Securing and Strengthening the Grid

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Securing and Strengthening the Grid
After a string of unprecedented events, the industry is revising and enhancing its strategies for storm response and restoration.

BY NICHOLAS K. AKINS

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Out of Balance
The law of unintended consequences is already affecting power markets in Europe and offers valuable lessons for power markets in the rest of the world.

BY JEFFREY ALTMAN

For more content, visit eei.org/EP
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On the cover: Nick Akins, chairman, president, and CEO of American Electric Power, and an EEI vice chairman, highlights how the electric utility industry is revising and enhancing its strategies for storm response and restoration, as well as keeping its focus on the customer. (Photo courtesy: Greg Miller)

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The Outlook for 2014

By Thomas R. Kuhn, president of the Edison Electric Institute.

We all know we can’t predict the future, but I believe it’s always best to be prepared. As we begin 2014, that means staying focused on our customers and continuing to promote the value that we provide.

Electricity is everywhere. We rely on it all the time, and we’re constantly connected. Electricity transforms our daily lives in ways too numerous to count, and the future possibilities for more innovation are endless.

Edison Electric Institute’s (EEI’s) member utility companies are making this future possible. We’re the industry that powers ingenuity, entrepreneurship, and much of the quality of life that Americans enjoy. But our industry, like every industry, continually faces new challenges. We must be strategic and turn these challenges into opportunities.

As I look at issues on the horizon and our “to do” list for 2014, I find myself thinking about the important role of our customers. We need to educate them about the value of electricity and the grid that transports it to and from their homes and businesses. The issues change but our customers are our constant, and they must be part of the solution for each challenge we face.

The need to update state net metering policies to ensure that all electricity customers are treated fairly will be a top priority in 2014. Our outreach to policymakers, customers, and other stakeholders will be ongoing and will require new thinking and extensive education from all levels of our member companies to all levels of government.

I also anticipate significant activity in the environmental policy arena on a range of air, water, and climate-related issues. This is going to be a critical year for regulations on greenhouse gases, cooling water intake structures and other water issues, and coal ash. The industry faces significant challenges to preserving “all-of-the-above” fuel options.

We will continue to focus on business continuity issues—cybersecurity, physical security, and storm response and restoration—that are critical to reliability. We have taken the initiative and are working closely with federal agencies to improve information sharing and access to detection technologies while developing joint response plans. Our education efforts extend to the state level where we are educating public officials about the steps our industry is taking.

We are working to bolster security of our critical physical assets as well. And we continue to work with the federal government and states to institutionalize the unprecedented cooperation between our industry and federal agencies in the wake of Superstorm Sandy so we are better prepared for future events that require an industry-wide national response.
In Congress, we face the prospect of fundamental corporate tax reform, and we will continue to educate lawmakers on the industry’s priorities, including the treatment of normalization, excess deferred taxes, deductibility of debt interest, depreciation, and corporate and dividend tax rates.

We also continue to work with Congress on cybersecurity legislation that strengthens information sharing and recognizes the industry’s existing regulatory structure on cybersecurity protections. With other stakeholders, we are focused on advancing bipartisan coal ash legislation in both the House and the Senate.

The list goes on and on. Fortunately, our industry is used to dealing with a multitude of legislative and regulatory issues at once. Doing so again will require that we raise our game. I believe that means being more innovative, more entrepreneurial, and more customer-focused.

Staying focused on our customers’ changing expectations must form the foundation of our business strategy. This includes looking for new ways to promote cutting-edge uses of electricity—as a fuel to power electric on-road and non-road electric vehicles, for example. It also means looking at the challenges to our traditional business model as new business opportunities to better serve our customers.

The robust, modern electric grid we continue to build will be more relevant than ever as a platform to integrate new technologies and maximize their capabilities. The nearly 50 million smart meters now deployed are just the beginning of the journey.

Our investment in smart grid technology is making it possible to identify and address problems on the grid before they occur, allowing us to be more proactive instead of having to wait for customers to report them. With better information, companies can speed power restoration by routing crews to specific locations faster, being more responsive to our customers and more efficient with our resources.

While electricity’s cost to households is holding stable, electricity’s value continues to rise. With our customers more and more reliant on products that plug in or charge, we play an increased but sometimes less obvious role in their lives. We must tout the value we’re producing for our customers and share our story with our stakeholders to help grow the understanding of our industry by all those we serve.

I also realize that to unlock the full potential of the future and to drive innovation and change, we can’t do it alone. To make the transformation possible, there are important partnership roles for regulators, policymakers, entrepreneurs, technology companies, and other stakeholders. We’ll need all of their help to meet the evolving needs and expectations of our customers.

Finally, powerful connections within our own industry will be important in addressing critical policy issues in 2014. EEI stands ready to help you. We are dedicated to your long-term success, and I encourage you to discover more fully the true Power By Association that EEI represents—helping to advance your vital mission of providing electricity to foster economic progress and improve our quality of life.
As we embark on a new year, it is important to reflect both on where we are going and where we have been.

Looking back at 2013, I am impressed by the great progress our industry made in this “year of electrification.” From promoting electricity as a transportation fuel to advancing fleet electrification, our customers are starting to see—and talk about—the growing applications of electricity in their lives. Indeed, electricity is beginning to transform the transportation sector, just as it has revolutionized so many other sectors of our economy.

What’s more, innovations in battery storage and grid technology may create opportunities for vehicle-to-grid programs that aid in grid stability and reliability. The testing of energy storage using electric vehicle batteries is underway, and is yet another example of our industry’s push to advance technologies that benefit the grid and society.

Looking ahead, we are poised to make even greater strides as we focus on telling the story of the transformative industry that continues to innovate and enhance our quality of life.

From the humble beginnings of Thomas Edison’s first power plant in New York City, the electric power industry has evolved into the nation’s most important high-tech industry. While we may be delivering the same product—the “smokeless light” that first lit up cities more than 130 years ago—our industry continues to utilize new technology to transform not only how utilities generate and deliver electricity, but also how our customers use electricity.

As our industry works to ensure that electricity can do even more for us in the future, we also must ensure that our customers understand this transformation. Gone are the days of one-way communication and a one-way flow of power. Today, we are working in partnership with our customers to meet their needs and expectations. To be sure, as customers continue to demand smaller and more powerful devices, the value of electricity in their lives continues to grow. Our industry is committed to exceeding our customers’ expectations with opportunities for energy savings and a variety of new services.

