workshops, according to information submitted by AECOM.

CSP plants convert solar radiation into heat energy. In a parabolic trough plant like the ones being developed by Solar Millennium, trough-shaped mirrors concentrate the radiation onto a pipe "in the focal line of the collector," explained

the company in a news release. "Its absorption heats a fluid heat medium in the pipe, generating steam in the power block through a heat exchanger. As in conventional power plants, the steam powers a turbine to generate electricity. By integrating thermal storage, electricity can be supplied on demand, even after sunset." Solar Millennium LLC is a wholly-owned subsidiary of Solar Trust of America LLC, the American joint venture between Solar Millennium (70%) and Ferrostaal (30%).

### Project Merit: Solar Power

**K**aiser Permanente (Oakland) for launching a solar PV initiative that will see PV arrays at 15 Kaiser Permanente buildings in 2011. The total program with Recurrent Energy will include 15 MW of PV capacity, which Kaiser believes will qualify as "one of the largest sustainable energy programs in U.S. health care." Panels will go up at medical centers in Vallejo, Santa Clara, Fontana, San Diego and other cities, producing an average of 10 percent of site power demand, according to Kaiser. The firm has set an ambitious goal of generating 25 percent of energy on site by 2020, and last year invested \$2.4 million to install window film and new lights that alone should save more than \$1.2 million annually in energy costs. The not-for-profit healthcare provider serves 8.6 million members and had operating revenue of \$42.1 billion in 2009, according to company data.

### Project Merit: Solar Power

**N**examp (North Andover, Mass.) for winning the competition to build what the company described as Massachusetts' largest ever public solar contract: \$20 million to build 4.1 MW of PV capacity at 12 water and wastewater treatment plants in the state. Funded with federal stimulus dollars, the project is on schedule to be completed by mid-2011. Also in 2010, Nexamp and the Merrimack Valley Chamber of Commerce were awarded a first-of-its-kind contract

to provide renewable energy and energy efficiency advisory services to 26 member businesses. Because of these and other projects, including the state's largest roof-mounted solar project (1 MW for National Grid) and a 100 kW installation at Wire Belt in Londonderry, NH, Nexamp added 28 employees in 2010.

### Project Merit: Green Building

**A**rcadis (Amsterdam) and its U.S. planning, design and engineering subsidiary RTKL for designing and engineering eBay's \$287 million Topaz data center in South Jordan, Utah. Opening in May 2010, the facility received a LEED Gold rating from the U.S. Green Building Council in November. According to Arcadis, the data center, which processes roughly \$2,000 in transactions every second for eBay.com and Paypal.com, is 50 percent less expensive to operate than the average eBay data center and 30 percent more efficient than the most efficient data center in the eBay portfolio. Key green and energy-efficient features include: cooling with a water-side economizer system supported by a 400,000 gallon rainwater cistern; using outside air to cool the data center for more than half the year; 400V power distribution, eliminating an entire level of transformers and saving 2% in power costs; in-row cooling units for close-coupled cooling; and a hot air containment system to isolate the hot and cold air within the server area.

### Project Merit: Adaptation

**A**ECOM (Los Angeles) for leading a nationwide investigation of the impact of climate change on the U.S. National Flood Insurance Program (NFIP) and providing improved coastal flood plain mapping. AECOM performed the innovative analyses evaluating the financial impact of climate change on the NFIP, which is a government-run insurance program administered by Federal Emergency Management Agency (FEMA). The project addressed riverine

and coastal flood response to climate change, with projections at 20-year intervals through 2100, according to information from AECOM.

Riverine analyses were based on modeled projections of climate factors from global models and multiple emissions scenarios. Results and existing regression models for stream discharges at over 2300 U.S. gage sites were used to establish generalized relationships incorporating climate indicators. Coastal analyses accounted for changes in storm frequencies and intensities, as well as sea level rise. All analyses used a Monte Carlo framework to capture median forecasts and measures of uncertainty. The change estimates for flood elevations and hazard areas were integrated with demographic and insurance data to determine the financial implications. Study results are intended as national estimates relevant to the overall health of the NFIP in the face of climate change. However, regional variations suggested priority areas meriting more detailed study when better climate information becomes available, according to AECOM.

### **Project Merit: Renewable Development**

**E**MPSi (San Francisco) for developing the Restoration Design Energy Plan for the US Bureau of Land Management (BLM) and cooperating state agencies in Arizona. This \$1.4 million multi-year contract will help Arizona achieve its goal of sourcing 15% of its energy from renewable sources by 2025. The plan will be a roadmap for renewable energy development on federal lands in Arizona with a focus on areas that are already disturbed or that have few environmental constraints. The aim is to foster environmentally responsible projects and allow permitting to proceed efficiently by allocating specific sites for renewable energy. The BLM manages 12.2 million acres of land in Arizona but the planning

area includes the entire state.

The project will identify disturbed or previously utilized lands in Arizona that, after remediation or site preparation, may be suitable for renewable energy development or generation. BLM Arizona and members of the public have identified 59 potential sites on federal, state, municipal, and private lands including gravel pits, mine sites, landfills, isolated parcels that have been disturbed and abandoned unauthorized airstrips. EMPSi is examining these lands for potential reclamation and use for energy generation. Funded under the American Recovery and Reinvestment Act of 2009, the draft plan will be released in 2011.

### **Project Merit: Wind Power**

**C**ape Wind Associates (Boston) for nearing what looks like the finish line of an epic 10-year effort to build a 468 MW wind power project in Nantucket Sound off Cape Cod, Massachusetts. After hotly contested local and state and permitting battles were concluded in 2009, Cape Wind won approval from the U.S. Department of the Interior in April. In January 2011, Cape Wind completed its federal permitting process with final approvals from the U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. In November 2010, the Massachusetts Dept. of Public Utilities approved Cape Wind's first power purchase agreement, authorizing National Grid to purchase half the project's output for \$187/MWh for 15 years, with a 3.5% annual escalation clause, a contract the DPU estimated at between \$1.6 billion and \$1.8 billion NPV. At CCBJ's deadline, Cape Wind was seeking project finance to build what would become the first offshore wind farm in North America.

### **Project Merit: Landfill Gas**

**R**epublic Services (Phoenix) for investment in landfill gas to energy

(LFGE) projects to produce electricity, pipeline gas and compressed natural gas for the company's growing fleet of natural gas refuse vehicles. In its largest 2010 project, the waste management and environmental services firm (\$6.1 billion revenues for nine months ending Sept. 30, 2010) contracted with Clean Energy Fuels Corp. to build a high-BTU LFGE plant at Republic's Sauk Trail Hills Landfill site in Canton, Mich. At full capacity, the facility is expected to produce the equivalent of 6 million diesel gallon equivalents annually. Fourteen smaller projects at California landfills will produce compressed or liquefied natural gas to fuel Republic's refuse vehicles.

Republic added 247 new natural gas vehicles (NGVs)—20 percent of its 2010 new truck orders—bringing its nationwide NGV fleet to 500, according to the company. CNG fueling stations are being constructed to support this fleet upgrade at Gardena, Sun Valley and Chula Vista, Calif., and Bellevue, Wash. Republic and Mack Trucks are also working together to test diesel garbage trucks equipped with selective catalytic reduction and the first American-built diesel hybrid garbage truck.

In a separate project, NV Energy and CC Landfill Energy LLC entered into a 20-year power purchase agreement for the sale of energy produced from an 11 MW LFGE power generation project to be located at Republic Services' Apex Regional Landfill north of Las Vegas.

### **Product Introduction Award**

**G**eneral Motors and Nissan deserve credit for being first with broad commercial launches of electric cars in late 2010. According to The Detroit News, General Motors sold between 250 and 350 Chevrolet Volts in December 2010, while Nissan and its Leaf recorded sales of 10 delivered units in its first month in December. While still just a drop in the



bucket of auto sales, waiting lists for both are more than full, with several thousands of buyers reportedly waiting for their electric vehicle. In the United States, Chevrolet Volt has a starting price of \$41,000, or \$33,500 net of the federal income tax credit. In addition, General Motors is offering financing options and will lease the Volt for as low as \$350 for 36 months and a down payment of \$2,500. The Nissan Leaf is less expensive with a purchase price of as low as \$25,300 after the federal tax credit, with additional rebates from states including \$5,000 tax rebate in California, a \$5,000 tax credit in Georgia, a \$1,500 tax credit in Oregon and others. While 2010 was a year of commercial introduction for electric cars, 2011 will be a legitimate test of consumer uptake and infrastructure development for charging, service and maintenance.

### NGO Activist Award

**G**old Standard Foundation (Cambridge, Mass.) for achieving market leadership as a certifier of high-quality carbon offsets. To date, there are over 500 projects in the Gold Standard pipeline, according to the foundation which was founded in 2003 by the Worldwide Fund for Nature and other NGOs in response to criticism of the Clean Development Mechanism. To qualify for the Gold Standard seal, project developers must use renewable energy or energy efficiency technologies, meet strict additionality standards and show they're positively impacting the local community. These are valued by carbon buyers who have rewarded Gold Standard projects with price premiums. According to 2009 market data in Ecosystem Marketplace's 2010 carbon markets report, Gold Standard offsets fetched the second highest price premium among voluntary offset certification regimes behind Greenhouse Gas Friendly, a pre-compliance certification regime established by the Australian government. ⚙️

## EBI Report 4000: The Climate Change Industry

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##### ♦ **Energy Efficiency & DR: 4300**

Policy and market drivers for EE&DR industry. Strategies of utilities and consultants to leverage demand response and EE to mitigate climate change exposure and limit peak generation. Role of consulting engineering firms, technology developers, energy service companies, etc.

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Energy Storage at the utility level is a \$2-billion industry in the U.S. Batteries and fuel cells for transportation and other non-consumer uses represent an additional \$14 billion. Covers advanced battery systems, flywheel energy, and other technologies.

##### ♦ **Green Building: 4500**

Annual growth was 30-40% from 2004-2007 after 50-60% growth in 2001-2003. Market breakdowns and forecasts by competitor and client type; regional variations in regulations, certifications and building practices.

##### ♦ **Transportation: 4600**

Assessment and quantitative analysis of transportation business opportunities resulting from climate change policy

##### ♦ **Carbon Markets: 4700**

Estimates regulated and voluntary carbon trading activity and explores carbon emissions brokerages, voluntary offset markets, agricultural and forestry offsets, role of C&E firms, and company profiles.

##### ♦ **Climate Change Adaptation: 4800**

CCBJ estimates that adaptation will grow to a billion-dollar industry in the U.S. by 2015, followed by exponential growth once design and construction of adaptation measures begin in earnest.

### **Consulting & Engineering & Professional Services in the Climate Change Industry: 4900\***

Detailed analysis of Consulting & Engineering (C&E) services related to climate change. CCBJ estimates today's climate change consulting market at \$1.9 billion worldwide and \$670 million in the United States. These figures are expected to more than double in the next five years.

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## Green Building & Energy Efficiency Back in Favor as Developers and Owners Seek Lower Operating Costs

*Engineering services firm reflects on recent trends in energy efficiency, new technology, LEED, and split incentives.*

**CCBJ:** To what extent does your firm get involved in energy efficiency retrofits, and what's going on in that market today?

WSP F+K: In the late 70s and early 80s, as a result of the energy crisis, we were heavily involved in energy retrofits both from a pure analysis and design standpoint, as well as in turnkey solutions through which we shared energy savings with our clients. Since the mid 80s, with relatively low energy prices, interest in energy retrofits had greatly decreased.

Today, however, with the renewed focus on energy costs and carbon footprints, and active government legislation promoting energy efficiency, this is once again becoming a growth area. Many owner/developers are now looking to invest in energy conservation retrofit measures that will reduce operational costs. We also see interest among asset managers in increasing asset value through reductions in operational expenses. The capitalized value of these expense reductions now has longer acceptable payback periods than we have seen in a long time.

**CCBJ:** As the economy recovers, to what extent will builders seek to minimize costs by cutting green and energy efficient features in new buildings?

WSP F+K: Given the depressed state of the construction industry, costs are now at their lowest levels in many years, allowing owners and developers to make decisions about adding sustainable design alternatives they might not have been able to consider a few years ago.

### WSP Flack + Kurtz

WSP Flack + Kurtz is an international leader in providing engineering services in mechanical, electrical, plumbing (MEP) as well as fire protection, security, IT and architectural lighting design. Part of WSP Group, the global design, engineering and management consultancy with 9,000 professionals working in property, transportation and infrastructure, environment, renewable energy and industrial sectors, WSP Flack + Kurtz has more than 500 employees in seven U.S. offices. The firm has designed and engineered building systems for some of the most prominent green buildings in the United States. Energy efficiency and sustainability have been at the core of the firm's practice for over 30 years. David Cooper, President and CEO of WSP F&K, discussed the current state of green and energy-efficient building with CCBJ.

For many of our clients, a green credential on their project is now considered a requirement, and it is part of the value proposition for their buildings. The industry is transforming both in terms of codes, legislation, and as well as with public understanding and demand. As such, green and energy efficient features will continue to become the norm and required rather than the exception and the optional.

**CCBJ:** What are some of the biggest challenges to achieving LEED existing buildings: operation and maintenance (EBOM)?

WSP F+K: Two key USGBC prerequisite credits that often present a roadblock for owners attempting LEED EBOM are: 1) the requirement that the building have a minimum Energy Star score of 69 (EA-P2); and 2) the flush and flow rates of restroom fixtures (WE-P1). Other key challenges include: varying degrees of investment, changes to current building operations, and ongoing sustainable actions by the management team.

### Technology Innovation

**CCBJ:** What energy-efficiency technological innovations are you particularly enthusiastic about? Where in mechanical, electrical, plumbing (MEP) systems do you see the greatest opportunity?

WSP F+K: A high performance building requires an integrated approach, spanning all facets of the design in concert with occupancy and operation. From a

design standpoint, energy efficiency starts with the building massing, orientation, and envelope. The building envelope is a tremendous driver of overall building efficiency, and there are great opportunities for innovation, the application of new technologies, and integration with the engineering approach to building systems such as natural ventilation and daylighting.

The glazing industry has made huge progress over the last 20 years. Current highly selective coatings transmit the majority of the visible light from solar radiation while rejecting almost all of the non-visible portion of the solar spectrum (ultraviolet and infra-red), resulting in admission of over 60% of the available visible light and rejection of over 70% of solar heat gain, without affecting the color of the view or admitted light.

Cutting-edge technology allows the transmission characteristics of windows to be continuously controlled to react to the building's need to absorb or reject heat to maintain temperature. New materials and design for window framing systems greatly reduce heat transfer across these historically "high speed" thermal pathways. Aerogel and GlassX are examples of new products pushing the envelope on efficiency. Putting all of these technologies together will result in super-windows in the very near future.

With HVAC systems, the development and application of more passive cooling and heating solutions such as chilled beam

technology, radiant floors and activated thermal masses are exciting. These passive solutions, in combination with phase change material thermal storage, are strategies we are enthusiastically incorporating in our designs. We also see good potential in small- to- medium on-site cogeneration with products such as micro-turbines. Much development effort is focused on photovoltaic technology, which should translate into cheaper and more efficient panels in the years to come.

We are also pursuing a variety of water conservation and recycling technologies. Much of the water used in building operations does not have to be potable, and we are finding cost-effective ways to avoid using water from the public potable supply.

Packaged HVAC systems incorporating variable speed fan motors and compressors, along with sophisticated digital controls, bring energy efficiency within the budget of lower-cost developments. We are finding increasingly that packaged variable refrigerant flow HVAC units provide comparable efficiency to more sophisticated, higher-cost systems. Some of these systems, furthermore, permit cost-effective provision of much smaller temperature control zones, allowing occupants to custom-control their local environment. While this control may result in some energy savings, it results in much greater occupant satisfaction.

Digitally addressable lighting controls are a technology that has been demonstrated in a few landmark buildings such as the New York Times headquarters, but first cost reductions in this technology will make it competitive for buildings with more modest budgets. This technology greatly facilitates addition of daylight-responsive lighting controls, maintenance of custom lighting levels in different types of spaces and with lamps at different points in their lifespan.

LED lights promise the final demise of older energy-inefficient incandescent technologies. The WSPFK New York office is in the process of replacing all of its 35 and 55 Watt halogen reflectorized lamps with 7 and 9 Watt LED refractor lamps.