One key to meeting this commitment is through continued grid enhancements. With significant investment and cutting-edge innovation, we are creating a smarter, more efficient infrastructure system that provides reliable electricity to our nation’s homes and businesses. A robust, modern electric grid will be more relevant than ever as a platform to integrate new technologies and maximize their capabilities.

Reflecting on our industry’s progress and path for the future, it is clear to me that we have an exciting story to share. Through open dialogue with our customers, regulators, and policymakers, our powerful story will tell itself.
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If you were to take a look at the first issue of Electric Perspectives magazine, launched in 1976, you’d be forgiven for thinking of the old refrain: The more things change, the more things stay the same. How do we grow our economy? What is the future of nuclear power? How do we keep pace with the demand for energy?

While we face many of the same big picture public policy questions today, what has changed is our industry. Today’s electric power sector is transformative, evolving, and innovative. We are two-way, always on, and always plugged in. As the role we play in our customers’ lives continues to expand and grow, the way we interact with them evolves as well. So it is fitting that Edison Electric Institute’s (EEI’s) flagship publication should reflect this exciting new reality.

With this issue, we relaunch Electric Perspectives. Our newly designed print edition has a sharp look that’s easier to read and is more reflective of our modern, high-tech industry. We know your time is important, so we’ve revitalized our graphics to communicate key takeaways quickly and effectively. We hope the visuals are more dominant and that the text is cleaner and reader-focused.

At the same time, we continue to offer the strong, compelling top-down content you rely on from Electric Perspectives and EEI. American Electric Power Chairman, President, and CEO Nick Akins explains how the industry is enhancing its response to emergency events on page 20. EEI President Tom Kuhn shares his thoughts on the year ahead on page 6. And our newest column, Plugging INnovation on page 46, highlights cutting-edge thinking at work in Arizona. Please share your copy with your colleagues and talk about the critical issues and trends facing your business and the entire industry.

We’ve also re-engineered our digital magazine for 2014, available at www.eei.org/ep. Our expanded online content includes photo galleries and videos from member companies and links to helpful external resources. The online edition allows you to seamlessly navigate through features and sections and print, e-mail, or share your favorite articles. You can access the online magazine on the go from your phone, tablet, laptop, or by using our app. And I encourage you to interact with us on social media by following us on Facebook and Twitter.

One thing that hasn’t changed in the 38 years since our first issue is that the Electric Perspectives staff remains steadfast in its dedication to providing current and future leaders at investor-owned utilities with strategic industry insights they cannot find elsewhere. I am thrilled to have joined the team in September and excited to work with Associate Editor Bruce Cannon, who does an outstanding job of delivering each issue. We both look forward to hearing your feedback about the magazine. I invite you to contact me directly at cjohnson@eei.org with your thoughts.

We have an exciting year ahead, and it starts now! Thanks for your continued support. EP
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Save the Date for these Upcoming Meetings

February 12, 2014
Wall Street Briefing
New York, NY

March 4, 2014
National LAMPAC Meeting
National Harbor, MD

April 6-9, 2014
Spring Transmission, Distribution and Metering Conference
Glendale, AZ

April 27-30, 2014
Spring Occupational Safety and Health Committee Conference
Boston, MA

For a more detailed list of EEI meetings, visit www.eei.org/meetings
The latest updates and events impacting today’s electric power industry.

**Keeping Pets Plugged In**

The majority of Florida pet owners leave household electric items on for their pets when they are not at home, and this could increase energy bills, according to a study released by Florida Power & Light Company (FPL).

A study of 1,500 Florida adults revealed that more than half (58 percent) own a dog, cat, or bird. Of those, 86 percent reported leaving on electronic items for their pets. According to FPL, using ceiling fans alone can account for up to $7 on monthly electric bills.

When asked to choose, however, nearly half of Florida adults considered being comfortable (47 percent) to be most important to them, followed by saving money (44 percent), according to the study. Only 9 percent considered saving energy to be most important to them.

To help find the best balance between pet comfort and cost savings, FPL recommends that customers take the Online Home Energy Survey at www.fpl.com/landing/petproject to receive a personalized energy savings plan with expert tips and recommendations that can help them change the way they use energy and save up to $250 a year in energy costs without impacting their pets.

In addition, FPL’s Energy Dashboard helps customers become more aware of their own energy-use patterns. It allows customers to see how much energy they are using by month, day, or hour.

**United States Leads on Shale Gas**

North America leads the world in the production of shale gas, according to a joint study by the Energy Information Administration (EIA) and Advanced Resources International (ARI). In fact, the United States and Canada are the only major producers of commercially viable natural gas from shale formations in the world, even though about a dozen other countries have conducted exploratory test wells.

China is the only nation outside of North America that has registered commercially viable production of shale gas, but the volumes contribute less than 1 percent of the total natural gas production in the country. In comparison, shale gas as a share of total natural gas production in 2012 was 39 percent in the United States and 15 percent in Canada.

Shale gas dry production in the United States averaged 25.7 billion cubic feet per day (Bcf/d) in 2012, while total dry production averaged 65.7 Bcf/d. In Canada, total dry natural gas production from the two major shale formations—Muska-Otter Park in the Horn River Basin of northern British Columbia and the adjacent Montney Basin that spreads over British Columbia and Alberta—averaged 2.0 Bcf/d in 2012, while total Canadian production averaged 14.0 Bcf/d.

China ranked as the largest holder of shale gas resources among the 41 countries assessed for technically recoverable shale resources in the study released by EIA/ARI. The Chinese government has not officially reported on shale gas production, but some independent Chinese energy analysts have claimed commercial production of at least 0.003 Bcf/d of shale gas, mainly from the Sichuan Basin.

### MOST COMMON ELECTRIC ITEMS LEFT ON FOR PETS

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air conditioning</td>
<td>73%</td>
</tr>
<tr>
<td>Ceiling fan</td>
<td>38%</td>
</tr>
<tr>
<td>Lights</td>
<td>27%</td>
</tr>
<tr>
<td>Television</td>
<td>17%</td>
</tr>
<tr>
<td>Radio</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: Florida Power and Light Company
Carbon emissions from U.S. power generation in 2012 were 5.9 percent lower than 2011 levels and 10.3 percent lower than 2010 levels, according to the Environmental Protection Agency’s (EPA’s) Greenhouse Gas Reporting Program. The drop is primarily the result of generators switching from coal to natural gas.