#### **CCBJ: What other trends are you excited about?**

WSP F+K: Another trend we are very excited about involves making buildings better citizens of their infrastructure “community.” Concepts that fall into this category include Demand Response capabilities, to manage customer consumption of electricity in response to supply conditions—for example, having electricity customers reduce their consumption at critical times or in response to market prices.

The water conservation strategies mentioned previously fall into this category as do systems such as low-flow fixtures and gray-water harvesting that minimize sewage output. Management of storm-water run-off, furthermore, reduces overflow of sewage treatment plants often required during rainstorms in cities with combined storm and sanitary sewers.

A final characteristic that we are pursuing in some projects is building resilience to disasters. Some of these strategies include putting building sump pumps and domestic water booster pumps on the building emergency generator to prevent flooded basements and to provide potable water to higher floors during extended utility outages. Protection of building electrical services from record high flooding enable taller buildings to continue operation during floods, and provision of operable windows allows continued building occupancy during power outages.

While some of these characteristics may not be considered “green” under conventional definitions, they increase the comfort and utility of buildings while decreasing their impact on the community and its resources.

## **LEED Certification**

**CCBJ: How can LEED be improved? Does it need a better mechanism for evaluating ongoing performance to ensure that buildings maintain their LEED certification?**

WSP F+K: LEED energy assessment needs to differentiate between the design or asset rating of a building and an operational rating. Energy points for the building design are based upon projections and assumptions of how the building will be used and what the tenant will install. The design team usually has only a notion of the actual operating schedule of the building and only a slightly more detailed idea of the “maximum possible” amount of tenant-provided equipment—but not the likely actual amount. Therefore, the design phase energy ratings really compare the actual tangible parameters of the building with those of a minimally code-compliant building using usage patterns that may or may not be relevant to the actual occupancy and operation.

LEED should require a transition from the as-designed energy evaluation into an as-operated energy evaluation. The current points for measurement and verification provide the means for making that transition, but the actual requirement is not there. Perhaps the design LEED rating should expire in five years or so after occupancy, replaced by an operational rating based upon measured energy and water performance that reflects actual usage.

## **“Split Incentives” and Green Leases**

**CCBJ: Some say that deploying energy efficiency measures in commercial buildings is hampered by the “split incentive” in which developers must invest in advanced systems while tenants receive the cost savings. How serious is this problem, and what’s your view of proposed remedies such as “green leases”?**



WSP F+K: The “split incentive” problem is very real and likely does inhibit both building owners and tenants from making capital investments to improve their energy efficiency. Model green leases allocate energy costs and savings to the party that has control of specific loads and thus controls or potential retrofits those systems to reduce operating costs.

The basis for a green lease is sub-metering of the tenants’ actual energy usage for systems under his control. Energy costs for systems under the landlord’s control, including central chiller or boiler plants, elevators, common area lighting, etc. are typically specified as line item costs per unit of rentable area at the lease initiation. This cost can then be escalated every year based upon documented energy cost increases.

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***LEED energy assessment needs to differentiate between the design or asset rating of a building and an operational rating.***

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Energy costs for the tenant-controlled systems are based upon his sub-metered usage. Thus, if the owner makes capital improvements, such as a chiller replacement, to reduce base building energy costs, the landlord keeps any savings that accrue, because the tenant’s annual payment for base building energy costs is not affected. The tenant is still incentivized to behave in an energy efficient way, because he is still paying for lights, receptacles and, in some cases, local air conditioning.

The difficulty is that most multi-tenant buildings have leases of various vintages, and the maximum benefit of the “green” lease is only realized when all tenants in the building have the “green” lease. Landlords could begin the conversion to green leases, while forestalling energy efficiency capital investments until the preponderance of the leases are converted. ⚙

## **SAIC Expects Energy Efficiency & Conservation to Spread South, and a Shift to Performance Based Models**

**CCBJ: What key trends shaped energy efficiency programs in 2010, and what are you expecting?**

SAIC: Energy efficiency and conservation programs have been the most popular on the East and West coasts of the United States. In recent years, SAIC has participated in the growth of efficiency programs throughout the Great Lakes regions. In the next few years, we expect that the growth will carryover to the South and Southeast. We are also seeing a shift away from traditional pricing models to a performance based model (per unit pricing) that places the majority of risks on the program administrator.

**CCBJ: The ARRA stimulus bill devoted more than \$10 billion to weatherization, state energy programs and energy efficiency block grants. How well is this money is being spent?**

SAIC: Many states and municipalities are using the ARRA Block Grants to develop energy master plans for their government-owned buildings and the communities they serve. We believe this is a prudent initial step in developing a comprehensive process for identifying and implementing energy efficiency projects. Through this type of planning, states and municipalities will increase the impact of their investments in energy efficiency. This investment in the capacity of local and state government for energy efficiency programs will help communities and investors realize that stimulating efficiency is one of the best investments we can make.

**CCBJ: In October 2009, President Obama ordered federal agencies to begin cutting GHG emission to achieve 28% reductions by 2020. How has this order impacted federal contractors, and how**

### **SAIC**

SAIC (McLean, Va.) is a leading scientific, engineering, and technology applications company that works in sectors of energy and the environment, critical infrastructure, national security and health.

The company’s approximately 45,000 employees serve customers in the U.S. Department of Defense, the intelligence community, the Department of Homeland Security, other U.S. government agencies and selected commercial markets. SAIC had annual revenues of \$10.8 billion for its fiscal year ended January 31, 2010.

SAIC’s Energy, Environment, and Infrastructure Business Unit comprises approximately 3,500 employees across 50 offices in the United States and Canada. Several senior staff members in this division collaborated to answer CCBJ’s questions about energy management and energy efficiency programs.

**has SAIC worked with these entities on GHG inventories and mitigation?**

SAIC: SAIC has supported or is supporting several Federal agencies in their preparation for and response to Executive Order (EO) 13514, including NASA, the Defense Logistics Agency, the U.S. Geological Survey and the Office of the Secretary of Defense. The U.S. government is also our largest customer and is placing certain expectations on its contractors to help meet the goals of the EO.

SAIC has completed and had verified by an independent third-party an inventory of Scope 1 and Scope 2 GHG emissions from our owned facilities. We will be expanding our inventory to include leased facilities as well as emissions from employee travel and waste management. We will voluntarily report this inventory to the U.S. General Services Administration

**CCBJ: For major energy-efficiency retrofits and upgrades, capital costs have been a persistent barrier. Property**

**assessed clean energy (PACE) bonds looked like a good way to finance residential and small commercial projects until it was sidelined last spring. What financing methods could have an impact in energy-efficiency investing?**

SAIC: For government buildings and large businesses, traditional financing will improve as the economy improves and credit opens up more. Energy Service Company's (ESCOs) can play a role to aggregate projects to improve financing rates. As the question implies, the more significant barrier is financing residential and small business projects. The federal home mortgage agencies decision on PACE puts a crimp on property-tax based financing. While lawmakers try to work out a solution to this challenge and work on other barriers (e.g., that PACE bonds are not tax exempt), remaining stimulus funds are helping the residential retrofit market stay somewhat afloat.

Also, other experiments and new initiatives by cities, utilities, and banks may help address the problem long term together with other options. One such program has already financed retrofits for about 500 Portland homes and is being used as a model for a similar program in Seattle. Called Clean Energy Works, it pays for energy-efficiency improvements through 20-year loans, which homeowners repay through their utility bills. This type of on-bill financing approach, possibly backed up by banks, may help give homeowners options. SAIC recently completed a two year study on local energy efficiency action that addresses financial barriers and solutions in depth.

**CCBJ: You've worked for states and utilities to design and manage energy efficiency programs. What are the keys to effective program design? What are the biggest challenges and potential mistakes of such programs?**

SAIC: During the design phase, it is important to capture the customer's

requirements and develop a well-defined communications structure. In parallel, recruiting local staff and trade allies familiar with the market will help to generate leads quickly and build a substantial pipeline of projects. Once the programs have been implemented, SAIC continually reviews the programs, surveys markets, and remains flexible to adjust to new market opportunities and barriers.

**CCBJ: How long term are these contracts, and what's the sales cycle like?**

SAIC: The typical contract is three years with option years at the back-end of the term, but the sales cycle is different for every potential customer. Typically, a vendor will have 30 days to respond to a request for proposal (RFP), with oral presentations conducted within the next 30 days. Then, the contract will be awarded and negotiated within the next 30-60 days. In the majority of awards, the selected vendor and the agreement with the utility needs approval from the public utility commission, which will extend the sales cycle anywhere from three to 12 months.

**CCBJ: The energy service company (ESCO) segment has contracted in the recession both because government and institutional clients are facing serious deficits and because lenders have tightened credit terms. How is your ESCO segment?**

SAIC: It is true that this market is challenging, and SAIC has redirected some of its resources to energy business areas that have been less affected by the economy. In our ESCO practice we have employed a diverse approach to financing vehicles such as Energy Savings Performance Contracts (ESPCs), Utility Energy Savings Contracts (UESCs), and other proprietary structures we have deployed in the marketplace. Specific to ESPCs, much of SAIC's efforts have focused on customer education and awareness related to the most recent DOE ESPC IDIQ [indefinite delivery/indefinite quantity contract]. Building on our extremely

strong customer relationships, our proven experience in solving difficult problems and delivering quantifiable value, and helping our customers manage risk, our ESCO efforts are well positioned for the coming economic recovery.

**CCBJ: Do you find more private-sector clients responding to the ESCO value proposition in the recession?**

SAIC: Most engagements focused on energy efficiency should include some aspect of performance related obligation. In the current economic climate, the risk associated with savings projections is a prominent concern in the minds of private-sector decision makers. Our private-sector clients have been receptive to the concept of performance based agreements, but often choose to forgo third party financing in favor of well structured performance guarantees and shared performance risk and reward. The payback periods for projects of interest have shortened during the economic challenge.

**CCBJ: What can ESCOs do to make performance-based energy efficiency contracts more palatable to private firms?**

SAIC: Traditionally, many ESCOs have considered performance-based agreements to be an exercise in contract negotiation and performance stipulation. We believe the private sector will continue to consider performance-based agreements alongside the many other contract structures available to them. As with any transaction, the mitigation of risk requires investment and the level of that investment can often push project cost beyond what private-sector clients consider viable.

ESCOs that focus on generating value first and are willing to consider multiple financial structures (including blending several structures) will ultimately find the most receptive audience in the private sector. Simply stated, ESCOs will need to deliver measurable, sustainable value rather than ask clients to agree to performance in advance of performance. ⚙

## Setting Priorities is Key When Pursuing Federal Funding for Technology Development

**CCBJ: The ARRA stimulus package made tens of billions of dollars available to companies in the Climate Change Industry (CCI), from advanced vehicle technology manufacturers to renewable energy project developers and energy-efficiency contractors. What were some of the lessons learned from that process?**

AB: One of the most important things was to pick and choose your targets carefully. It's always important to do that, but with the Recovery Act funding it was especially important to prioritize because compared to typical federal budgets, the Recovery Act was like a fire hose, with so many notices of funding availability and RFPs hitting the streets in a short period.

It's challenging enough for a company to devote 200 to 250 man hours in a two- to three-month period to putting together a single competitive proposal for funding. Even if the Recovery Act created three or four or five strong opportunities for them, writing that many competitive proposals in that time frame was difficult, if not impossible, so it was absolutely imperative to think through which projects were most important to advance each company's goals.

**CCBJ: Even so, while DOE had obligated about \$33.7 billion by December 31, 2010, only about one-third of \$33.7 billion in recovery act funding had been disbursed.**

AB: The way federal funding works is you have to incur the expenses first, and then you are reimbursed, so even though all the funds have been obligated, most of the money is still at DOE. In some cases, a company can receive funds as it's getting ready to incur an expense, but either way, there is a significant time lag between the announcement of an award and the disbursement of funds.

### TechVision21

TechVision21 (Washington, D.C.) is a consulting firm that works with technology developers to pinpoint and secure federal funding; navigate federal regulations, legislation and critical policies; and build visibility among policymakers. TechVision21 also works with government and non-profit organizations to craft and implement technology-based economic development strategies.

Senior Vice President Anita Balachandra discussed TechVision21's work on behalf of companies in the climate change industry. As she explains, the Recovery Act provided a unique funding opportunity, but the imperative to obligate funds quickly complicated the challenge for many firms. Recognizing that the Recovery Act represents a one-time stimulus and that Washington is entering a period of relative austerity, she nonetheless predicts that funding for advanced energy technology will remain strong.

**CCBJ: Does this mean there are still significant opportunities for firms to subcontract with awardees?**

AB: That's hard to say across the board. For some programs, applicants can lay out the scope of work but not identify every subcontractor and still be competitive, but in other programs you do have to specify every major subcontractor, and often that's defined as anyone who's getting more than \$100,000.

**CCBJ: At year end, less than one-quarter of DOE's \$73.8 billion in available loan guarantee funds had been committed, some conditionally and some in final contracts. What opportunity do these programs represent for firms in the CCI?**

AB: We had a number of companies inquire about the loan guarantee programs, so early on we distilled the 120-page Federal Register announcement into a 10 or 15 page guide. When clients saw what it was going to cost to apply, the information they'd need to provide, the outside consultants that they'd have to engage for independent engineering and accounting assessments, every one of them opted not to go forward. We didn't mean to discourage them; we were trying to be realistic and honest. We are working on a loan application for the Advanced Technology Vehicle Manufacturing loan program, but that predates the Recovery Act.

**CCBJ: What do you think cleantech firms can expect in the 2011-2012 budget?**

AB: We had federal support for cleantech R&D before the Recovery Act and we will continue to have federal support after it. We are going into a pretty austere period right now in budget terms, but the energy technologies have been repeatedly cited as a top priority for the administration. Both parties are looking for ways to streamline programs, which is a good thing. With the release of the President's budget, we will know more about the Administration's strategy for dealing with the new Congress.

**CCBJ: What can you share about your strategy for helping clients win federal fund competitions?**

AB: Well, as I said earlier, it is really critical to think strategically and methodically about your priorities. Once you know, for example, whether your first priority is developing your next generation product or deploying a pilot-scale system of your current generation product, you can look across agencies at the types of programs that are available to you. We ask them to start by telling us what they want to do and what it's going to take to get there.

People assume if you're dealing with energy you have to go to DOE, but if you're proving out a concept for a system that works at a certain scale and you want



to put two or three units out in the country to demonstrate how well they work, you should consider the Rural Energy for America program at USDA.

You might be able to find a rural hospital that can put your system in place, creating an opportunity to prove and publicize the benefits. USDA has funded a number of cleantech deployments. They're also relatively accessible and easy to deal with.

We're working with an electric co-operative that is building a new LEED certified building, and they've applied to USDA to fund just the geothermal systems. The grant will allow them to not only improve the energy payback of the system but also to charge a lower rate for their customers. USDA Rural Development has a whole suite of grant and loan programs that can be used to deploy renewable energy.

**CCBJ: How do you structure your contracts and organize your consulting?**

AB: We generally prefer to work on a retainer basis, with a typical initial agreement for 12 months. Once we've developed a strategy, we work with the companies to execute on the priorities. Typically that means drafting a white paper describing the technology and its applications, briefing program managers and congressional staff, and working through funding opportunity announcements once they are published.

We prefer to be engaged with a company before their first funding opportunity. That gives us time to get to know them and develop the strategy. It also gives us time to meet with the agency program managers before the solicitation hits the street. We get a sense of their research priorities and give them a sense of what we have to offer.

It's not like saying 'I'm going to sell you a blue car so please write a solicitation for blue cars.' It's 'We think we can accomplish this, how does that fit? Is it

close to what you want?' In some cases a technology bridges two different topic areas. This is the dialogue that we want to get started before the solicitation comes out. We're trying to find the areas of common interest between the agencies and the clients. That's a big part of what we do.

Once the funding notice is out, we'll go through it and develop an annotated outline to guide the proposal development. We'll highlight the specific challenges the agency is asking applicants to address, the level of specificity they are requesting and so on.

Usually the companies write the proposals themselves, and then we'll do a pretty intense gap analysis, as well as shaping and editing the narrative.