Emissions of methane and nitrous oxide from power plants also dropped dramatically between 2010 and 2012. Methane emissions decreased 18.4 percent from 2010 levels and nitrous oxide emissions decreased 15 percent from 2010 levels.

EPA’s Greenhouse Gas Reporting Program collects annual greenhouse gas information from more than 8,000 facilities in the largest emitting industries, including power plants, oil and gas production and refining, iron and steel mills, and landfills.

### GREENHOUSE GAS EMISSIONS BY U.S. ELECTRIC POWER SECTOR

(Million metric tons of carbon dioxide equivalent.)

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide (CO₂)</td>
<td>2,078</td>
<td>2,209</td>
<td>2,317</td>
</tr>
<tr>
<td>Methane (CH₄)</td>
<td>3.1</td>
<td>3.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Nitrous oxide (N₂O)</td>
<td>8.5</td>
<td>10.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Greenhouse gas emissions reported to the EPA Greenhouse Gas Reporting Program. Data prepared by EEI’s Business Information Group.

### CAREERS IN ENERGY WEEK

Careers in Energy Week is an annual celebration of the individuals who work in the energy sector. From line workers to customer service operators to electrical engineers, these men and women work tirelessly to ensure that businesses and homes across the country always have the energy they need. Last year, several Edison Electric Institute (EEI) members celebrated Careers in Energy Week, October 14–20.

Exelon Corporation held events focused on building a strong energy workforce and encouraging individuals to consider careers in the energy industry. Employees of ComEd, Exelon’s Chicago-based electric utility, led elementary school students from local neighborhoods on a tour of the Rockford, IL, training center. ComEd also hosted an open house for employees to educate friends and family members about energy career options and training and recruitment opportunities. In addition, employees of Exelon Generation, Exelon’s power generation and marketing business, spoke to students at the Illinois Math and Science Academy and local high schools about career opportunities and events in the nuclear industry.

Ameren Illinois also is working with school districts on the implementation of science, technology, engineering, and math curricula that prepare high school students for a successful career in energy and is providing tours and job fairs over the next year.

To meet the country’s growing demand for energy, the electric industry is focused on growing its skilled workforce of talented individuals and raising awareness of the rewarding careers available in the energy industry. Energy jobs offer promising opportunities to both experienced workers and those just starting their careers. These stable jobs are active, hands-on, rewarding, and available in every state. To learn more about the diverse career opportunities in the energy industry, please visit www.GetIntoEnergy.com.
EEI MEMBERS SCORE HIGH MARKS ON MILITARY EMPLOYMENT

Eleven member companies of the Edison Electric Institute (EEI) are among America’s Top 100 Military Friendly Employers, as recognized by G.I. Jobs magazine. Ameren Corporation; American Electric Power (AEP); Arizona Public Service Company (APS); Dominion; Exelon Corporation; FirstEnergy Corporation; MidAmerican Energy Holdings Company; PG&E Corporation; Public Service Enterprise Group, Inc. (PSEG); Southern Company; and Xcel Energy Inc. each demonstrated their support of military service through their employment of veterans.

Criteria for the Top 100 Military Friendly Employers included the strength of military recruiting efforts, the percentage of new hires with prior military service, retention programs, and company policies toward National Guard and Reserve service. The list was drawn from a sample of 5,000 companies whose annual revenues exceed $500 million.

EEI and the energy industry are focused on connecting the nation’s military veterans to rewarding energy careers. The industry’s Troops to Energy Jobs program provides a roadmap for entry into skilled utility and engineering programs in the energy industry. With their extensive military training and experience, many veterans already have the skills and knowledge required for energy careers.

To learn more, please visit www.TroopsToEnergyJobs.com.

SECURITY LIGHTING BRINGS PEACE OF MIND

Louisianans joined the nation in setting their clocks back on November 3, marking the end of daylight saving time and ushering in the shorter days of fall and winter. That’s why Entergy Gulf States Louisiana and Entergy Louisiana are helping customers light up their homes and businesses, promote peace of mind, and increase safety and security with private-area lighting options that are cost-effective and hassle-free.

“Private-area lighting is important for customers, particularly when the shorter days of fall and winter offer less natural light outside,” said Pat Waters, vice president of Entergy’s lighting business. “For a low monthly cost, customers can keep their families, employees, homes, and businesses safe, secure, and functionally lit year-round. Safety is always Entergy’s first priority, and we are pleased to be able to offer security-lighting solutions that are a proven step in crime-prevention efforts.”

According to the Federal Emergency Management Agency, effective security lighting is the single most significant crime deterrent. It enhances natural surveillance, delineates private and public spaces, can help direct access, and has been proven to increase security and safety.

By filling out a short form online, customers can let Entergy know they are interested in having a security light installed at their home or business. Entergy will contact them quickly, and a lighting expert will assist them in determining what best suits their needs.

Security lights are available in a variety of sizes, styles, wattages, and lamp types for home and business use. Customers are charged a set monthly fee for the lights (depending on the light’s wattage), with the cost conveniently added to existing bills. Whether the light is installed on an existing or new pole, Entergy will work with customers to determine the most cost-effective option. In some cases, installation may even be free. In addition, there is no fee for regular maintenance, which includes bulb replacement. If the light and pole are destroyed in a storm event—such as a hurricane or tornado—they will be replaced free-of-charge to customers.
When different perspectives come together, there is a unique opportunity for innovation and discovery. The Modern Solutions Power Systems Conference (MSPSC) encourages meaningful collaboration across a variety of industries and disciplines. Industry leaders and technical experts share success stories, discuss best practices, learn about emerging technologies, and explore innovative solutions to simplify and solve the critical issues affecting modern power systems.

Register now and learn more at www.selinc.com/mspsc.

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- Best Maintenance Practices Improve Power Systems
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- Implementing Large-Scale Solutions to Aging Infrastructure
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- The Realities of Renewables
- And more...

"The diversity of speakers and the fact that there are discussions that go beyond our industry make this more unique than most conferences."

Managing Director of Transmission Engineering

JUNE 3–5, 2014 | HOUSTON, TEXAS
FROM TRASH TO TREASURE

The world’s largest landfill site is set to become New York’s biggest solar energy facility. Freshkills Park, located in Staten Island, NY, will be transformed into a solar installation by SunEdison at no cost to the city.