**CCBJ: In addition to your experience at Department of Commerce, many of your colleagues have extensive backgrounds in government and public policy. TechVision21 CEO Kelly Carnes is a former assistant secretary of commerce for technology policy. How do you use this Washington experience on behalf of clients?**

AB: We really understand the Executive Branch agencies and how their programs work. This understanding allows us to explain to our clients the agency's objectives in running a particular program, which in turn allows our clients to submit truly responsive proposals.

We've also worked at different levels of government, that is, both career staff and political appointees, state and federal, so we have a pretty comprehensive understanding of the dynamics between these different entities—each with distinct interests and jurisdictions. Finally, because of our backgrounds and the policy work we continue to do, we are known for our expertise in technology commercialization, STEM education, workforce development, and technology-based economic development issues. ⚙

## Certifier Defines Sustainable Development at the Local Level, Creating Benefits for Host Communities

*Gold Standard Foundation addresses confusion over the meaning of "high quality" offset projects by targeting the poorest parts of the United States.*

### The Gold Standard Foundation

The Gold Standard Foundation (Cambridge, Mass.) is a leading certifier of carbon offsets from renewable energy and energy efficiency projects that meet strict additionality criteria and deliver environmental, social and economic co-benefits to the communities where the offset projects originate. Lisa Hodes Rosen is general counsel and director of U.S. Markets. Prior to joining the Gold Standard, Rosen practiced environmental law in matters arising under Superfund, the Clean Water Act, the Clean Air Act and other environmental laws, as well as issues related to climate change.

**CCBJ: Why is the Gold Standard needed when the Clean Development Mechanism and voluntary carbon trading platforms already require third-party certification of offset projects?**

LHR: The Gold Standard Foundation was founded in 2003 by a network of large nongovernmental organizations, including the Worldwide Fund for Nature, in response to criticism that the Clean Development Mechanism was not adequately addressing sustainable development.

Key to the Gold Standard's formula for a high quality project is the involvement of the project's local host community—those most affected by climate change—without whose cooperation projects are more vulnerable and likely to fail. As a result, hundreds of communities have reaped co-benefits such as job creation, improved health, better healthcare

services, access to affordable electricity and stimulus to the local economy.

Our buyers and supporters include the United Nations Foundation, the United Kingdom, Belgium, the Netherlands, Germany, and the Renewable Energy and Energy Efficiency Partnership (REEEP), which represents multiple European governments and Fortune 500 companies, such as Virgin Atlantic and Newscorp. These buyers have established the Gold Standard as a clear leader in mitigating climate change by consistently demanding Gold Standard carbon credits, which command a significant price premium over competitors.

**CCBJ: You're an NGO, so it may sound odd to ask about competitors, but are there other NGOs or private organizations that perform a function similar to yours?**

LHR: There are 15-20 offset certification standards operating in the voluntary carbon markets. Some of these standards claim to certify "high quality" offset projects, causing confusion among the general public and policymakers. This confusion is especially prevalent in the United States. To overcome this challenge, the Gold Standard plans to build its U.S. project supply in the poorest areas of the country, allowing them to benefit from carbon finance and tangible sustainable development efforts. The Gold Standard defines "sustainable development" on a local level, and despite the perceived wealth of the nation, many areas in the United States are very poor. The Gold Standard was established to fill this market need, and plans to start doing so in the upcoming year.

**CCBJ: What's your budget and major sources of revenue?**

LHR: Our fiscal year 2010 budget was \$2.5 million. We are funded through a mix of certification income and grant funding.

**CCBJ: What impact do you think the Federal Trade Commission's "green guide" for carbon offsets will have on the voluntary carbon market?**

LHR: We commend the FTC for taking steps to mitigate consumer confusion around offsets. The three proposed offset guidelines relate to carbon accounting, additionality and the timing of an emissions reduction claim. These proposed guidelines echo the general consensus in the voluntary market that emissions reductions from offset projects must be real, additional, verifiable, permanent, traceable and enforceable.

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*Emissions reductions from offset projects must be real, additional, verifiable, permanent, traceable and enforceable.*

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**CCBJ: The Gold Standard Foundation certifies offsets in both voluntary and compliance (Clean Development Mechanism) markets. How much of the offset volume certified (by mtCO<sub>2</sub>e and dollar value) has been in each category? What developing countries supply the largest amounts of offset credits?**

LHR: As of January 2011, the Gold Standard has certified over 580 projects and issued over 5.2 million credits. Generally, 50% of our business can be attributed to certifying voluntary projects and 50% to labeling CDM projects. China, India and Turkey are our largest markets. Historically, we have not had a great deal of visibility into the liquidity of the voluntary market, but that is changing with the emergence of players such as the Carbon Trade Exchange.

**CCBJ: How will California's commitment to implement cap and trade—with the likely participation of British Columbia, Quebec and Ontario—change**

**the North American carbon market?**

LHR: California's commitment to cap-and-trade is important because if it is successful, then it can set a prominent example for the rest of the country that cap-and-trade and market-based mechanisms are the best tools for addressing climate change mitigation. It is necessary to note that the Regional Greenhouse Gas Initiative (RGGI) is still operating in the northeast. Since its inception, RGGI states have raised tens of millions of dollars that have either been re-invested in reducing energy bills for residents, energy efficiency programs or creating clean energy jobs. In Massachusetts alone, over 2,000 new jobs can be attributed to the RGGI program.

RGGI may have also saved jobs. Some states have used the money raised from RGGI auctions to plug holes in their state budgets, likely saving the jobs of thousands of state workers, including teachers. If California can similarly prove that cap-and-trade is good for the economy overall, then we will see a revival of cap-and-trade legislation in the United States.

**CCBJ: California has offset protocols for urban forestry, forest management, dairy methane digesters and domestic high-GWP gas destruction. Will California dairy methane projects qualify for GS (as renewable energy)? Are you considering extending your criteria to include California's other approved project types?**

LHR: Dairy methane projects in California will qualify for Gold Standard certification if the projects can meet Gold Standard's strict technical, additionality and sustainable development criteria. Gold Standard is actively looking at ways it can fit within the framework being defined by the Air Resources Board.

**CCBJ: What are you doing to make the Gold Standard more accessible to grassroots organizations in developing countries?**

LHR: The support of NGOs in developing countries is crucial to the Gold Standard's success as they serve as the Gold Standard's "eyes and ears" on the ground. The NGOs, who apply to become a Gold Standard NGO Supporter, attend local stakeholder meetings and provide critical feedback on the impacts of a proposed project. In several instances, the Gold Standard delayed a project's registration until the project developer resolved the concerns of a local NGO Supporter. To date, the Gold Standard has over 65 NGO Supporters.

**CCBJ: What are your goals for the next two to three years?**

Having established itself as the benchmark standard for high quality offsets, the Gold Standard must maintain and build upon this leadership position in the United States. Its three immediate goals are: 1) to develop greater awareness of the benefits of its approach among governments and businesses, which will further build the demand for, and supply of, Gold Standard projects and credits; 2) to build capacity among auditors and governments to certify projects against the Gold Standard and; 3) to expand the range of project types and methodologies that are applicable under the Gold Standard. For example, the Gold Standard is considering methodologies that would support the switch to lower carbon vehicles.

For the medium and longer term, the Gold Standard will identify additional areas into which it can bring its unique combination of environmental rigor, sustainable development expertise and financial acumen. This approach will be delivered across three themes: increased activity within the carbon markets beyond renewable energy and energy efficiency; a focus upon energy markets outside of the carbon sector; and bringing the Gold Standard's values and value-add to new environmental markets such as water and ecosystem services. ⚙

## NEI Lays Out Goals on Behalf of Nuclear Energy Industry

*Nuclear Energy Institute advocates better access to a larger volume of DOE loan guarantees, FedCorp to manage nuclear waste, repeal of state moratoria, and construction cost recovery.*

**CCBJ: Most analysts say the United States cannot reduce greenhouse gases from the power sector without increasing nuclear capacity significantly. What are the nuclear industry's top policy priorities in the 112th Congress? What are you hoping for from state legislatures over the next two years?**

LK: We'd like to see technical corrections made to the Department of Energy's clean-energy loan guarantee program so that the companies that need this federal backstop the most—those seeking to build in competitive electricity markets—can access the loan guarantees with reasonable fees.

NEI also supports increased loan guarantee volume so that project developers can have clear line of sight that financing will be available. This will be necessary if we expect them to continue spending the millions of dollars—or, in the case of new nuclear power and fuel supply facilities, billions of dollars—necessary to maintain project schedules. If Congress chooses to impose limitations on loan volume—and we are not persuaded that such limitations are necessary in a program where project sponsors pay the credit subsidy cost—then those limitations should be commensurate with the size, number and financing needs of the projects. In the case of nuclear power, \$18.5 billion is not sufficient.

For purposes of regulatory continuity, NEI also advocates swift re-confirmation of William Ostendorff and Kristine Svinicki to their posts on the five-member Nuclear Regulatory Commission. His term expires this June, and her term expires in June 2012. The NRC always

### Nuclear Energy Institute

The Nuclear Energy Institute (Washington, D.C.) is the policy organization for the nuclear technologies industry. NEI has nearly 350 members in 19 countries including nuclear power plant operators, design and engineering firms, fuel suppliers and service companies, companies involved in nuclear medicine and nuclear industrial applications, universities and research laboratories and labor unions. Leslie Kass is senior director for business policy and programs.

operates best when it has a full complement of five commissioners.

We'd also like to see legislation that would establish a federal corporation (FedCorp) to manage a government storage program for used nuclear fuel. The nuclear industry believes that an effective used fuel management program must have stable management and continuity of funding that is not subject to the constant turnover that comes from changes in political administrations.

We advocate repeal of moratoria that exist in some states barring nuclear plant construction. This would allow state leaders to put nuclear energy back on the table for consideration. Along with this, we believe it's important that states increase consideration of construction work in progress legislation that allows nuclear plants to qualify for recovery of certain construction and pre-construction expenditures from ratepayers.

**CCBJ: Within the utility industry, nuclear is widely seen as the best generation technology for increasing low-carbon power, yet critics point to risks from nuclear waste. How do you reassure citizens who live near proposed new reactor sites (where waste will be stored onsite)?**

LK: Particularly with citizens who live near reactor sites, our primary goal is to



show, not tell, them about used nuclear fuel. Many people are not aware that used nuclear fuel consists of solid fuel pellets contained in steel fuel rods inside engineered fuel assemblies. Cutaway images showing how these components are safely and securely stored in containers are very reassuring. It also helps when citizens can see images of plant employees working next to dry storage containers and understand that used fuel is continually monitored by health physicists and the Nuclear Regulatory Commission.

It should be noted, at the same time, that most of the plans for new reactors to date would increase the number of reactors at sites that already have operating facilities and where area residents voice strong support for nuclear energy. In the most recent “plant neighbor” survey conducted for NEI by Bisconti Research with Quest Global Research Group in July 2009, 90 percent of Americans living near nuclear power plants said they view the local nuclear power station positively, and 76 percent expressed support for construction of a new reactor near them.

**CCBJ: The existing fleet of nuclear plants has increased its output through improved capacity utilization, but every plant must eventually be decommissioned. What’s the lifespan of the current fleet of nuclear reactors? Will a large number be decommissioned in the next decade?**

LK: No. Since the year 2000, the Nuclear Regulatory Commission has approved 20-year license extensions for 61 reactors, and license renewal applications for another 21 reactors are under review. Many additional reactors have not operated long enough to qualify yet for license renewal. The 20-year approvals to the original 40-year operating licenses mean that existing reactors will operate into the 2030-2050 period.

**CCBJ: When CCBJ last covered the nuclear power industry in September**

**2009, the NRC had received 18 license applications for new reactors, was expecting almost that many more in 2010, and anticipated issuing its first license as early as early as 2011. What’s the status of the nuclear new-build market?**

LK: Thirteen applications for 22 possible reactors that would be built over the next 10-20 years are under active review at the NRC. Progress toward nuclear plant construction continues at the measured pace that industry has predicted for several years. The first wave of new nuclear plant construction is expected to see four to eight new reactors begin producing electricity between 2016 and 2020.

Some plans for major capital projects including new nuclear projects have slipped by a few years, partly in response to lower-than-expected electricity demand and partly in response to near-term financial pressure on power companies. But the electric sector’s long-term fundamentals and the industry’s long-range plans have not changed. Companies that may not start building right away still are pursuing NRC combined construction and operating licenses or early site permits to reduce their time to market when the market rebounds.

**CCBJ: Proposed new reactors will be built using advanced technologies that have yet to be deployed in the United States. To what extent have these technologies been deployed in other countries? What kind of operational track record has been established that U.S. utilities and developers can point to?**

LK: Advanced reactors similar to designs currently under review, such as the GE-Hitachi/Toshiba ABWR, have been operating in Japan for a decade. Others are under construction in China, Finland and France. The lessons learned from these operations and construction [projects] are being incorporated into the designs currently under NRC review.

Once the designs are approved and the U.S. first-of-class licensing complete, subsequent license application schedules should be significantly shorter. An NRC review of subsequent license applications that reference an early site permit and a certified (approved) design should be complete in 24 months or less. In addition, history has shown that, when lessons learned from Japanese, Korean and French and initial U.S. construction projects are incorporated into subsequent projects, the result is reductions in construction schedules.

**CCBJ: Should nuclear power be included in existing state or potential federal renewable energy standards?**

LK: The Nuclear Energy Institute does not describe nuclear energy as a “renewable” technology. At the same time, if the goal of any legislative proposal is to achieve meaningful reductions in greenhouse gas emissions in the electric sector, it is impossible to ignore the fact that 70 percent of the carbon-free electricity generation in the United States is provided by nuclear power plants. On that basis alone, it is understandable why there is considerable discussion about including nuclear energy in approaches to accelerate the transition to low-carbon energy technologies.

**CCBJ: A handful of states have enacted policies that allow incremental cost recovery for new nuclear power plants in development and construction. How important are such policies for financing new nuclear capacity?**

LK: They are important. They have the dual benefit of stimulating investment and lowering overall project costs, which translates into a savings for consumers once these long-term investments in energy reliability and energy security are operating. These policies are a big reason that hundreds of additional workers already are on site in Georgia and South Carolina doing preliminary activities to expand the Vogtle and V.C. Summer power stations. ⚙

## Sustainable Design Must Generate Bottom-Line Value for Infrastructure Clients

**CCBJ: What growth do you foresee in low carbon and renewable power markets in 2011-2102?**

DM: I'm sure we'll see a surge in growth of renewable energy of all sorts and particularly in large, utility-scale applications such as solar concentrating power. I believe we'll also see municipalities and industrial facilities begin to consider more generation of renewables within their existing facilities. We're already seeing a large increase in demand for renewable power, ranging from requests to install solar panels in facilities, to capturing methane emissions and other waste by-products to produce thermal or electrical power.

**CCBJ: How do you define sustainable infrastructure development? What policies are driving this trend in the U.S.?**

DM: At MWH we look for opportunities within all of our infrastructure projects for more sustainable engineering and design. We have found that, done correctly, this approach consistently drives bottom-line value for our clients in terms of real monetary savings.

Sustainable infrastructure development is, simply, being as efficient as you can in the origination, use, reuse, and disposal of materials during all phases of any infrastructure asset's lifetime. Whether that means procuring locally, using recycled content, or simply using less of a commodity such as energy or water, there are many means to save money through sustainable practices at nearly any facility.

While federal policies around GHG are driving some sustainability trends, we see state policies having more of an impact on regulating and encouraging sustainable development. In the absence of strong federal legislation, many states are

### MWH Americas Summary

MWH Americas (Broomfield, Colo.) is a division of MWH Global, which describes itself as the "global leader of the wet infrastructure sector," including water supply, treatment, water resources management and design and construction of hydropower facilities. MWH Americas has a presence throughout North and South America, and in addition to "wet infrastructure" projects, the firm provides engineering services for solar PV, wind, biomass power, biogas and waste to energy projects. MWH Americas President Dan McConville discussed the firm's work and perspective on sustainability and clean energy.

setting their own policies to encourage a greener economy within their jurisdiction.

**CCBJ: With an increasing number of new policies driving sustainable infrastructure development, what should industries and municipalities be watchful for on the horizon?**

DM: Lack of federal legislation in clean energy or climate change has only spurred individual states to set policy and standards for themselves. Most recently, states such as Colorado and California have increased their Renewable Energy Portfolio Standards. A number of states have charged ahead in creating carbon markets, such as the 10 New England states involved in the Regional Greenhouse Gas Initiative and California's new Cap and Trade program.