Former New York Mayor Michael Bloomberg plugged the project, saying, “It’s fitting that this site, long associated with the most stubborn challenges of urban development, will now be a shining example of cutting-edge solutions.”

SunEdison is leasing about 47 acres of the former landfill to install from 30,000 to 35,000 high-efficiency solar panels that could potentially generate up to 10 megawatts of power—enough to power nearly 2,000 homes. The facility will be built, operated, and paid for by SunEdison. It will feed energy back into Con Edison’s grid system to help power the entire city.

Provided there are no delays, construction of the site will start in 2015. When operational in 2016, the innovative facility will employ more than 100 workers. The landfill was closed in 2001, and the 2,200-acre park will be the largest in the city when it opens.

DIMMING THE LIGHTS ON INCANDESCENT BULBS

In 1879, Thomas Edison created the first long-lasting electric light bulb. It burned for more than 14 hours.

As of January 1, federal rules ban the manufacture or import of incandescent light bulbs that use 40 watts of power or more. This is the third phase of the Energy Independence and Security Act, energy efficiency legislation passed in 2007.

About 8.2 billion light bulbs and tubes—known collectively as lamps—are installed in the United States, according to the National Lighting Bureau (NLB). Of those, 5.8 billion are located in homes and 2.1 billion are in commercial buildings. Converting all residential and commercial installations to more efficient lighting would save 176.25 billion kilowatt-hours per year and, following NLB’s estimates on current electricity costs, Americans could save more than $20 billion per year.

The law is meant to encourage consumers to use more energy-efficient lighting technology. Advances in technology regulating currents and voltage mean that compact fluorescents are now cheaper, safer, more efficient, and instantly on. Compact fluorescent bulbs cost more than incandescent bulbs but last longer and use 75 percent less energy.

Halogen incandescent bulbs are more energy-efficient than older incandescent ones but less efficient than compact fluorescents. LEDs are 80 percent more energy-efficient than incandescents, according to the Department of Energy, and have far longer life expectancies. Incandescent bulbs typically last 1,000 to 2,000 hours, compact fluorescents have an expected life of 10,000 hours, and LEDs can burn 25,000 hours or more.

According to the Energy Information Administration, recent improvements in technology have reduced residential electricity demand for lighting by 2 percent.
**TOP CITIES FOR EVs**

The San Francisco Bay Area is the U.S. leader for electric vehicles, according to ChargePoint, the nation’s largest network of electric vehicle charging stations. ChargePoint’s list of “Top 10 Metropolitan Areas” for electric vehicles ranks cities based on the number of electric vehicles owned as well as the number of public charging stations available on the ChargePoint network.

The Bay Area (including San Francisco, Oakland, and San Jose) leads the nation, followed by Seattle; San Diego; Austin; Honolulu; Los Angeles; Portland, OR; Detroit; Washington, DC; and Boston.

While Los Angeles has the highest number of drivers of electric vehicles (more than 17,000), when equating for population differences, the Bay Area (nearly 15,000) leads the nation. The latter also tops the list in terms of the number of charging stations.

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**POSITIVE ENERGY RECEIVES TOP HONES**

Oklahoma Gas & Electric’s (OG&E) Positive Energy Smart Grid program was recognized as the top-ranked smart grid project in the world out of 200 projects reviewed by the “2013 Smart Grid Global Impact Report,” released in November.

The report presents a detailed analysis of the characteristics of successful smart grids as well as best-practice case studies from the most innovative utilities around the world. It mapped more than 200 projects worldwide and conducted in-depth questionnaires with 30 project owners representing an array of project sizes, differing scopes, and geographic areas.

According to the report, OG&E’s Positive Energy program delivers on five pillars of achievement for smart grid project outcomes: economic, environmental, consumer, reliability, and innovation impacts. It enhances the customer experience by reducing demand, reducing system losses, increasing security, and reducing costs. The utility’s innovative and comprehensive approach to intelligently monitoring the network earned OG&E the top spot in the report.

Introduced in 2010, the Positive Energy program helps customers more efficiently manage energy use and costs to fit their lifestyles. It also helps OG&E offer even more reliable service and maintain reasonable rates through smart meter deployment, distribution automation equipment, customer systems such as programmable communicating thermostats, and studies of peak pricing rates. It is one of 99 projects co-funded by the Department of Energy Smart Grid Investment Grant program.

The “2013 Smart Grid Global Impact Report” was a collaboration between Ventyx, an ABB company, and international energy think-tank VaasaETT.
Plan now to attend EEI’s 2014 Annual Convention.

Everywhere. All the Time. Connected.
More than ever, electricity remains the very lifeblood of the U.S. economy and our way of life. People everywhere recognize the value of being connected to the electric grid, all the time. The technologies that help generate and deliver electricity to the nation’s homes and businesses evolve continually. Yet the urgency of that powerful connection to the grid remains constant.

Come and explore the exciting future of the electric power industry at the EEI Annual Convention in Las Vegas, June 8-11. Take advantage of an unparalleled opportunity to connect with top industry leaders, who will discuss major issues including distributed generation, environmental regulation, cybersecurity, and much more. Throughout the Convention, you will hear from thought leaders who are helping forge the industry’s future, and you can take advantage of The Connection, EEI’s high-energy, interactive hub, perfect for networking with colleagues.

Mark your calendar now to attend EEI’s 2014 Annual Convention—the industry’s premier strategic networking event.

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The commitment to helping neighbors in Yarnell and Prescott, AZ, shows no signs of slowing. Arizona Public Service Company (APS) and its employees continue to reach out to the community as it begins to rebuild following the Yarnell Hill Fire that killed 19 firefighters with the Prescott Fire Department's inter-agency Granite Mountain Hotshots on June 30.

The company recently provided a $200,000 gift from the APS Foundation to the Yarnell Memorial Scholarship Endowment, a program operated by the Arizona Community Foundation.

“Since the fire and tragic loss of life in the Yarnell community, the APS teams in the Yarnell and Prescott areas have been engaged in a number of activities to support the communities and the families of the fallen firefighters. This tragedy was a very personal loss to many of our employees,” said Don Brandt, chairman, president, and CEO at Pinnacle West Capital Corporation and APS.

“In addition to our other efforts to support the families, we have been looking for ways to extend long-term support to the children of the fallen firefighters,” Brandt continued. “With the help of the Arizona Community Foundation, we have found a partner that will help ensure these children don’t have to pay for college.”

The Yarnell Memorial Scholarship Endowment will provide scholarships for the children of the Granite Mountain Hotshots and other fallen firefighters. The endowment will support the total post-secondary educational needs of the children—not just tuition—and scholarships will not be limited to public educational institutions located in Arizona.

The scholarship fund was established at the Arizona Community Foundation with a $100,000 lead gift from the Helios Education Foundation. Other firms and organizations joining APS in contributing to the endowment include Prescott True Value Hardware, Honeywell, and the Fiesta Bowl.

The goal is to build the fund to at least $1 million, which will continue to grow—thanks to the power of endowment—over the next 12 to 16 years or until the children are of age to apply for college scholarships.

The company also found a way to show its support through a Prescott Fire Department t-shirt fundraiser. The Prescott Fire Department has been raising funds through the sale of limited edition t-shirts. All funds taken from the sale of the t-shirts will benefit the families of the 19 Prescott firefighters. APS purchased many of the t-shirts and provided them to members of the company’s employee network groups.
After a string of unprecedented events, the industry is revising and enhancing its strategies for storm response and restoration.

Providing safe and reliable power to customers continues to be the electric utility industry’s primary mission. It takes tremendous investment, planning, coordination, and operational excellence to keep the lights on and our economy humming 24/7.

To make sure we can deliver on this huge responsibility, we’re constantly planning ahead and conducting drills for all types of emergencies, from weather-related events to threats to physical infrastructure and cyber attacks. Our goal is to decrease our response times, limit financial impacts, and maintain customer confidence following an interruption of our normal business functions.
The industry has a strong track record of maintaining high levels of reliability. When power outages do occur, we respond quickly—and unlike any other industry, we can call on our peers to provide assistance when and where we need it. Our decades-old mutual assistance network is the cornerstone of our commitment to get the power back on as quickly as possible following a major incident.

During the unprecedented restoration effort following Superstorm Sandy in 2012, an estimated 65,000 utility workers from across the United States and Canada helped restore power within two weeks to 99 percent of customers who could receive power, according to the Department of Energy. American Electric Power (AEP) sent about half of our line and contract resources—more than 2,600 workers—to assist.

LESSONS LEARNED

The industry learned that there are many impediments to effective restoration following a large event like Superstorm Sandy. Moving massive numbers of crews and equipment over long distances presented unique challenges. The speed of response was slowed by truck weigh stations and toll booths along the route, and border crossings to move resources between the United States and Canada were slow as well. Once crews arrived at the areas impacted by the storm, there were logistical challenges in having so many resources in a small geographic area and ensuring fuel availability for the restoration fleet. We are working with key government agencies to address some of these bottlenecks.

One of the strengths of our industry is that we believe we can always improve. We’ve long been committed to identifying and sharing best practices and lessons learned after each significant event. Following Superstorm Sandy, the Edison Electric Institute (EEI) and its member companies, along with municipal and cooperative organizations, came together with an even greater focus on continuous improvement. In addition to identifying barriers that could be overcome through partnerships with government agencies, we recognized the need to enhance and formalize the mutual assistance process for events that require a national, industry-wide response.

EMERGENCE OF THE “NATIONAL RESPONSE EVENT” FRAMEWORK

Sixty individuals from 36 utilities worked intently for many months to develop a new National Response Event (NRE) framework that will come into play during massive events—those that cause widespread power outages to a significant population and require resources from multiple regions. The goal is to ensure that resources are allocated in an equitable manner and that the response effort is efficient and coordinated to restore power to customers as quickly and safely as possible. While we still have work to do, our industry has made great progress since Superstorm Sandy:

- We developed the new structure and process for responding to large, national events that will allow us to streamline and improve resource allocation. A new National Response Executive Committee, made up of senior utility executives from all regions of the country, will govern the process, and a National Mutual Assistance Resource Team will pool and allocate resources to best meet restoration needs in a major event.
- We tested and refined the new NRE framework through multiple drills. A tabletop drill identified the need to better define how certain parts of the process should work and to ensure that the resource allocation team will have the tools it needs to implement the process properly.
- We consolidated three smaller regional mutual assistance groups (RMAGs) in the Northeast to allow better coordination of resources. Superstorm Sandy showed us that having too many RMAGs can impede progress, so the number of RMAGs nationwide has been decreased from nine to seven. Additionally, when an NRE is declared, the regional mutual assistance groups will act as one to ensure the highest level of coordination of resources.
We partnered with federal and state agencies to begin putting in place processes that will improve the flow of information between utilities and government emergency personnel, expedite the movement of resources across state and national borders, and leverage the logistical support and security abilities that the military can provide during emergencies.

**Policy Implications**

It is important that we continue to educate industry stakeholders about the NRE approach so they are aware of the new process before the next major event occurs. The industry already has heard supportive comments from federal, state, and local officials, including the National Association of Regulatory Utility Commissioners, which passed a resolution in November 2013 supporting the new process. Moving forward, states can explore several public policy issues, if they have not already, to help support the industry’s efforts:

- increase utility system hardening to withstand extreme weather more effectively;
- foster installation of microgrids in strategic locations to support rapid recovery of critical loads; and
- continue to encourage the implementation of smart grid technologies.

While it would be nearly impossible to completely protect the electric system from violent storms, system hardening efforts such as upgrading poles and towers with stronger materials and trimming trees remain critically important. Our efforts also include grid resiliency measures to help speed restoration. By breaking certain parts of the system into smaller microgrids, integrating more distributed energy resources such as batteries, and continuing to install smart grid and smart meter technologies, we can better isolate outages and reroute power as needed to minimize the impact of damage to the grid. As always, utilities must determine the strategies for improving grid reliability during major storms that will provide the greatest benefit and successfully receive recovery for those investments.

**Speaking in One Voice**

The way we communicate with customers and others during a large storm event is crucial. AEP has had great success with a “One Voice” communications process through which we
provide the most accurate and timely service restoration information available, along with safety messages, to all interested parties. These include media outlets, government officials, emergency management agencies, customers, and employees.