I believe increasing renewable energy standards will have an influence on the overall business climate of these states, and will encourage resident businesses to have conversations about their own carbon footprint. Smart businesses will carefully watch the sustainability climate of their local government and work to stay ahead of the regulatory curve.

**CCBJ: How do you encourage sustainable practices in projects not typically considered green, such as water treatment plants?**

DM: One of the key drivers for municipalities and utilities is to control their costs and balance their operating budgets. Water treatment and wastewater systems can be expensive to operate, so when we can come to them with a design that is

not only more sustainable but one that also helps reduce their operating costs, they become very interested. This "bottom-line" perspective makes a lot of sense to clients looking to manage projects more efficiently, at a lower cost, and with a higher standard of green performance than traditional facilities.

This approach also resonates well with our industrial clients. Reducing the carbon footprint of an industry may have some initial up-front costs, but when we can show the long-term financial savings, the value of cap and trade participation, and the short ROI periods associated with lower carbon footprints, they become very interested. The "green" benefits of making these changes only enhance the positive aspects of sustainable operational changes.

For example, we were approached by a multinational client in the U.S. that needed help controlling and reducing their energy costs. We worked with the client to reevaluate the approach: instead of focusing on energy costs, we suggested they manage their carbon emissions. By taking the high-level approach, we were able to realize not only the energy savings they were looking for, but also the additional benefits of reduced greenhouse gas emissions.

**CCBJ: What have been some of your key success over the last two years in helping industries reduce their carbon emissions? And the main challenges in doing that work?**

DM: We have helped organizations ranging from utility providers and mu-

municipalities to large industrial clients. We have clients that have contracted with us solely to use our carbon assessment and implementation services. However, most of the time we work with our existing infrastructure clients to perform carbon footprint audits and provide recommendations for potential carbon reductions and energy savings.

For example, MWH worked with a client in the Washington DC area to identify ways they could save money and reduce their carbon footprint. The changes we recommended, which included low cost equipment maintenance and operational changes, will result in significant savings, with less than a two-year payback.

Recent legislation has encouraged grants, loans and tax incentives to improve the environmental performance of our clients. While these have provided crucial capital for green projects, it has also proven challenging to follow the myriad of resources available, which vary by location and constantly change as incentives expire and new ones become available. MWH keeps working hard, with dedicated staff, to help our clients maximize the use of these incentives.

**CCBJ: MWH has been involved with climate change education in schools. How does one teach students what climate change may mean for their future while giving them cause to hope that governments, citizens and businesses can solve the problem?**

DM: At MWH we've really enjoyed working with schools all over the country to increase student awareness of our climate, including the water cycle, the impact of pollution, and the contribution everyone can make to reduce their carbon footprint. These climate change programs are well-received by both students and teachers. Students are excited about the topic and are energetic participants in the activities and discussions.

The activities in our education programs start by helping students to understand the science behind the greenhouse effect and the implications of a changing climate on the water cycle in particular. Rather than focusing on doom and gloom predictions, the session then turns to action—how students can make a difference now and in the future. We hope to empower students to make changes in their own habits now, so that those lifestyle choices can be sustained in the future.

Our community outreach activities support our company's mission of Building a Better World. We strive to leave a lasting legacy in the communities in which we work, and educational outreach is a great way to do that. Outreach also provides an opportunity for students to interact with engineers and scientists, and perhaps spark an interest in pursuing a technical career. A student in our class today may end up being a valued environmental engineer in our community tomorrow!

**CCBJ: Given the large numbers of Americans—including media personalities and members of Congress—who think that climate change is a liberal-socialist plot to undermine the American way of life, what can solution providers like MWH do to focus clients on climate change mitigation and adaptation while avoiding political controversy?**

DM: Political controversy will always exist in our government, whether around climate change, healthcare, fiscal policy or the military. We focus instead on the realities our clients are facing, which is their need to reduce operating costs, save energy and improve their bottom lines, while operating below current or potential GHG thresholds. We talk about being good environmental stewards and using sustainable practices to improve the quality of the area in which they live and work. Discussing the value of change in both dollars and in corporate responsibility always resonates. ⚙

## Climate Change Transforms Water Treatment into a Resource Recovery Industry

*The industry must 'mine' non-GHG-emitting energy from wastewater, in addition to reducing fossil fuel energy used in treatment.*

### Kennedy/Jenks

Kennedy/Jenks (San Francisco) is a consulting engineering firm active in water environment, transportation and industrial sectors with more than 500 staff working at offices in California, Arizona, Colorado and Hawaii. Dawn Lesley is sustainability leader for the firm. A licensed professional Environmental Engineer in Oregon and a LEED AP, Lesley has 15 years of experience in municipal and industrial wastewater plant operations and design.

**CCBJ: In broad terms, how is climate change – both the potential impacts and the pressure to mitigate greenhouse gas emissions – transforming the wastewater treatment industry?**

DL: Wastewater treatment evolved first to protect public health and then in response to environmental impact concerns. Climate change provides a new set of drivers, transforming the industry to one of resource recovery.

When Western society moved from the outhouse to indoor plumbing—the “water closet”—the first sanitary engineering mainly involved moving dirty water out of the center of town and into the nearest water body, be it a river or ocean, or even a lake. As population and industry increased, environmental impacts—massive fish die-offs, the Cuyahoga River catching fire—on these receiving waters drove regulations requiring centralized collection and treatment of wastewater.

The first wastewater treatment regulations were aimed at removal of organic



material and suspended solids, and (for industrial dischargers) pH adjustment. Over time the regulations have steadily become more stringent for these constituents, and broader to regulate additional constituents such as bacteria, nitrogen, phosphorus, and even temperature. But still the emphasis was to make wastewater “less bad” (to quote William McDonough).

Climate change brings very different drivers to the industry. First, every climate change scenario model predicts significant to massive changes in the distribution of precipitation. While there are many different wrinkles to various model scenarios, the bottom line is we expect climate change to cause localized and regional water shortages in many areas around the globe. The water industry has already been grappling with population pressure on water supply for decades; this adds tremendous weight to the problem and puts the spotlight squarely on all freshwater being “precious,” even wastewater. This provides a whole new reason to reuse treated wastewater, not just to protect the river but to see the water itself as a resource. The Water Environment Federation had a campaign several years ago, reminding us that “Water is Water is Water.”

Second, after a delay of a decade or so, climate change is finally driving efforts to really do something to reduce human-caused GHG emissions. The wastewater industry is contributing to this quest in two ways, one is to ‘mine’ renewable (non-GHG-emitting) energy from the wastewater, the other is to reduce fossil fuel energy used to deal with wastewater (and water).

Because water is heavy, we recognize that it is energy-intensive at both ends of human use, the pumping, treatment, and distribution of drinking water as well as the collection, treatment, and disposal of wastewater. This has driven a productive national and global conversation about the “water-energy” nexus, which Kennedy/

Jenks has advised should really be discussed as the “water-energy-carbon” nexus, to further emphasize that connection.

**CCBJ: As you note, treated wastewater is expected to be an increasingly important water resource in regions suffering from decreasing precipitation. How does water re-use also function as a GHG mitigation strategy?**

DL: Water reuse functions as a GHG mitigation strategy when reuse water can be substituted for a higher-energy water source. This can play out in many different site-specific ways, but generally speaking, traditional freshwater supplies are over-allocated and shrinking, while new freshwater supplies to satisfy increasing demands are becoming more energy intensive. Ground water is being pumped from deeper and deeper sources, surface water is being pumped over faraway mountain ranges, and ocean water is being desalinated. When the energy used to accomplish this is fossil fuel energy, the GHG emissions implications are clear.

Meanwhile, communities generate a steady flow of good-quality water from their wastewater treatment systems. This is water in which we’ve already invested significant resources to make it safe and environmentally benign, and it often requires very little additional energy investment to make it suitable for many many important uses: irrigation, industrial cooling water, washdown water, and more. Even indirect or direct potable reuse can make sense from an energy standpoint in areas where the potable supply is extremely energy-intensive. Using less fossil fuel energy to supply water needs directly reduces GHG emissions associated with that energy.

**CCBJ: Indirect potable re-use has only been implemented by a couple water utilities in the United States. Do you see this strategy increasing with growing water stress?**

Indirect potable reuse will undoubtedly increase; it already is. It’s important to note that we have already had “indirect potable reuse” ever since we first discharged wastewater into a river upstream from another community’s water intake. In the absence of a frank community discussion and gaps in basic science education, the public has defaulted to “magical thinking” about this for over a century. The public tends to feel more confident about “natural” river water being treated to drinking water standards than they do about a demonstrably much cleaner water source flowing from a reclamation facility. The planning and engineering communities can do a much better job of explaining that, truly, water IS water IS water.

GW Miller (WateReuse Association 2007) suggests a 7-step public acceptance strategy as follows:

1. Agree on Terminology;
2. Develop a Positive Brand;
3. Learn How to Communicate Risk;
4. Conduct the Necessary Research on Microconstituents such as Endocrine Disrupting Compounds and Pharmaceutically Active Compounds;
5. Educate the Politicians;
6. Embrace all Stakeholders; and
7. Educate the Public on the Value of Water.

These steps would go a long way toward improving public acceptance of this important water supply.

**CCBJ: For digester gas to energy projects (CCBJ Oct/Nov 2010), some wastewater treatment plant (WWTP) operators are augmenting sewage with food and other waste to increase biogas production. How much additional energy can be produced, and what are the challenges?**

DL: A large amount of energy is available in waste materials, and some of these materials—in particular fats, oil, and grease (FOG) and food waste—are suitable for anaerobic digestion systems

operated by WWTPs. For WWTPs with excess digester capacity, the economics of this can be very favorable, as a few WWTPs have recently discovered. In the case of the City of Millbrae, Calif., adding a FOG receiving station and the revenue source from FOG tipping fees allowed the City to upgrade an aging cogeneration system that seemed headed for the scrap heap, as well as to improve the digester mixing system. Now the City produces more electricity and less biosolids, while enjoying the benefits of easier operation (due to upgraded facilities) and a new revenue stream from the FOG.

Nationwide we estimate that approximately 600MW of electricity could theoretically be generated from commercial FOG and food waste, were it to all be processed using existing technology (anaerobic digesters and internal combustion cogeneration engines). However, there is a huge infrastructure gap: nationwide very few WWTPs actually utilize anaerobic digestion for solids processing, and only 20 percent of those utilize the biogas that is generated from anaerobic digestion.

Electricity and natural gas are so inexpensive, it is very difficult to get a reasonable payback period on infrastructure development. Public agencies are under increasing pressure to “do more with less” as their budgets are cut and their regulatory requirements increase, making it difficult to implement long-term visionary, “optional” programs such as energy recovery when a large capital infrastructure investment would be required. Low landfill tipping fees and poor or nonexistent grease ordinances in most of the nation are also disincentives.

Specific to food waste, additional challenges include the difficulty of obtaining good quality material that does not compromise the anaerobic digestion process or the acceptability of the final biosolids product. Political turf battles over ownership of combined waste, lack of quality control in source separation, and lack of

separation infrastructure are all barriers to implementing commercial food waste collection and processing at WWTPs.

Success of the City of West Lafayette, Indiana at overcoming such barriers shows it's possible. The city had the favorable quaternary of existing digester capacity, an existing high-quality source of separated commercial food waste (Purdue University's cafeteria), funding incentives, and a highly motivated utility director. Implementation of this program is reducing the WWTP's power bills, reducing truck traffic and associated emissions and helping the City achieve its sustainability goals.

Clearly, the combination of rising energy costs, shrinking landfill space, and increasing emphasis on GHG emissions reduction will continue to drive us in the direction of recovering more energy from our wastes. In some cases the WWTPs will be the right place to implement this. In others, giant gaps in infrastructure and shrinking public agency budgets will necessitate the development of privately owned and operated infrastructure.

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**CCBJ: Phosphorous removal is an important part of wastewater treatment. By using it in byproducts like fertilizer, WWTP operators can earn revenues, while GHG emissions caused by mining phosphorous can be avoided. What's the potential for greater economic use of phosphorous in wastewater?**

DL: Phosphorus recovery is beneficial for the reasons you have stated in the question, *plus* we're starting to see data indicating that the world is facing a global shortage of phosphorus, a situation tidily summed up by the phrase “Peak

Phosphorus,” which may be imminent. Underground reserves of phosphorus are finite and we may have already passed the peak point of mine extraction, after which it becomes harder to find, harder to mine, and therefore more expensive.

With some notable exceptions, WWTP operators are moving slowly on this. There is great interest, but the economics aren't there yet to support a widespread embrace. I have no doubt this “mining” of wastewater is going to increase, but the entire industry is reeling from three simultaneous stresses. One, public agency budgets are stretched extremely thin, making it difficult to spend precious FTE planning and implementing an “optional” plan such as this one, even though it may have long-term payback. Long-term operational savings that may seem like a good idea in theory take a back seat to the near-term lack of funds for capital investment.

Two, public infrastructure is aging and it takes more and more time and attention to merely hold the WWTP together and meet increasingly stringent permits. Again, “optional” programs seem a luxury to many agencies. Three, baby boomers are retiring and a lot of institutional knowledge is leaving the WWTPs with them. On a good day, this may bring in fresh ideas including phosphorus removal. On a bad day, it's just another stressor making it more difficult to meet permit.

The places where phosphorus recovery is moving most quickly are those places where TMDLs [total maximum daily loads] and other regulations are ratcheting down on phosphorus discharge limits, providing the driver that makes P removal no longer “optional,” but necessary to meet permit. That driver brings everyone to the table, and when they see that P can be a valuable fertilizer commodity and has the long-term economic benefit, it makes the approach very attractive. ⚙

## Greenhouse Gas Management Software Expected to Grow Despite Absence of a National Standard

*Ironically, failure to pass a federal law may actually increase the need for software solutions to replace spreadsheets.*

**CCBJ:** A year ago, an oddsmaker might have given a U.S. national cap and trade law a 50/50 chance. Now the odds are about zero of such a policy being enacted by the 112th Congress. How has this changed the market for GHG management software?

JSL: Ironically, lack of progress on a U.S. national standard actually increases the need for GHG management software. Climate change is the most complex and difficult environmental regulatory challenge of this era. If there were a single, stable U.S. standard, more companies might be tempted to continue trying to comply by using spreadsheets. It would be a mistake if they did, because they would still be addressing GHG in a management silo and missing out on the many advantages of managing GHG as part of a comprehensive approach to EHS and sustainability.

Without a U.S. national law, however, more and more overlapping, ever-changing regulations are being enacted at the state and even local levels. These challenges are compounded, of course, when companies are operating beyond U.S. borders and trying to cope simultaneously with reporting requirements worldwide. Mandates based on industry standards, best practice guidelines and corporate policies make full compliance even more difficult.

To make matters worse, escalating compliance challenges also tend to interfere with much needed energy efficiency programs. Companies that rely on a smorgasbord of spreadsheets and home-grown systems to track GHG emissions

### IHS

IHS (Englewood, Colo.) is a leading source of information and insight in energy, economics, geopolitical risk, sustainability and supply chain management. Founded in 1959 and publicly traded since 2005, the company employs 4,400 people in more than 30 countries, speaking 50 languages. GHG and energy management software are important components of the firm's EHS and sustainability solutions. J. Scott Lockhart, vice president, Environmental Solutions, discussed the market trends with CCBJ.

are much less likely to have the bandwidth or analytic tools required to track and optimize their energy consumption, so this critical business priority could end up being neglected.

For all of these reasons, we believe that demand for enterprise-level GHG and energy management software solutions will continue to grow and that IHS will continue to extend its leadership position in this space.

**CCBJ:** What other political or regulatory developments are influencing this market?

JSL: The most recent political and regulatory change impacting this market is the U.S. EPA's decision to add carbon as an additional dangerous pollutant under the existing Clean Air Act. This has cemented our position that carbon emissions should be viewed as additions to a long list of chemical emission that require management and reporting.

Enterprise information management systems must be able to meet both industry specific carbon related regulatory requirements along with tracking required to meet cap and trade programs. That's why more and more companies are taking the opportunity to manage GHG emissions within a broader environmental sustainability management solution set – one that also supports product stewardship, supply chain management, operational risk management and corporate responsibility reporting. By addressing these challenges holistically, companies are achieving their goals for new efficiency and operational excellence.

**CCBJ:** Verdantix and other observers of the GHG management software space have ranked IHS (since its acquisition of ESS and ESP) as one of the leaders. Yet many VC-funded start-ups and large enterprise software firms are competing hard for this growing market. What are your key competitive advantages?

JSL: Startup vendors who provide a narrow GHG solution are unable to support compliance with increasingly complex regulations, much less offer users the opportunity to achieve operational efficiencies enterprisewide. Other so-called enterprise vendors who provide systems that only aggregate data at the business unit level are unable to provide the detailed visibility necessary to trace potential problems down to the equipment level and take corrective action. IHS offers broad, deep, bottom-up enterprise solutions that customers really need.

While new competitors do keep popping up, only well-established providers that have a strong track record will be trusted by industry leaders to support their GHG compliance and sustainability programs.

**CCBJ:** When we covered this space in the Fall 2010, companies told us that most of their potential clients were still using spreadsheets. Is that your perception?

JSL: Yes, we still see companies tracking GHG emissions data on countless spreadsheets or on homegrown software systems. However, organizations with large numbers of assets are recognizing that spreadsheets and legacy systems are incapable of handling complicated regulatory schemes



for carbon management. They come to us seeking enterprise-level solutions that will help them reduce the number of disparate systems in order to reduce operational complexity, risks and costs.

Companies in the asset-intensive process industries – those with the largest environmental footprints – are adopting enterprise-level GHG software solutions most readily. Many of them have been dealing successfully with environmental compliance challenges – air, water, waste, refrigerants, etc. – for years by using enterprise-level EHS software systems, including IHS solutions. So they were quick to see that they could monitor and manage GHG emissions more efficiently and effectively by taking the same approach here, sometimes by building upon existing EHS and sustainability software platforms.

However, companies from a broad variety of other industries that have traditionally had smaller environmental footprints and been subject to fewer compliance mandates are also beginning to adopt more sophisticated GHG software solutions. IHS has a number of important new clients from these industries who see increased carbon regulation as inevitable and are getting out in front of both the management challenge and their competition. Customers who are stuck in the spreadsheet era need help developing a business case for change. Our experts work closely with them to justify the necessary investment.

**CCBJ: Do you combine strategic consulting around GHG management with your software, or do you partner with other providers of such services, like assurance firms?**

JSL: We do both. IHS is unique in our ability to provide a comprehensive array of strategic consulting services in combination with the best information content and enterprise software solutions in the business. Our extended family of energy and climate change experts at IHS CERA

and IHS Global Insight can help organizations foresee the impact of existing and projected policies on their operations and develop scenarios to optimize their business strategy. And our professional services team within the IHS EHS and Sustainability group includes industry and technology experts with unparalleled experience in regulatory applicability analysis and global system implementations, as well as outstanding technical support.

We also work closely with world-class large system integrators and environmental consulting firms. Together, we provide clients with the industry, domain and technical expertise they need to ensure the success of their EHS and sustainability software projects. IHS partners deliver a full complement of services including site assessment, work plan development, data analysis, software configuration, systems integration, report writing, database management, systems testing, managed services and overall project management.

**CCBJ: We've heard from some in the assurance industry that a global framework for reporting carbon emissions and sustainability is needed to give investors confidence in company disclosures. What standards do you incorporate in your software? What's your perspective on the need for globally consistent standards?**

JSL: We agree that globally accepted standards for carbon management or sustainability reporting are important to give investors and other stakeholders clear insight into their organization's performance and its ability to manage financial, regulatory and operational risks relative to its competitors, as well as its internal goals. IHS software for GHG and energy management is configured to meet standards like those put forth by respected organizations like the Carbon Disclosure Project (CDP) and the Global Reporting Initiative (GRI), the two of the leading proponents of uniform global reporting

standards for GHG and sustainability metrics. Our software has achieved accreditation by the CDP, a designation that means our software products meet CDP's stringent standards for collecting, calculating and reporting GHG information. Only a handful of providers have achieved this status. In addition, IHS software passed an independent third-party evaluation based on standard carbon emissions measurement and reporting criteria. Data was collected based on guidelines developed by the World Resource Institute/World Business Council for Sustainable Development.

**CCBJ: In 2010, you released a new 8.1 version of opsInfo software for environmental health and safety and sustainability information that promises a higher level of "auditability." What exactly does that mean?**

JSL: Many of our global clients are now submitting GHG emissions reports that require verification by independent third parties. These auditors provide feedback to our users who then point out additional areas that require improved transparency. In some cases, this third-party verified reporting is actually required by law. For example, companies that report emissions under California AB32, that state's new greenhouse gas statute, or the European Union Tradition Scheme or Carbon Registry, must submit their results for independent verification. In the largest number of instances, however, companies are voluntarily submitting third-party verified reports in anticipation of new policies or to satisfy transparency demands of external stakeholders and investors.

The latest IHS software solutions for GHG and energy management support the highest standards for auditability. The net result is that IHS software facilitates efficient third party audits – reducing risks and costs and allowing our clients to focus on their business. ⚙

## Capacity Additions Boost Nuclear Energy Generation in 2010

*Loan guarantees, cost recovery and strong private sector involvement are all needed to finance nuclear capability; Without substantial regulatory/policy change, new construction remains difficult.*

**CCBJ: IBISWorld's U.S. Nuclear Power Generation report estimates 2010 industry revenues at \$33.2 billion, with 4.9% year-on-year growth. Is that strictly energy sales from the 104 existing nuclear plants, or does it include revenue to engineers and consulting firms for relicensing and new plant development? What accounted for the 4.9% growth in a year when net generation increased little if at all?**

JM: The revenue figures represent the existing U.S. nuclear plants. The 4.9% revenue growth reflects the capacity additions over 2009 that allowed operators to increase output of nuclear energy. Even though cumulative generation was relatively unchanged in absolute terms as of September 2010, uranium spot prices have been shooting up, and these operators likely passed on the costs to their customers through the last quarter of 2010.

Further, the 5.5% nuclear power generation year-over-year increase through September 2010 reveals a compelling trend of capacity additions, which will likely turn into increased nuclear power generation and, thus, revenue growth for firms.

**CCBJ: What's the lifespan of the current fleet of nuclear reactors?**

JM: Decommissioning of plants is a necessary evil in this industry. Most U.S. nuclear reactors have an average life-span of 40 to 60 years, which reflects increased investment in capacity utilization over the past two decades. Replacing steam turbines is the best way to increase the life-span of a nuclear reactor. Without

### IBISWorld

IBISWorld (Santa Monica, Calif.) is a publisher of U.S. industry research with expert analysts covering 700 different market segments. Industry Analyst Justin Molavi discussed CCBJ's questions about the U.S. nuclear power industry.

the growth in capacity investment, most nuclear reactors would only have about a 40-year life-span. Decommissioning nuclear reactors depends on whether a certain reactor has gone under capacity or technology upgrades to increase its life.

**CCBJ: When CCBJ last covered the nuclear power industry in September 2009, the NRC had received 18 license applications for new reactors, was expecting almost that many more in 2010, and anticipated issuing its first license as early as 2011. What's the situation now in terms of the nuclear new-build market and the pace of development?**

JM: As of late 2010, the NRC has not received any new license applications. There are several reasons for this phenomenon. First and foremost, the NRC's charter ensures safety and public health. It does this through very long, onerous licensing cycles and impact report requirements, which limit the supply of licenses and discourage nuclear reactor construction.

Further, the cost of competing electricity generation fuels deterred many to-be nuclear power generation firms from applying for a license. Prices for natural gas and thermal coal are both low as a result of commodity price drops during the recession, and they have not recovered as quickly as some other commodities. The Alvin Vogtle, however, is under preliminary construction and, if completed, would be a huge win for the nuclear power industry.

**CCBJ: What impact has the low price of natural gas had on utilities' plans for new nuclear capacity?**

Natural gas is an intermediate base-load power source and is effective in that space; that is, it can be turned on and off with relatively low cost. Coal would be a more direct competitor to nuclear energy, and analyzing prices for coal would be an effective way to examine the utility's decisions regarding generation source. Nonetheless, many utilities are examining natural gas as a base-load source, given the recent natural gas discoveries in the Marcellus Shale region.

**CCBJ: Critics say the DOE loan guarantee conditions should be more rigorous, while the withdrawal of Constellation Energy/EDF from negotiations over an estimated \$880 million fee shows problems from the industry's side. How important is the loan guarantee program to the future of nuclear power?**

JM: Loan guarantees can be a helpful bridge for energy companies to use to get a nuclear plant built. But there are heavy risks for each party during development. Given the current economic circumstances, the DOE's loan guarantees are essential to getting a project from the development phase to construction. Broader economic realities, however, might transcend guarantees and force companies to pursue other projects.

Ultimately, the project needs buyers to purchase the power. If, given the costs of the project, nuclear power from the proposed nuclear reactor cannot compete on price with other base-load power generation inputs, loan guarantees won't be able to keep a project from going under. On the other hand, the withdrawal of Constellation emphasizes the need to examine what went wrong aside from the broader economic realities. Sometimes, the recovery rate calculated on behalf of the government is not based on the fundamentals of the project.

Additionally, the climate change bill's inability to pass Congress has also made it harder for firms to get projects off the

ground. Competing technologies can definitely undercut nuclear power given the high upfront capital costs for establishing a facility. In the current environment, loan guarantees are essential because the licensing and permitting processes are so long and uncertain, making it extremely expensive for utilities to carry the loan while they wait for approval (and thus, have no cash flow).

**CCBJ: New U.S. reactors are proposed with advanced technologies that have yet to be deployed in the United States. To what extent have these technologies been deployed in other countries?**

JM: Generation III reactors have a good track record in Western Europe and Japan. China is in the process of making a fully operational third-generation reactor. The upgrades to Generation II units have the potential for 120 years of operation given the necessary capacity adjustments and upgrades.

With regard to possible advanced reactor designs, advanced boiling water reactors (ABWR) are in the running as potential nuclear deployment in the United States. This technology has been successfully deployed in Japan. With regard to the other advanced technologies, it's hard to point to a track record because many of the plants with advanced designs and technologies are currently under construction abroad. ABWR designs are the simplest of the new designs to obtain permits because the technology is so similar to existing Generation II BWR reactors.

**CCBJ: Who are the leading candidates to commission the next new nuclear power plant in the United States?**

JM: Given the tough regulatory hurdles a firm has to go through to establish a nuclear facility, it's difficult to determine which firm is the front-runner. Southern Company's Georgia plant is clearly ahead of the pack.

**CCBJ: What states are most conducive to nuclear new-build, and why?**

JM: States that have a history of supporting nuclear power through state-level legislation and favorable regulation are most conducive to providing a home for the next nuclear plant. Lax state-level environmental regulations are also helpful for nuclear firms looking for a home state.

**CCBJ: What are the nuclear industry's top policy priorities in the 112th Congress? What is it hoping for from state legislatures over the next two years?**

JM: The nuclear industry is hoping for an overhaul of the loan guarantee program after Constellation withdrew. Although the U.S. Congress has committed more money to the program, the industry believes the calculation of risk on behalf of the government is too liberal, and more money for the program might not solve all the issues involved with increased loan guarantees.

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*Competing technologies can definitely undercut nuclear power given the high upfront capital costs for establishing a facility.*

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Industry officials are also pushing for further nuclear power research; H.R. 5866 passed the House, potentially providing \$1.3 billion for research and development. The problem with this approach is that academic insight regarding nuclear power might not result in commercially viable reactors that can be deployed effectively.

**CCBJ: Within the utility industry, nuclear is widely seen as the best generation technology for increasing low-carbon power, yet critics point to risks from nuclear waste. Where does the industry stand on waste handling and storage?**

JM: Officials in the industry are pushing for a permanent, centralized disposal facility. The outcome of this effort, however, is bleak. Another method to solve this problem would be to move forward with waste reprocessing and beyond the once-through fuel cycle. The waste fuel at U.S. nuclear reactors still contains about 95% of its fissile potential, but the NRC has been slow to take the risk of allowing reprocessing in the United States. ... Fuel reprocessing is widely used in Europe, Russia and Japan.

**CCBJ: A handful of states have enacted policies that allow incremental cost recovery for new nuclear power plants in development and construction. How important are such policies for financing new nuclear capacity?**

JM: Cost recovery mechanisms are helpful but are only one small piece of the puzzle. Loan guarantees and strong private-sector involvement make up the other pieces. This mechanism is more helpful for existing upgrades because the customers will be able to see the cost savings relatively quickly.

Furthermore, the potential cost recovery for a new reactor is quite small given the high upfront costs of establishing a reactor and only makes up a small percentage of the overall financing costs. Progress Energy Florida's push for cost recovery is a clear example of this phenomenon. It is seeking to recover \$164 million in nuclear capacity upgrades and investment in a new nuclear facility. A move toward substantial nuclear reactor construction in the United States would be very difficult without substantial changes in national regulatory policy through the NRC. Piecemeal incentives by states can, at best, allow increased capacity at existing facilities. ⚙



## Consulting Firm Anticipates Transformation of the Electric Utility Industry

*If utilities pursue a customer-oriented strategy, they will find information and data become as important as the production and delivery of power.*

**CCBJ: You have a very diverse business model. Can you describe how the business started and how it has evolved?**

JW: After helping develop one of the first hedge funds in the alternative energy space, we understood there was a need to link cleantech companies with end users, both suppliers and consumers, and the capital markets. We had a long-term vision around distributed energy – load closer to the energy user, network-oriented, more real-time and cleaner – that presaged some of the thinking around today's smart grid. To be frank, we were a bit early still but did some interesting work, including our benchmark index, the Distributed Energy Stock Index, which performed phenomenally well.

Over time, we have gravitated more towards the customer. A big leap forward for us was our work on the “Day in the Life of a Customer in 2015” vision of the future customer experience in the utility sector, which ended up being a video that won a number of Teddy awards and showed what was possible with smart grid. Our recent work includes a focus on prepay transactions, communication and messaging and development of offers and programs on the demand side. In this context, we developed a vision of the Customer Advisor of the Future with our utility clients through the Customer Care Research Consortium that we run with Navigant Consulting.

EcoAlign, of course, is all about customers, retail and commercial, and moving the dial through marketing. We formed EcoAlign with the mission to close the gap between what consumers

### DEFG

DEFG is a nine-year-old specialized consulting firm focused on energy and the environment. Its clients include power and gas utilities, technology companies, energy marketers and energy solution providers. With a focus on the experiences of end-use energy customers, the firm manages three energy industry research consortia for which DEFG publishes cutting-edge research on energy consumers' attitudes and behavior and the ever-evolving structure of energy markets. In addition, DEFG operates a full-service marketing agency, EcoAlign, and in 2008 DEFG launched an early-stage private equity investment arm, DEFG Ventures, that has invested in two lighting technology companies and an advertising firm that specializes in reaching customers via the Internet and mobile devices.

DEFG makes much of its research, including its EcoPinion survey reports and the ABACUS report on utility restructuring, available ([www.defgllc.com](http://www.defgllc.com)) at no charge. After digesting some of this material, CCBJ discussed key questions with Jamie Wimberly, CEO, and Nat Treadway, managing partner.

say is important to them and their actual behavior that impacts energy consumption and the environment.

**CCBJ: Speaking of consumer attitudes and behavior, what language and concepts should advocates of climate change policy (including renewable energy and energy efficiency standards) use to appeal to the broadest swath of Americans?**

JW: One important and consistent finding in the background of all our research is that Americans are increasingly feeling disconnected and separate from nature and the environment due to many factors, not the least of which is that our young people are spending less and less time on free play outdoors.

I would posit that the strategy and messaging that the modern environmental movement has employed is a factor in driving this alienation. The focus has been on regulation, politics and litigation. So for many Americans, the environment is now a political issue, and climate change is not only political but an issue so large and abstract that many feel they have no control over it, and thus no responsibility.

So, how do we get people engaged? We need to get back to a focus on the underlying values of good stewardship and revisit what drove people like Thoreau and

Carson to connect their values to actions. Churches, for example, have begun to take leadership to connect the environment to spiritual values and even language, e.g., “creation care” for Evangelicals or putting up solar panels on the church. There needs to be a focus on helping people develop personal relationships with nature connected to their own set of values.