We believe this process provides better information and potentially answers many questions our stakeholders have before they are asked. The information communicated through One Voice includes:

- number or percentage of customers restored;
- pertinent weather information;
- number of crews working on restoration or on their way to assist;
- utility needs such as road clearing, security, and traffic control;
- public safety messages; and
- items of interest such as major areas restored, copper theft concerns, road conditions, etc.

We share these updates internally and externally through e-mail, our websites, and social media platforms such as Facebook, Twitter, and YouTube. Our external affairs, community affairs, and emergency preparedness coordinators share them directly with public officials and appropriate agencies. During a storm event, One Voice updates are published throughout the day.

While we have been successful in making information readily available, we still face the challenge of improving the accuracy of our estimated times of restoration—the information that customers are most interested in. (See the sidebar, “Focus on the Customer.”) We continue to work to improve this process throughout AEP.

Our industry’s workers have a long legacy of doing whatever it takes to get the power back on when major events interrupt service.

RESPONDING TO INCREASED EXPECTATIONS

Our industry’s workers have a long legacy of doing whatever it takes to get the power back on when major events interrupt service. Although we have done a tremendous job responding to events in the past, it’s fair to say that the large storms we have seen in recent years have brought more attention to the way utilities respond to storms and other emergencies. With the 24/7 news cycle and social media, customers expect and deserve more
timely communication in addition to the safest and best restoration efforts possible. Regulators expect—and in some cases require—a more effective and efficient response and restoration effort.

In 2011, utility storm restoration activities related to both Hurricane Irene and the October Nor’easter of 2009 were reviewed by regulatory commissions in Maryland and Connecticut. The outcome of these reviews prompted AEP to ramp up an internal review of our storm restoration processes and determine opportunities for improvement.

We put in place a Storm Preparedness Strategy Team to look at processes from pre-planning through customer restoration. The team’s evaluation included a review of current practices, organizational processes, technology improvements, and implementation efforts. During the team’s review, the 2012 derecho, Hurricane Isaac, and Superstorm Sandy also provided “live” case studies.

Building on best practices throughout the industry, AEP is focusing on three key areas for improvement over the next three years:

- **Implementing the Incident Command System (ICS).** Numerous utilities are moving to this nationally used crisis management tool as a standard for responding to small and large emergencies and incidents.

- **Technology improvements.** Introducing new tools and improving our systems to better manage our workload during major events and to provide more timely and accurate information to customers and other stakeholders.

- **Process improvements.** Working to standardize our assessment process and implement a number of restoration process enhancements that will improve how we manage our crews and other resources.

We believe that improvements in these three areas will move our company’s storm response and restoration efforts in the right direction. There will likely be challenges and opportunities for improvement ahead as we implement the incident command structure across AEP’s seven operating companies. The rollout will be staggered over the next few years—beginning with AEP Texas and Indiana Michigan Power—and we hope this approach will allow us to learn, adjust, and improve as we go.

Ultimately, the ICS will make it easier for our employees to do their jobs by improving management efficiency, reducing redundancy, and more clearly defining and limiting the focus of employees’ responsibilities during emergency response. It also will improve communications with first responders and emergency management agencies since we will be using the same efficient chain-of-command structures and terminology they use.

The technology and process improvements we make will enhance customer satisfaction and communications by providing the frequent and accurate information the public wants and needs. As always, safety is at the core of any changes we make to our systems and processes.

We also are taking proactive steps to identify transmission facilities that were impacted by recent storms in our service territory and contributed directly to customer outages. Using this information, we have developed a portfolio of transmission and distribution projects that are designed to provide long-term solutions for some of our most vulnerable areas. Solutions include providing a second source to a radial transmission line, providing for new distribution stations to serve as backup sources, rebuilding old transmission lines, providing switching enhancements, and expanding supervisory control and data acquisition (SCADA) to reduce outage durations and aid restoration in difficult areas.

**SECURING THE GRID**

Responding to devastating storms like Superstorm Sandy, the 2012 derecho, and other major weather events is just one piece of the reliability puzzle. The other top threats to reliability include physical and cyber attacks.

The industry is deeply invested in improving the security of the grid to protect customers from
power disruptions. Like many other companies, AEP has been the target of increased threats from adversaries, and we take physical and cybersecurity very seriously. Electric utilities are the only critical infrastructure sector with mandatory and enforceable cybersecurity standards focused on making the grid stronger, more reliable, and more resilient in the face of threats. Since 2005, the industry has been required to comply with mandatory reliability standards or face penalties of up to $1 million each day for failing to do so.

At AEP, we continue to be vigilant in protecting our network and our systems through a multi-layered security infrastructure that includes anti-virus systems, intrusion detection and prevention systems, and carefully designed and implemented critical network architectures to help ensure that our critical control systems are protected from intrusion attempts.

While there is no single solution that can make the grid completely immune to potential threats, our industry has been proactive in partnering with federal agencies such as the Department of Energy, Department of Homeland Security, Federal Bureau of Investigation, and Federal Energy Regulatory Commission to enhance preparation, detection, information sharing, and response and recovery of the grid.

The North American Electric Reliability Corporation (NERC) coordinates a national threat-sharing effort, and AEP also interfaces with external cybersecurity experts and a smaller group of utilities to do attributed threat sharing. These are just two examples of the proactive steps the industry is taking to improve information sharing among utilities and U.S. agencies. We need to continue to build upon these efforts and address liability protection issues inherent in threat sharing. We also must streamline the security clearance process to allow utility industry security experts to receive clearances so we can understand the context of threats and focus our efforts on the biggest potential threats.

This past fall, AEP joined 165 organizations to take part in GridEx II, a simulated physical and cyber attack that damages the bulk power system and causes widespread outages. The two-day exercise, conducted by NERC, included utilities from across North America, as well as U.S. government agencies and universities. Drills such as these are critical to assess our industry’s readiness to respond to large-scale physical and cybersecurity incidents, and to identify improvements that can be made in our security plans, systems, and response procedures.

GridEx II reinforced the fact that the industry can continue improving the way we prepare and respond to incidents. As threats to the grid increase and become more sophisticated, we must continue our work to make the grid stronger, more reliable, and more resilient. Just as important, we must continue to prepare for situations that could impact our ability to fulfill our core mission—reliably providing the power that enhances our customers’ lives and fuels our nation’s economy. EP
At AEP, we believe a strong energy future requires balance in our fuel mix. From coal to natural gas, we’re finding a balance to meet our customers’ energy needs. In fact, we’ve completed a 600-megawatt, ultra-efficient coal-fueled plant in Arkansas, while we further diversified our fuel mix with a 580-megawatt, combined-cycle gas plant in Ohio. Our portfolio includes nuclear and we’re adding more wind power, too.