**CCBJ: Your Project Energy Code has studied how utilities can motivate customers to conserve energy. What are some the key insights utilities and energy efficiency program designers need to know about this research?**

JW: One key insight is that utilities and energy efficiency program designers ought to ask what impact their programs have on consumer behavior, and what past arrangements or attitudes have an ongoing impact on consumer behavior. In other words, what makes some behaviors more “sticky” and sustainable than others. Some programs have great intentions, but the outcomes are not as intended because the underlying design of the program results in a “foregone conclusion” based on past behavioral patterns. Every program designer needs to consider the psychology and culture of the target audience, and design the program or marketing approach with those realities in mind.

Second, practitioners should think of behavioral science as a landscape. On that landscape, there are different levers, e.g., fear being the most powerful, which can be employed for people to change their behavior, sometimes consciously through information and sometimes subconsciously through images or codes. Different people will react differently to various levers. And no one approach is a silver bullet.

Third, and for engineers this is sometimes difficult, emotion is a powerful and important driver to motivate people to change their behavior. As an industry, we need to get a lot more comfortable with the unpredictable, irrational, and sometimes messy nature of human behavior to leverage people as resources effectively. From a business perspective, not only will this approach improve enrollments and program sustainability but will also lead to value creation, drive premium pricing opportunities and lead to brand development.

**CCBJ: According to your research, prepaid energy accounts – with consumers regularly notified about their balance – are becoming popular in Texas. How well are these programs doing at incentivizing conservation?**

JW: Yes, prepay is coming – and our research points to the fact that it is going to have a big impact on the utility business. For energy conservation, you are going to get consumption savings of 5 to 20 percent from the customers that go on the offering because you are communicating daily with them on their usage and account information, combining that with energy management options and demand response program offerings. Most importantly, it is transactional, meaning there are real dollars in play that consumers can manage.

The extra value for many consumers is that prepay provides convenience and control not offered by traditional bill pay

options. Plus, our research shows that prepay as a transaction is aligned with many consumers' preferences in regard to lifestyle and how they like to conduct business, very mobile and incremental. This is especially true with younger people.

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*As an industry, we need to get a lot more comfortable with the unpredictable, irrational, and sometimes messy nature of human behavior to leverage people as resources effectively.*

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Texas is still a developing market in regard to prepay so it is still early to know exactly what the energy conservation and other benefits will be over time. But for every utility or other provider, e.g. Salt River Project, a few co-ops and long established programs in Europe, prepay has resulted in significant energy savings (10 percent plus) that would be almost impossible to garner through single measure, energy efficiency programs. You could describe prepay as having the potential to be the killer app for smart grid.

CCBJ: Your 2010 ABACCUS (Annual Baseline Assessment of Choice in Canada and the United States) report on retail choice in electricity markets shows that more than half of U.S. states retain vertically integrated utilities with no direct-access options for consumers. Why hasn't electricity market liberalization made greater strides in these states?

NT: Electric markets have made strides in many states, but not for all consumers. Recall that in 2000, 23 states were moving toward retail electricity restructuring in 2000. However, the California experiences in 2000-01 convinced several states to suspend restructuring and others to proceed more cautiously. But many states forged ahead and have seen good progress with large consumers. As of 2010, 13 states (California, Connecticut, Delaware,

Illinois, Maine, Maryland, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, and Texas) and the District of Columbia, can claim success in restructuring for large consumers. In those 14 jurisdictions, more than 25% of large commercial and industrial consumers have switched away from the incumbent supplier.

The states which suspended electricity restructuring and the states which remain fully regulated are cautiously waiting to see what happens in restructured states. Many pundits feel there are no economic or political drivers that are causing those states to consider market liberalization at this time. Some market observers believe that current low natural gas prices may lower the marginal cost of electricity production to where there will be new pressures on states with high electricity rates to consider restructuring.

**CCBJ: You report that price is a top driver for commercial & industrial (C&I) firms to shop around for electricity. Credit terms, the ability to hedge and other factors come into play, as does the ability to procure low-carbon power through RECs or directly. How are electricity suppliers innovating to serve the demand for low-carbon power?**

JW: Given that there is not a clear direction on carbon pricing and policies, offering development has lagged. For many suppliers, their green offerings and pricing programs are intended to serve niche markets or key accounts, or serve as placeholders. And for some, the offerings are loss leaders to close deals on more profitable parts of the offering.

If you can't see the carbon portion of the equation, though, and thus can't measure it against your business objectives, then the low-carbon portion of an offering is difficult to value. Demand for low-carbon power is an add-on for many suppliers. But I see this changing slowly over time with sustainability becoming

more core to the business connected to investor expectations on risk mitigation and growth prospects tied to viability.

**CCBJ: What levels of price premiums are C&I firms willing to pay for low-carbon power, and how has the recession affected this market segment?**

JW: As shown by the depressed auction results within RGGI, carbon allowances have not been in high demand and premiums for low-carbon power are low. This is due to stagnant macroeconomic conditions but also to uncertainty around carbon pricing and policies. In some cases, however, I am aware of wind contracts and other offerings that have gained market traction, but this is usually connected to discounted pricing opportunities (under the regulated price) or hedging strategies and not explicit demand for low carbon power.

In this market, there aren't many companies willing to pay a few points more if anything. In 2011, this probably will improve a bit as the economy gets better.

**CCBJ: Among residential electricity customers, the rates of "switching" from**

**default service providers are much lower in restructured states. You write that this is partly due to the fact that some states limit or discourage residential electricity choice. Why do they do that?**

NT: Large consumers are more sophisticated and better informed about their options. They are more capable of making comparisons and selecting an energy supplier and a contract for power that meets their needs. The states with little or no residential consumer switching have focused on wholesale power markets – that is, on power acquisition and the design of "default service" rates. This has meant that the incumbent (usually the utility) has been carefully supervised to acquire bulk power as lowest cost.

However, typical default price design is not consistent with the development of a vibrant retail market where the consumer determines what he/she prefers. If regulators emphasize lower cost, they do not reflect actual market conditions. For example, regulated prices often result in cost shifting across time periods. Fuel price adjustments are inconsistent with competitive markets in which the energy

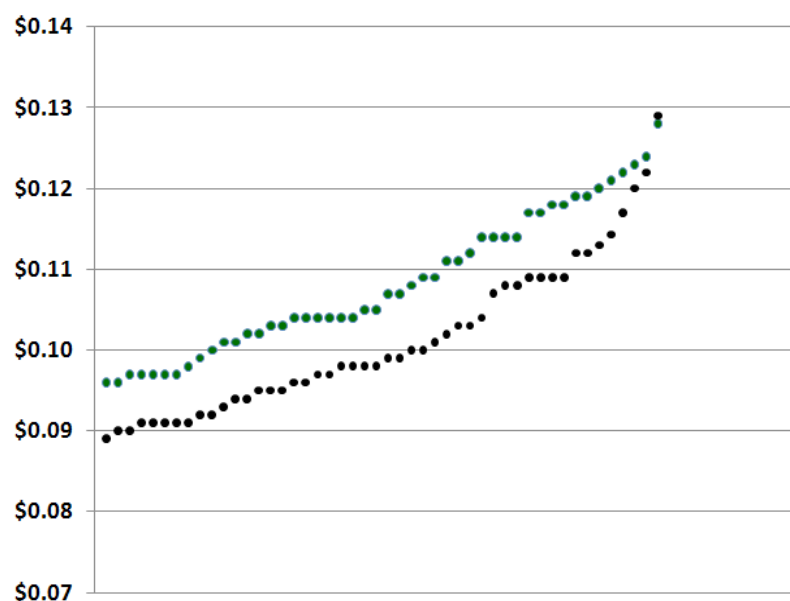
supplier assumes the risks, and does not have regulatory authority to recover costs later. With time, regulators in all states will trust markets and consumers, and will remove these barriers to retail competition.

**CCBJ: Residential customers also buy low-carbon energy. What does your research tell you about how widespread and prominent this is? What levels of premiums will customers typically pay, and how has this changed?**

JW: Green energy sales are a significant portion of the residential market in Texas, however, as with the details of pre-paid service, there is not easy access to the sales data. To be frank, the retail offering remains a work in progress. I fully expect 2011 to be a period of offering discovery and development, moving away from selling only on the price of the commodity to a bundled package with the commodity tied to service contracts over a period of time. Low-carbon energy, particularly renewable, will be a part of that packaging along with energy efficiency and management options.

Regarding the premiums paid, we can look to public data to compare the offers available to residential consumers. In Texas, residential consumers have access to more than 250 offers, and among these are green pricing options and fixed price options. The chart displays two series of offers (each dot is an offer) from Houston in November 2010. The green series of dots (or upper series) displays 100% green, fixed-price (y-axis) power for terms of 12 or more months. The black (or lower) series displays fixed-price power for terms of 12 months. While there is not a one-to-one correspondence between the offers as displayed in ascending order, one can see that there is about a ½ cent per kWh premium paid for green power in the Texas market. This is the premium that one must pay to lock in a price for 12 months of green power as compared to locking in 12 months of power provided with a mix of resources. (Note that this

**Premium Paid for Green Power in the Texas Market in 11/2010**



Source: DEFG



does not reveal consumer willingness to pay or the impact of the recession on consumer choices.)

**CCBJ: While vertically integrated utilities are offering bundled services as well, you write that competitive suppliers are more nimble in addressing markets. Are regulators monitoring these products or is it “buyer beware”?**

NT: Consumer protection remains an important role for regulators in a restructured energy market, however, market pressures should ensure that consumers are protected on the important issues. Products that place risks on consumers will not be popular. We see the rise of fixed-price contracts in residential markets because consumers want certainty, and consumers are not able to monitor or manage prices in volatile wholesale energy markets. In this regard, consumers in restructured markets are better protected than consumers in regulated markets! Most regulators allow utilities to make fuel cost adjustments on a quarterly or annual basis. While this is consistent with certain principles of regulation, it is inconsistent with consumer preferences for price guarantees.

Regulators must continue with oversight to ensure there are proper disclosures, and that market participants do not take advantage of consumers through deceptive practices.

**CCBJ: How would you characterize the types of investors that have gravitated to what is known as cleantech?**

JW: It matters what stage of investment that you are talking about, but early stage investors like us usually have a lot of experience in the alternative energy sector and are looking to leverage expertise and networks to bring new products and technologies to market. We look for companies that have proprietary technologies that could use capital productively to build out their IP and establish a market-

ing presence with an eye towards doubling valuations within a year. We don't do any project financing.

Everyone is looking for a nice return, but there is a bit of mission involved for many especially in Silicon Valley. Many of those guys have made their money and are looking to establish a broader legacy connected to the environment. Smart grid is proving to be the bridge for investors traditionally focused on networks and IT to consider alternative energy.

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*Customers truly will become resources through their individual choices and actions, either as consumers or increasingly as suppliers of distributed resources.*

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**CCBJ: We at CCBJ theorize that certain markets will increasingly coalesce around climate change drivers, hence our name and the climate change industry. Do you generally agree or do you think distributed energy, energy security or other drivers may be more powerful in the long term?**

JW: Climate change is occurring, and occurring more quickly and unpredictably than what the world's scientists considered even a few years ago. Unfortunately, this is going to drive a huge amount of activity and business over the long term simply to contain and mitigate the damage.

When we were kicking around ideas for a new exchange traded fund, I threw out that we should create a “mean and green” index. The premise would be that climate change is occurring, that humanity will react to mitigate but will be behind the curve, so there will be growing business on the negative side of the ledger, e.g., defense industry, pesticide manufacturers, water purification, etc. This may

seem jaded but what I am describing would optimize a portfolio around climate change to maximize return over the long term. That's how investors think.

But over the next couple of years, climate change will remain somewhat peripheral to the market, mainly because there is no price for carbon and no real policy direction on how to regulate and manage carbon. It will be a consideration, but a tangential one.

What is exciting though is to watch the slow-moving but inexorable transformation of the utility sector, away from a sole focus on the production and delivery of electrons to something different. Utilities need to ask big strategic questions about their business, including whether or not they intend to serve customers or simply be managers of regulated assets. If they choose to implement a new, enhanced customer strategy, increasingly, these companies will find they are in a different business focused on information and data as much as electrons.

In turn, the utility sector should become much more efficient and productive over the next 10 to 20 years. Given the aging infrastructure and the difficulty of building almost any capital project of any size, it will have to do so. Customers truly will become resources through their individual choices and actions, either as consumers or increasingly as suppliers of distributed resources.

While climate change won't be the primary driver, this transformation will drive greater amounts of efficiency, through engineering advances, network optimization or awareness and value creation leading to behavioral changes, among other trends. Efficiency, in turn, should result in a much cleaner, more climate-friendly industry. ⚙️

## Project Financing Improves, But Tax Equity Dollars Alone Are Unlikely to Support Robust Growth

**CCBJ:** As you and others observed in past editions of CCBJ, the grant-in-lieu-of 30% investment tax credit (ITC) revived the renewable energy industry in 2009. How dependent on the grant program is the industry today? And how important was the one-year extension of the program approved in the last days of the 111th Congress?

MP: The grant is still extraordinarily important. Despite the fact that I believe we have seen an improvement in the depth of the tax equity market, the renewable industry would have faced a fairly profound funding gap if we were dealing with a PTC/ITC market. During the course of 2010, I don't believe we saw a well developed utility-scale contracted project fail to raise tax equity financing if its sponsor was seeking to do so.

However, I also believe we are far from the point of having a supply-demand balance where available tax equity dollars could support robust growth in the sector in the absence of the grant. In fact, if economic wind power purchase agreements were more readily available, we may have seen good projects go wanting for tax equity financing despite the fact the grant was in place.

**CCBJ:** Before the extension, developers were under pressure to expend 5% of project costs before the end of the year to qualify for the ITC grant. How did project sponsors and investors cope? How likely is this to be repeated next year?

MP: There was a tremendous amount of time and money spent pre-qualifying projects under the 5% commencement of construction safe harbor. I understand that some well-funded developers qualified the equivalent of two years of development

### CP Energy Group

CP Energy Group (Boston) advises investors and developers on both sides or renewable and conventional power project finance transactions: the institutional investors who provide project financing and the project sponsors that develop, own and operate projects. Its staff includes financial and legal specialists as well as career energy professionals. Managing Director Martin Pasqualini discussed the state of renewable energy project financing with CCBJ.

pipeline prior to the grant extension clearing Capitol Hill and being signed into law. It was truly an unintended "stimulus" as developers were forced to accelerate spending on panel and wind turbine orders in order to ensure grant eligibility.

As a technical matter, the experienced advisors and legal counsel developed a pretty clear understanding of what needed to be done in order to qualify, and there were a good number of project financings that closed prior to the grant extension passage that were premised upon the grant being eligible due to compliance with the safe harbor. All things remaining the same, I would expect there to be similar efforts at the end of next year to qualify projects in advance of the next scheduled sunset on grant eligibility.

**CCBJ:** To what extent have tax equity investors re-entered the renewable project finance market? Is the pool of tax credit investors shaping up to be larger than the relatively small number of entities the industry relied on prior to the recession?

MP: As I alluded to above, while the market has recovered a good deal, we continue to see a market where tax equity dollars are the most precious component of the capital structure. In fact several of the currently active tax equity investors would either drop out of the market or at least see their level of investment activity severely impacted if the grant were not

available. They simply don't have enough tax capacity to do a meaningful amount of investment in PTC/ITC deals as opposed to grant-based financings.

While we have seen some new entrants and some participants playing a more active role, the number of truly meaningful investors that invest broadly across the space is still only in the neighborhood of 10 institutions. CP Energy as well as others in the space are continuously seeking to cultivate new investors and bring additional depth to the market. Unfortunately the process of identifying potential investors, educating them and getting them to the point of having product approval and a budget to invest is a time consuming process that can be measured in months or years.

**CCBJ:** For wind power projects with high capacity factors, the production tax credit can be more favorable than the ITC, yet with little tax equity capacity available in 2009 and the first half of 2010, most sponsors had no alternative but to opt for the ITC grant. Did PTC deals become more common in the last half of 2010? What about 2011?

MP: There were PTC-based financings that closed last year although I don't believe there more than three in total. You need to have the right combination of capacity factor and cost to construct such that the PTC provides more economic benefit to the developer than constructing a financing around the cash grant. Remember, at one point after the cash grant guidance was issued, the option of choosing between a PTC deal and a cash grant deal was strictly a theoretical exercise due to the fact there weren't PTC equity dollars to be had in the market. Thankfully that level of market constraint has passed and a number of PTC deals have closed. I am also aware of a fairly sizable 2011 deal that could be executed on a PTC basis if the sponsor so elects as it has received multiple PTC-based offers. That is an encouraging sign.

**CCBJ: In addition to advising funders of new projects, you work with energy companies – especially foreign ones – looking to acquire wind power projects. What's driving their interest in the U.S. wind power market? Have there been any recent deals that you can share?**

MP: The attraction of the U.S. market is largely based on its size and the fact that certain foreign investors with expertise in the segment abroad still see the U.S. market as an attractive growth market as compared to their own footprints. That said, there is much more caution on the buy side as there is great reluctance to overpay for development pipeline.

Potential foreign investors also need to be wary of the depth of the tax equity market before making the plunge because they typically do not have sufficient tax equity capacity to absorb the tax equity benefits generated by the projects. CP Energy recently assisted a foreign developer in connection with its acquisition of a portfolio of construction-ready wind development assets here in the United States. The transaction has not been publicly disclosed but it is evidence of current activity on the foreign front. I will add that the buyer examined and passed on numerous opportunities before electing to purchase these assets as they spent a fair amount of time trying to find an opportunity that was realistically priced and truly construction ready.

**CCBJ: ACORE's last quarterly report included Navigant's estimates that solar PV capacity will grow by 32% to 46% annually to 2014, driven in large part by utility investment (incentivized by the 30% ITC which lasts through 2016). Navigant sees wind power investment dropping significantly unless the PTC and/or ITC grant is extended beyond the end of 2012. What's your take?**

MP: My personal view is that the PTC and probably the ITC will be extended for wind, although I view the prospects

for a further cash grant extension far less likely at least as of now. That said, I think the greater challenge to the growth of the wind market is the combination of low natural gas prices and the fact that the various state level renewable portfolio standards are running out of steam, at least as they pertain to wind.

The result has been far fewer economic power purchase agreements being executed limiting the amount of new wind MW being built. Solar is benefiting from the fact that many state states have solar specific carve-outs in their RPS legislation which have yet to be achieved. The result in the solar arena is far more activity on the PPA front. It's worth noting that the recession has also reduced demand across the board and that also impacts the appetite of the load serving entities to add MW to their generation mix as a general proposition – at least in the near term.

**CCBJ: Renewable energy projects require debt as well as equity. To what extent have credit availability and terms become more favorable for renewable developers?**

MP: The debt markets recovered far more quickly than the tax equity markets after the financial crisis ebbed. We see a deep project market with both bank and private placement lenders active in the market.

There are somewhere in the neighborhood of 30 active lenders if you include the private placement players. While spreads and fees increased dramatically after the financial crisis for project debt, absolute interest rates have been very low and there have been ample dollars available. While we saw some spread contraction last year we have also seen an increase in interest rates over the course of the last few months – although on the whole the cost of debt dollars remains relatively low. ☼

## Schools, Ski Industry, Local Government and Progressive Utilities Contribute to State's Clean Energy Landscape

*DOE-funded RDSI project in Colorado will provide a test bed for integrating renewable technologies into the grid.*

### Brendle Group

Brendle Group (Fort Collins, Colo.) is a consulting engineering firm focused on sustainability for local governments, K-12 and higher education, the ski industry and other industries. Brendle's services include energy assessments, climate action and water conservation plans, sustainability management and sustainable design. Judy Dorsey, founding president, answered CCBJ's questions about how a 15-person firm competes with much larger outfits and what's driving the sustainability and climate change services market in Colorado.

**CCBJ: How have climate change and sustainability evolved as business drivers for Brendle Group? How have you adapted your business model and capabilities to respond to this growing market?**

JD: We have seen a dramatic upswing in climate change and sustainability as business drivers for Brendle Group. When we started our business in 1996, much of the discussion was focused on pollution prevention, while sustainability and climate change were very much emerging fields only on the radar of the very leading-edge organizations.

We were fortunate to have the opportunity to work with some of these organizations early on as they pioneered new territory through climate action programs and sustainability plans. Early work with innovative school districts and the ski industry helped lay the groundwork for the sectors we serve today. We constantly



check and update our capabilities to respond to a rapidly changing market so we can respond to market trends, such as the increasing integration of climate, energy, water, and overall sustainability.

**CCBJ: How and to what extent is climate change impacting your work in water resources management?**

JD: We are seeing an increasing nexus between water and climate change, particularly through the lens of adapting to a changing climate. Because we are located in a water-limited area of the country, we are seeing a variety of customers, from water utilities to the beverage industry, looking ahead and planning for a water-stressed future. What this means for our work in water efficiency and conservation is that we will be working with customers on solutions not for just short-term costs and savings, but also as part of long-term strategic planning around water supply and scarcity.

**CCBJ: Brendle is a small firm with 15 employees. How do you compete with much larger firms?**

JD: One of Brendle Group's strengths is our long history of working in the fields of climate and sustainability relative to other firms, large and small. We also view being a small firm as a strength, allowing us to stay nimble and provide a closer and more collaborative working relationships with our customers than some other firms may offer.

We also look for opportunities to both build our customers' capacity and take innovative approaches to what might otherwise be straightforward projects. As part of a recent project with Denver Water we were asked to assess indoor and outdoor water conservation opportunities in over 200 K-12 schools in the Denver area. We developed a training and curriculum program to engage students, turning what would have been a fairly straightforward engineering project into a rich and rewarding learning experience.

**CCBJ: Although you work in other states, much of your work is in Colorado. What's driving the market for climate change work in your state?**

JD: We've always viewed Colorado as a state conducive to innovation with respect to climate change, from its progressive communities such as Fort Collins and Boulder to its robust higher education system and associated research activities. More recently, its political leadership has embraced the clean energy economy as well as efforts to address climate change.

School districts and our higher-education institutions are key players driving the market, as are ski areas and local governments. For example, recently, the Rocky Mountain Climate Organization helped to convene the Colorado Climate Network – a new network of Colorado local governments working in climate change and adaptation.

**CCBJ: You and a colleague attended the September 2010 World Climate Solutions conference in Copenhagen. What were some of the insights you gained and how will you apply them to help clients?**

JD: When I visited Denmark last fall, it was 292 days after 40,000 people, including 5,000 journalists and 120 heads of state, assembled at the exact same venue for COP15. Disappointment was still strongly in the air – even the fact that leaders were still counting and quoting the numbers of days that had passed. And yet, with the disappointment, there was strong sense of resolve to get it done anyway. I'm biased being an engineer, but the focus on solutions shifted the dialogue from policy to innovative projects and programs. As well, there was an air of "reflect and move-on." One of the reflections was that COP15 suffered from a communications challenge. Keynote speaker Ted Nordhaus from the Breakthrough Institute reflected this best by saying if Martin Luther King had mobilized the civil rights movement with a "I have a

nightmare" speech, things would have unfolded very differently.

**CCBJ: You help public and private clients with energy planning and management, energy efficiency and renewable projects. How have those markets weathered the recession and cheap natural gas in Colorado?**

JD: Particularly in the public sector, energy planning and management as well as renewable energy projects have seen a significant boost from ARRA stimulus funds. In Colorado, over the past four years we have also benefitted from former Governor Ritter's support for clean energy and energy efficiency through programs and initiatives such as the Governor's Energy Office. Xcel Energy and other energy providers in the state have also continued to support energy efficiency by offering low-cost energy assessments.

Having the country's most aggressive renewable portfolio standard in Colorado (30% by 2020 for investor-owned utilities; 10% for co-ops and municipals with more than 40,000 customers) as well as progressive utilities committed to energy efficiency and renewable energy over the long term has also been a great benefit for the energy market.

**CCBJ: You're part of a consortium working on FortZED, a zero-net energy district in Fort Collins through conservation, energy efficiency, renewable power and smart grid technology. What's the status of this initiative?**

JD: FortZED is a community-inspired initiative with a long-term vision to transform the downtown area of Fort Collins and the main campus of Colorado State University. It's a three-way initiative of the Colorado Clean Energy Cluster, Fort Collins Utilities and UniverCity Connections. First conceived in 2007, FortZED will help prove out the concepts, pathways and technologies to achieve net zero energy use in an existing community. There

is no funding for the broad initiative per se; rather, an overall strategic plan will drive specific projects that cumulatively help to realize FortZED's overall vision for a Zero Energy District.

Several projects have received funding to jump start the initiative. The largest of these, Renewable and Distributed Systems Integration project or "RDSI", is testing the viability of substantially increasing the use of renewable and distributed energy sources for supplying electric power during times of peak electric demand. The three-year project is funded by a \$6.3 million grant from the U.S. Department of Energy plus \$5.1 million from local community investors and site and technology partners.

With a target of reducing peak electric load by 20 to 30 percent, the project is serving as a test bed for integrating a range of technologies into the electric grid, from advanced solar photovoltaic inverters to demand response strategies and plug-in hybrid vehicles.

Technical partners are supporting RDSI by helping site partners identify projects, monitoring system performance during the demonstration year and providing specific technologies such as switches and inverters. The project is providing valuable research contributions in the areas of smart grid and demand response to the U.S. Department of Energy's national RDSI project, which includes eight other projects of a similar nature around the country.

The grant-funded RDSI project is on track, with the third and final demonstration year of the project just underway, kicked off by former Governor Bill Ritter at a ceremony on January 5th. It's important to note that municipally owned Fort Collins Utilities is both progressive and strongly supportive of the goals of Fort ZED as well as specific projects like RDSI. ⚙️

## Give Renewable Energy Technology the National Standard it Deserves

*The majority in Congress and state legislatures are pro-renewables, but a National Renewable Energy Standard is still urgently needed; global trade barriers pose a threat.*

**CCBJ: What are ACORE's top policy priorities, and what arguments will you and your members make to gain support for members of Congress and state legislatures who are skeptical about the costs of and need for renewable energy?**

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*We believe that about 60%-70% of the Congress today is pro-renewable energy, and about 60% of the states have pro-renewables legislatures.*

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ME: ACORE is for renewable energy and against nothing. With those thoughts in mind, we see our task as scaling up renewable energy until it contributes 25% of U.S. energy supply by 2025. What happens this year or next has to be seen in this decades-long strategy.

The way we see it, about 90% of elected officials did not see the need for renewable energy 20 years ago. It dropped to 60% 10 years ago and perhaps 40% this year. The trend is in our favor. We have a goal of winning over one elected official at a time, and this is working very pretty well.

We believe that about 60%-70% of the Congress today is pro-renewable energy, and about 60% of the states have pro-renewables legislatures. We are crossing the point of no return. There are many who are skeptical about the costs of and need for renewable energy, but they are increasingly in the minority. The majority are increasingly for renewable energy.

### ACORE

The American Council On Renewable Energy (ACORE; Washington, D.C.) is a nonprofit organization of member companies and institutions dedicated to moving renewable energy into the mainstream of America's economy, ensuring the success of the renewable energy industry while helping to build a sustainable and independent energy future for the United States. President Michael T. Eckhart discusses the economic and policy landscape for renewable energy.

Renewable energy technologies came from a national research & development program over 35 years. This is a major national achievement. Now, as they come into the market, they face a set of challenges and hence deserve a national standard to drive demand and bring them down the cost curve and into general viability.

**CCBJ: Getting access to transmission is one of the biggest challenges for wind and utility-scale solar power, yet obstacles like cost allocation and NIMBY opposition confront transmission development. What are your hopes and expectations for FERC's rulemaking on regional planning and cost allocation?**

ME: We have two ways to work on this. One is to push forward on new transmission lines, and ACORE is in favor of this as the way to get no-carbon wind power, solar power, geothermal power and other renewables from the Great Plains and the mountain states to load centers.

The second way to address this issue is to promote distributed generation that does not require transmission lines, and this will be especially relevant in the East and West. ACORE is supporting both of these solutions. We are exceedingly pleased by how FERC Chairman Wellinghoff has broken FERC out of 50

years of traditional, monolithic thinking on transmission to become a thought leader in these complex arenas.

**CCBJ: ACORE's last quarterly report included Navigant's estimates that solar PV capacity will grow by 32% to 46% annually to 2014, driven by increasing utility investment, solar carve-outs in state RES policies and other factors. But Navigant flagged low natural gas prices – resulting in lower electricity prices – as a potential impediment. What's your perspective?**

ME: We have two worlds: the pre-2009 world and the post-2009 world. In 2009, the financial world crashed, the world economy went into recession, solar PV costs and prices declined by 40%, and the U.S. woke up to the availability of shale-based natural gas in infinite quantities at \$4.00/mmbtu.

In my opinion, the one constant is that PV prices and costs dropped by 40%. All of the other factors will reverse and go up again. I believe that natural gas prices will shoot up to \$8 and \$12, because the “old” natural gas industry needs \$8 gas to be wildly profitable, and the LNG industry needs gas to be at \$12 for them to be viable. So I believe we will see high natural gas prices again. Solar energy is accelerating because of the drop in costs and will further enjoy market growth when natural gas prices go skyward again.

**CCBJ: What other impacts is the current low price of natural gas having on renewable power development?**

ME: The major impact today and in the near-term future is the impact on wind power growth. Low load, low utility purchasing and low natural gas prices threaten the momentum of the wind power development and manufacturing industries in the U.S. It is a young industry and is sensitive to the ups-downs of the market. Wind power needs stability of demand from a strong National Renewable Energy Standard at this time.

**CCBJ: Wind power developers have been highly dependent on the production tax credit and more recently the grant-in-lieu-of investment tax credit. With the grant potentially expiring at the end of 2011 and the PTC at the end of 2012, what arguments can wind power advocates use to convince a deficit-averse Congress to continue these incentives?**

ME: The PTC for wind power is worth about 35% of the economic value of a wind farm project, so it is a powerful incentive. Some argue that it should not be continued. But I say that this is a political surrogate for the environmental, climate and domestic energy benefits of wind power – it is a fair public “compensation for benefits” and not an unfounded subsidy. In my view, it should be made permanent, like the oil depletion allowance and the coal mining subsidies.

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*I fear that the entire world is on the verge of creating trade barriers in renewable energy.*

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The cash grant in lieu of tax credits expires at the end of 2011, after the one-year extension that US PREF and others persuaded Congress to enact. We are encouraging Congress to extend it further to match the PTC schedule to the end of 2012. The rationale is that it costs the taxpayer nothing – it is simply a different form of payment for the PTC that already exists, but it has a tremendously positive effect on project development and employment in the wind power industry.

**CCBJ: Solar renewable energy credits are key to financing in New Jersey and other states. How well are these markets functioning?**

ME: This is similar to the PTC being a method of financial social benefit.

The RECs that have been created by the state-level Renewable Portfolio Standards (RPS) are another form of such compensation. It is a brilliantly simple idea that has some amazingly complex characteristics in implementation.

We at ACORE began working in 2003 on a standard REC trading contract and eventually published it in 2007 after 40 lawyers worked pro bono on it for years under the direction of Roger Feldman. The markets are not functioning well, however, and we urgently need a National Renewable Energy Standard to create a framework in which in-state RECs function plus inter-state RECs.

**CCBJ: You participate in many global renewable energy forums. How serious is the issue of trade barriers (such as local content requirements in China and Ontario)? What impacts might it have for the renewable industry domestically?**

ME: I fear that the entire world is on the verge of creating trade barriers in renewable energy. This is nothing new. All of us who travel carry adapters for electrical systems in each country. That is because countries discovered long ago that if they wanted to have domestic manufacturers of electrical equipment, they needed to create protected markets and standards that were not compatible with other country standards.

There is a long history of this. Renewable energy has been the exception, but this is, I believe, about to end as many countries see the economic potential of renewable energy technology manufacturing and do not want to import the equipment from China and other countries. But if we can learn from history, we will avoid this by developing global standards and keeping international trade going. Renewable energy will grow faster and to higher levels with this global perspective. ⚙



## Key Legal Developments Shaping The Future of Global Warming Lawsuits

By Joanne Zimolzak, Christina M. Carroll,  
and J. Randy Evans of McKenna Long &  
Aldridge LLP

**T**he Supreme Court's recent decision to grant certiorari in *American Electric Power Co. v. Connecticut*, No. 10-174 (AEP) could significantly affect the course of current and future litigation seeking to hold industry liable for the alleged effects of greenhouse gas emissions on climate change. The country's highest court is now poised to address whether states can seek redress under federal common law for the effects of climate change allegedly caused by anthropogenic (i.e., man-made) greenhouse gas emissions.