Now that’s a good balance for our environment and our energy future.
The law of unintended consequences is already affecting power markets in Europe and offers valuable lessons for power markets in the rest of the world.

BY JEFFREY ALTMAN

OVER THE LAST DECADE, VARIOUS WELL-MEANING GOVERNMENTS AND REGULATORS ACROSS EUROPE HAVE CREATED SHORT-SIGHTED RENEWABLE ENERGY POLICIES WITHOUT FULLY ASSESSING THE IMPLICATIONS OF THEIR ACTIONS. These policies, in turn, came as a response to previous policies that slowly revealed themselves to be unsustainable. As a result, the effects of these policies are exerting pressure on consumers, the environment, and power companies alike.

Germany has been one of the most aggressive supporters of renewable power in the world and accordingly provides an appropriate case study of the law of unintended consequences.
Rising Electricity Bills

By 2050, Germany is gearing up to reduce carbon dioxide (CO\textsubscript{2}) emissions by 90 percent from 1990 levels and to provide 80 percent of its electricity generation with renewables. In addition, the government wants to phase out nuclear power by 2022.

A recent front cover of Der Spiegel magazine, entitled: “Luxury electricity: Why energy is becoming more expensive and what politicians must do about it,” showed gold-plated and diamond-encrusted power cables that succinctly summarized the mood of the German public toward high energy prices. Since the feed-in tariff (FIT) program supporting renewables started in the early 2000s, electricity prices have more than doubled, going from 18 cents per kilowatt-hour in 2000 to more than 37 cents in 2013. By comparison, the average electricity price in the United States is 10 cents per kilowatt-hour. The cold reality is that unless the current system is corrected, electricity prices are expected to increase in Germany by 35 percent for consumers and some 30 percent for industrials by 2020. The consequences to Germany as a competitive exporter, as well as to its overall economy, could be significant. Germany’s national strategic energy plan (known as “Energiewende” or energy change), which is currently in development and calls for the build-out of and additional subsidies for renewables, is now being challenged by power companies, industry, consumers, and even some governmental officials.

Part of the explanation for the increase in electricity prices lies in the generous government support for renewable energy technologies. For the most part, renewables still are not at grid parity based on ultimate true costs and their adoption requires subsidies and other financial and non-financial incentives. The FIT subsidy program already has cost more than $468 billion and some estimate that program costs could exceed $1.3 trillion by the time it expires. German consumers and companies finance clean-energy subsidies by paying a surcharge on their monthly power bills. The levy jumped 18 percent on January 1, 2014, and has surged more than fivefold since 2009, according to a recent Bloomberg report. In October 2012, according to www.stromvergleich.de, this surcharge amounted to 14.6 percent of the electricity price paid by consumers.

Since the feed-in tariff program supporting renewables started in the early 2000s, electricity prices have more than doubled, going from 18 cents per kilowatt-hour in 2000 to more than 37 cents in 2013. By comparison, the average electricity price in the United States is 10 cents per kilowatt-hour.
Decreasing Wholesale Prices and Thermal Generators
Due to massively subsidized renewable energy through FITs in Germany and other European countries, producers of other sources of electricity have seen the prices paid to them fall as renewables, with much lower short-term marginal production costs than traditional thermal plants, get dispatched first.

Depending on the region, the growth in renewables is creating load and margin destruction to conventional power plants. As more renewable energy is used to meet electricity demand, there is less need for the electricity produced by conventional sources. In addition to this loss of revenue due to reduced production, there also is a reduction of the wholesale price per unit paid to conventional generators since least-cost, subsidized renewable resources displace more costly sources of generation. In Germany, last year’s estimated market price for power was 48 euros per megawatt (MW). In mid-November 2013, the market price for power stood at 37 euros per MW—a reduction of 23 percent.

A close examination of daily solar and wind production in Germany shows the unsurprising seasonality of both wind and solar. Moreover, it illustrates that the wind blows only for a couple of minutes on many occasions and that solar has a tremendous amount of variability, including that it is not available during nighttime hours. Therefore, thermal generators are still producing a majority of the load in Germany. (See Figure 1.) In essence, these thermal plants have now moved from baseload plants to back-up plants. Having thermal plants as spinning reserves is nothing unusual to the power industry. What is unusual, however, is having up to 40–55 gigawatts of thermal plants as back-up generation, and just as important, the amount of times these plants must intervene in power markets by producing electricity to quickly make up for the lack of output generated by variable renewable resources.

Unfortunately, the magnitude of these interventions is growing and most thermal plants were not built to produce such intermittent power. (See Figure 2.) Moreover, these

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**Figure 1**
MONTHLY PRODUCTION OF SOLAR, WIND, AND CONVENTIONAL ENERGY (2012)
(Terawatt-hours (TWh))

![Bar chart showing monthly production of solar, wind, and conventional energy (2012).](image-url)
**Figure 2**

INTERVENTIONS TO STABILIZE THE GRID IN GERMANY BY GRID OPERATOR TENNET, 2003-2012

Source: Tennet

**Figure 3**

DEVELOPMENT OF RATINGS OF MAJOR EUROPEAN UTILITIES SINCE 2010

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**STANDARD & POOR’S**

- ○ rating as per Jan. 1, 2010
- ● rating as per May 2013
- ▲ standalone rating as per June 4, 2013

(If applicable and different from corporate rating)

**MOODY’S**

- ○ rating as per Jan. 1, 2010
- ● rating as per May 2013
- ▲ standalone rating as per June 4, 2013

(If applicable and different from corporate rating)

Clear downward trend in ratings for utilities across Europe.

Profitability and investability at stake.
Interventions are not sufficient to keep many of these thermal plants economically viable under the current market regime and, as a result, many thermal plants are now being closed. In Germany’s case, these often include the more costly gas-fired plants.

Growing Carbon Emissions
In fact, perhaps the most unintended consequence of over-subsidizing renewable energy in Europe has been an increase in CO$_2$ emissions. In Germany, natural gas prices hovered around $10.00 per million British thermal units last summer, and coal delivered to power plants fell to a record low last fall. In these conditions, many of the highly efficient gas-fired power plants are being put off-line in favor of coal since the price of gas in Europe is so high.