A key issue before the Court is whether reductions of greenhouse gas emissions and climate change are properly dealt with through tort litigation or, alternatively, if such issues are inherently political and therefore within the exclusive ambit of Congress and the Executive Branch. Businesses whose operations generate greenhouse gas emissions, together with their respective insurers, are among the sectors most likely to be affected by the Court's decision. Yet while some have suggested that a ruling favoring industry would sound the death knell for climate change-related tort litigation on a going forward basis, any such conclusion seems at best premature.

### Second Circuit Decision

The case, which dates back to 2004, began when eight state attorneys general, the City of New York, and three land trusts filed two complaints in the U.S. District Court for the Southern District of New York alleging that AEP and four other electric power companies are responsible for about ten percent of all carbon dioxide emissions from human ac-

### *McKenna Long & Aldridge LLP*

*The U.S. Supreme Court has agreed to hear a complicated and unusual case in which states, cities and land trusts have sued American Electric Power alleging that its carbon dioxide emissions have created a common-law public nuisance by contributing to global warming and harming the environment. McKenna Long & Aldridge attorneys Joanne Zimolzak, Christina M. Carroll and J. Randy Evans parse the issues at stake in this and related cases. They also examine conflicts between carbon emitters and their insurance providers over whether carbon dioxide is a pollutant and thereby excluded from most commercial general liability policies.*

tivities in the U.S. The complaints alleged that the power companies have created a common-law public nuisance by contributing to global warming and harming the environment, state economies, and public health. The plaintiffs sought permanent injunctive relief requiring the power companies to abate the nuisance by capping and then reducing their emissions by a specified percentage each year for at least a decade.

The trial court dismissed both cases on grounds that they present "non-justiciable political questions" because their resolution would require identification and balancing of interests (e.g., economic, national security) that are constitutionally committed for resolution to the U.S. Congress or the Executive Branch. In other words, courts lack jurisdiction over suits whose adjudication would require examination of questions that are constitutionally committed to the political branches and/or for which no judicial standards exist.

On September 21, 2009, a two-judge panel of the U.S. Court of Appeals for the Second Circuit vacated the trial court's dismissal and remanded the case for further proceedings, allowing the plaintiffs' claims to proceed. In reversing as to the political question issue, the panel described the case as an "ordinary tort suit" and held that a decision by a single federal court regarding whether the emissions of six domestic electricity plants constitutes a public nuisance does not implicate broader policy issues that arguably would fall to the political branches. The panel further

held that the plaintiffs have standing to bring their claims, that the plaintiffs can assert claims under the federal common law of nuisance, and that such claims are not displaced by federal legislation. As to this latter point, the panel found that because there is no comprehensive federal greenhouse gas regulatory scheme, the Clean Air Act (CAA) and other greenhouse gas legislation do not displace the plaintiffs' claims.

### Other Climate Change-Related Civil Litigation

AEP is one of several pending cases presenting common law tort allegations for alleged contributions to global warming. One other suit is *Native Village of Kivalina v. Exxon-Mobil Corp.*, in which an Inupiat Eskimo village sued twenty-four oil, coal, and power companies, alleging that their emissions have contributed to global warming and thereby caused Arctic sea ice to diminish. In *Comer v. Murphy Oil USA*, Mississippi coastal residents and landowners instituted a class action lawsuit against numerous oil, coal, and chemical companies, alleging that their emissions contributed to global warming and increased the severity of Hurricane Katrina.

As in AEP, defendants in the *Kivalina* and *Comer* cases successfully moved to dismiss those respective actions on grounds that, e.g., the plaintiffs lacked standing and the claims were barred by the political question doctrine. The appeal to the Ninth Circuit in *Kivalina* is still pending. The subsequent history of the *Comer* case is more complicated.

In *Comer*, a panel of the Fifth Circuit initially reversed the district court's dismissal and remanded the case for arguments on the merits (i.e., allowed the plaintiffs' case to proceed). Thereafter, the Fifth Circuit, left with a bare quorum due to the recusal of seven justices, voted to hear the *Comer* appeal en banc, automatically vacating the panel's earlier decision. The subsequent recusal of an eighth justice resulted in the loss of the quorum necessary to hear the appeal. The Fifth Circuit concluded it lacked authority to reinstate the vacated panel decision and thus ultimately dismissed the *Comer* appeal entirely. The plaintiffs thereafter filed a petition for a writ of mandamus to the Supreme Court, seeking to require the Fifth Circuit to reinstate the appeal.

In a decision announced on January 10, 2011, the Supreme Court denied the *Comer* plaintiffs' petition for writ of mandamus, meaning that the high Court will not review the procedural issue of whether the Fifth Circuit had a sufficient quorum to dismiss the appeal. A technical result of the denial is that the decision of the U.S. District Court for the Southern District of Mississippi to dismiss *Comer* on political question and standing grounds will stand. However, since the Supreme Court is about to examine similar issues in *AEP*, it is unlikely that courts would accord the district court decision much substantive weight.

### ***AEP*: A Rather Extraordinary, "Ordinary Tort Case"**

*AEP* presents a number of important legal issues, including whether the plaintiffs' claims constitute merely an "ordinary tort case" or are barred by the political question doctrine. Regardless of the answer to this particular question, there are several twists and turns that make the case far from ordinary.

Justice Sotomayor did not take part in the Supreme Court's decision to hear the appeal, given her prior involvement in the

case as a judge on the Second Circuit. As a result of her recusal, it appears that only eight justices will hear the case, raising the possibility of a 4-4 deadlock. In such an event, the Second Circuit's ruling in favor of the plaintiffs would remain intact, but the case would not be binding upon other federal courts of appeal. Given the even number of justices who will hear the case, it is also possible that a plurality opinion will issue (meaning an opinion that does not receive the support of a majority of the justices, but receives more support than any other opinion). Although such a decision would be binding on the parties in the *AEP* case, its precedential value would be far less clear.

Certain noteworthy events also precipitated the Supreme Court's certiorari decision, which seemed doubtful for months after the private utility defendants filed their petition. Although there was a potential disagreement brewing among the circuits concerning whether nuisance law could be used to hold companies liable for greenhouse gas emissions, that disagreement arguably had not fully matured, given that (1) the Ninth Circuit has not yet decided the *Kivalina* appeal and (2) reinstatement of the district court's decision in *Comer* technically created a "split" but occurred only after a series of recusals left the Fifth Circuit unable to hear the appeal or, as was decided, to reinstate the panel decision in favor of the plaintiffs in that case. Given these circumstances, it is likely that the Obama Administration's decision to support the petitioners by urging the Supreme Court to take and reverse the decision in the case helped to tip the scales in favor of review.

The Solicitor General's brief, submitted on behalf of defendant Tennessee Valley Authority, argued that the Court could resolve the case on relatively narrow grounds, either by finding (1) that the plaintiffs lacked prudential standing (because global warming presents a generalized grievance) or (2) that their claims are

displaced by EPA actions taken after the Second Circuit issued its decision.

Although many environmentalists considered the Administration's move a betrayal, an alternative view is that it supports the Administration's efforts to implement strong, comprehensive regulation of greenhouse gases under the CAA.

### **"Displacement": A Key Issue**

Based on the arguments presented by the Solicitor General, the Court's decision in *AEP* could hinge on whether EPA and Congress have regulated greenhouse gases to the extent required to displace court involvement. The Second Circuit's conclusion on this issue was that the then-existing EPA regulatory scheme was insufficient to displace the plaintiffs' federal common law claims, although the Court left open the possibility that further regulatory developments could do so.

EPA indisputably has taken significant actions to address greenhouse gas emissions since the Second Circuit's decision; the question is whether those actions will be considered sufficiently comprehensive to displace the common law in this context.

In particular, EPA began in January 2011 to regulate greenhouse gases under the CAA's Prevention of Significant Deterioration (PSD) program. The PSD program imposes federal emission control requirements only on new and modified sources of pollution, not on existing sources. Because the *AEP* case targets existing stationary sources of greenhouse gases, plaintiffs likely will argue that EPA's regulatory scheme falls short of displacing the common law.

Plaintiffs also could argue that only the top tier of emitting facilities are currently regulated due to EPA's Tailoring Rule, and thus there is no comprehensive scheme. Proposed congressional efforts to freeze or eliminate EPA authority over stationary sources, if successful, also could affect the

displacement analysis. On the other hand, the very fact that the Clean Air Act covers greenhouse gases — as confirmed by the Supreme Court's holding in *Massachusetts v. EPA* — may support the notion that Congress and EPA have a comprehensive regulatory scheme.

Decisive action by Congress, in the form of enacting comprehensive climate change legislation, might eliminate any doubts regarding this issue in the federal common law context. This appears unlikely to occur in the foreseeable future. In the meantime, both the litigants and other interested parties will closely watch the legislative and regulatory landscapes for new developments that could affect the Court's decision.

### Potential Impact on Future Climate Change-Related Litigation

A broad ruling in AEP could affect the outcomes in the *Kivalina* and *Comer* cases, as well as shape the course of future climate change-related litigation. Any suggestion that a reversal would put an end to all such litigation in the future, however, appears premature for at least two principal reasons.

First, there are some key differences between AEP and these other cases, including the identity of the plaintiffs (states versus private parties), legal theories pursued (federal common law versus state common law and claims unrelated to nuisance), and remedies sought (injunctive relief versus monetary damages).

Second, the trial bar in previous public interest tort actions has proved to be remarkably adaptable. Indeed, it took more than forty years for tort litigation against tobacco companies to succeed, and the history associated with claims in the asbestos, hazardous waste, and similar contexts reveals a similar pattern of initial success for defendants at the motion to dismiss stage, only to be followed by dedicated, repeated efforts by plaintiffs to find a legal theory that “sticks.”

If past is prologue, no matter how the Court rules in AEP, the trial bar will attempt to find a way around the decision and continue pursuing climate change-related litigation, resulting in significant transactional and defense costs for the foreseeable future. This obviously has implications for targeted industries — i.e., those that emit greenhouse gases as part of their operations — as well as their insurers.

As to the latter group, it bears noting that one coverage action associated with a claim in connection with the *Kivalina* action, *Steadfast v. AES Corp.* (AES), already is pending. And, regardless of the ultimate decision in AES, if climate change-related tort cases continue to proceed, as many commentators expect, it is inevitable that additional coverage litigation will follow.

### Steadfast v. AES Corp. (AES)

The first insurance coverage case to arise out of climate change-related litigation began in July 2008, when *Steadfast* instituted declaratory judgment proceedings regarding the extent of its coverage obligations, if any, for the *Kivalina* case under five liability policies issued to AES, a global power company.

*Steadfast* denied owing any duty to defend or indemnify AES in the *Kivalina* case on the three grounds: (1) the *Kivalina* Action does not allege “property damage” caused by an “occurrence,” as the *Kivalina* plaintiffs alleged that AES's decision to combust fossil fuels and discharge carbon dioxide into the atmosphere was an intentional act, and AES knew or should have known of the damages its emissions would cause; (2) the relevant policies contain a pollution exclusion that bars coverage for the “air pollution” alleged in the complaint, and (3) a loss in progress endorsement in the policies precludes coverage for the underlying claims.

The Virginia trial court ultimately ruled in favor of *Steadfast*, granting sum-

mary judgment on the “occurrence” issue. Ruling from the bench, the court opined that notwithstanding the use of the term “negligence” in the underlying complaint, all of the facts and circumstances pled by the *Kivalina* plaintiffs allege intentional conduct, not negligence. Since only intentional conduct was alleged, according to the court, there is no occurrence and hence no duty to defend.

That decision is now on appeal to the Virginia Supreme Court, with a decision likely this year. Regardless of the decision, it will be closely studied by the insurance industry, policyholders, and their respective lawyers. Indeed, representatives of these groups already have published numerous articles and held a variety of seminars discussing ways to expand upon or limit the reach of AES, depending on their particular constituency.

### Potential Applicability of the “Pollution Exclusion”: A Key Insurance Issue

An issue raised but not decided in the AES case is the potential applicability of the “pollution exclusion” often contained in commercial general liability (CGL) and other liability policies to bar coverage for climate change-related claims. The two most common types of pollution exclusions found in such policies -- i.e., the “qualified” pollution exclusion and the “absolute” pollution exclusion -- may be interpreted differently in the context of determining coverage for prospective climate change-related claims.

The so-called “qualified” pollution exclusion found in historic CGL policies does not apply to discharges, dispersals, or releases of “pollutants” that are “sudden and accidental.” The effectiveness of this exclusion in barring coverage for greenhouse gas emissions likely will be jurisdiction specific, as some jurisdictions refuse to enforce the exclusion and others hold that “sudden and accidental” can encompass gradual releases such as may be



alleged in lawsuits seeking tort damages for the effects of greenhouse gas emissions on climate change. Although the “sudden and accidental” language generally ceased to appear in CGL policies beginning in 1986, should climate change-related tort litigation continue, some policyholders may assert that early occurrence-based policies containing this language provide coverage for such claims.

It remains to be seen whether the “absolute” pollution exclusion, which is most typically found in CGL policies today, would bar coverage for climate change-related liabilities. This version of the pollution exclusion, which first appeared in policies in 1985, eliminates the exception for “sudden and accidental” releases. The applicability of this exclusion to climate change-related claims nonetheless remains an open question that is likely to be the subject of significant litigation, with a determination depending on whether greenhouse gases are considered “pollutants” within the meaning of the applicable policy or policies.

The fact that greenhouse gases include commonly or naturally occurring substances (such as carbon dioxide, water vapor, and methane) is likely to be argued by policyholders as a basis for finding that greenhouse gases do not constitute “pollutants” and, therefore, are not excluded from coverage. Thus, how a jurisdiction treats naturally or commonly occurring substances with regard to a pollution exclusion may prove helpful in determining how greenhouse gases will be treated in that jurisdiction.

Jurisdictions deeming exclusions to be unambiguous and applying the terms of an exclusion literally have had no difficulty designating commonly occurring substances as “pollutants.” For example, a Minnesota appeals court held that gases and fumes from a pig farm fell within the pollution exclusion because the pollution exclusion clearly applied to fumes. A Texas District Court, likewise, has held that

argon, despite being an inert, naturally occurring gas, could constitute a pollutant at “dangerously elevated concentrations.”

In contrast, relying on the principle that insureds have reasonable expectations of coverage for damages caused by substances that are not traditionally considered to be pollutants, some jurisdictions deeming exclusions to be ambiguous have found that commonly occurring gases cannot qualify as pollutants under a pollution exclusion clause. For example, an appeals court in Wisconsin held that carbon monoxide at high levels in a residence resulting from operation of a fireplace and boiler was not a “pollutant” within the meaning of the landlord’s liability policy partially because the landlord could reasonably expect coverage for damages caused by the accumulation of a substance that is commonly present. In these types of jurisdictions, insureds seeking to negate application of a pollution exclusion may argue that greenhouse gases (in particular, CO<sub>2</sub>) are commonly occurring, inert gases typically found in the atmosphere, and as such do not qualify as traditional pollutants for purposes of the pollution exclusion.

An important development regarding whether courts will recognize greenhouse gases as pollutants for purposes of pollution exclusion clauses is the 2007 United States Supreme Court decision in *Massachusetts v. EPA*, in which the Supreme Court held that certain Greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and HFCs) are pollutants for purposes of the Clean Air Act. Thus, Massachusetts is persuasive evidence that Greenhouse gases should be treated as “pollutants” for insurance purposes. It is not, however, dispositive, as the meaning of the term “pollutant” in the Clean Air Act context may differ from insurance policy definitions of “pollutant.” In the context of policies with pollution exclusions, insureds have focused and likely will continue to focus on any such differences to argue against categorizing greenhouse gases as pollutants.

## Global Warming Cases: The Future Is Now

Based on the grant of the petition for certiorari in *AEP*, the Supreme Court will decide certain important, threshold issues surrounding climate change-related tort claims. For the reasons discussed above, it is unlikely that even a decision favoring industry will put an end to all such litigation. Nonetheless, the amount and direction of future litigation in these areas undoubtedly will be shaped to some degree by the decision in *AEP*, which makes it a case well worth watching. The Court is expected to consider and decide the *AEP* case prior to the end of its current term in June 2011. ☼

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