In 2013, Bloomberg determined that German power plants burning coal can earn 12 cents per megawatt-hour while German power plants burning natural gas lose 25 cents per megawatt-hour. This discrepancy clearly explains why coal is replacing natural gas. In November, for example, Germany opened its first coal-fired power plant in eight years and more will be coming online in the future, which will grow the coal fleet by 33 percent. As a result, CO$_2$ emissions are going up. In 2013, German energy-related CO$_2$ emissions were estimated to increase for the second straight year, by about 20 million tons.

Increased Distribution Investments and Capital Costs
It is not only the power plants that are being stressed but also the electric grids of the European continent. With the ever-increasing need to call on system resources to balance the system, investment in smart grid technology will become a further necessity in order to balance the system from the variability of renewable power.

Moreover, grids will need to be refurbished to handle additional loads as well as built out to go to those locations where renewable resources are more prevalent.
Germany, for example, is going through a massive build-out of its grids to facilitate new onshore and offshore wind farms as well as solar farms. It is estimated that this investment will range from 21–27 billion euros over the next decade.

Balancing the Market and the Grid
Replacing costly resources with less costly ones is exactly what competitive and well-functioning markets are supposed to do. However, as Germany’s situation proves, government policies of large renewable subsidies without giving consideration to the balancing of the whole system have created disequilibrium in the power markets and higher power prices.

Current renewable and storage technologies are not economically or technically capable of replacing all load from conventional power producers. Since renewable energy is variable in nature, conventional power plants need to be able to remain in the market so they can be called upon when the wind is not blowing or the sun is not shining. A large reduction in wholesale electricity prices, brought about by unsustainably high subsidies, runs the risk of driving these needed generators out of the market. Without this backup load from thermal generators, issues of reliability of supply occur, including the potential for major power outages.

In Germany, there are already calls to modify the existing market rules and provide capacity payments to existing conventional generators to ensure that many of these plants avoid closure. From a regulatory perspective, this is essentially a call for the re-regulation of thermal plants that were deregulated back in the late 1990s.

Economic Impact to Utilities
The impact to European utilities is materially significant. The European Stoxx Utilities Index is down some 31 percent since 2010, and E.ON, one of Germany’s largest utilities, has seen its stock plunge some 45 percent since 2010 (although it was also impacted by the nuclear decommissioning). The impact to credit ratings of these institutions has also been significant, which helps explain why the cost of capital is going up for the major utilities. (See Figure 3.)

The Coming Wave of Regulation
All of the factors mentioned previously, as exemplified by what has occurred in Germany, have made various European governments review their policies toward renewables over the last couple of years. Some governments have instituted retroactive taxes or changes in existing regulatory policies where they had inappropriately structured various tariff regimes that had been gamed by various market players or made obsolete by unforeseen technical or market conditions. Spain, for example, went through five regulatory interventions over the last several years that impacted more than 6 billion euros of investors’ equity and debt.

A new wave of regulation that will be driven by the incumbent utilities, as well as the governmental authorities, is likely to be coming shortly. Utilities would ask for a fair and level playing field, whereby renewable energy producers would share in the costs of the whole system, including...
Distributed Generation in the United States
BY LOLA INFANTE

Across the United States, there is growing interest in using rooftop solar panels and other small-scale, on-site power sources known as distributed generation (DG). To encourage the introduction of these systems when they first came to market years ago, many states approved a billing system called net metering.

While net metering policies vary by state, generally customers with rooftop solar or other DG systems are credited for any electricity they sell via the electric power grid. Electric companies are required to buy this power typically at the full retail rate, which includes all of the fixed costs of the poles, wires, meters, advanced technologies, and other infrastructure that make the grid safe, reliable, and able to accommodate solar panels or other DG systems. Through the credit they receive, net metered customers effectively are avoiding paying these costs for the grid. As a result, these costs are shifted to those customers without rooftop solar or other DG systems through higher utility bills.

Net metering policies and rate structures in many states should be updated so that everyone who uses the electric grid helps pay to maintain it and to keep it operating reliably at all times. This will ensure that all customers have safe and reliable electricity and that electric rates are fair and affordable for all customers.

Please visit the Edison Electric Institute’s website at www.eei.org/DistributedGeneration for additional information. The resources outline the industry’s support for solar power, as well as our concerns with current net metering policies.

Lola Infante is director of generation fuels and market analysis for the Edison Electric Institute.
Utility Stocks Trail Broader Market Averages

BY MARK AGNEW

The Edison Electric Institute (EEI) Index was essentially flat for the third quarter of 2013, returning a negative 0.45 percent, slightly trailing the mid-single-digit gains posted by the broader market averages. The Dow Jones Industrials returned 2.1 percent while the S&P 500 returned a slightly stronger 5.2 percent for the period. Only the NASDAQ Composite achieved double-digit gains, climbing 10.8 percent on the strength of major index constituents Apple and Facebook, which surged 20 percent and 50 percent, respectively.

Year-to-date through September 30, 2013, the EEI Index lagged the major averages, with a 10.3-percent return compared to the Dow Jones Industrials’ 17.6 percent, the S&P 500’s 19.8 percent, and the NASDAQ’s 24.9 percent. (See Table 1.) Such underperformance is to be expected when bullish spirits dominate markets, which they did during 2013 given the Federal Reserve’s massive support for stocks in the form of its aggressive quantitative easing (QE) program and the economy’s continued (albeit slow) expansion.

Fed Fireworks Dominate Market Moves

It may be an exaggeration to call them “fireworks,” but statements by Fed Chairman Ben Bernanke seemed to be the major drivers of the summer’s market action. The first occurred in May when Chairman Bernanke hinted the Fed may taper its monetary support by year end if economic growth were sufficiently strong. This caused a spike in interest rates as investors, who seemed taken aback by the chairman’s comments even though he was non-committal and merely affirmed the Fed’s prior position on its approach to monetary stimulus, began to factor in a withdrawal of Fed support; the benchmark 10-year Treasury yield surged from its early-May low of 1.6 percent to nearly 3.0 percent by early September.

The Fed surprised markets again in mid-September when Chairman Bernanke announced that the Fed had decided not to reduce the pace of QE after all, citing fears that economic growth wasn’t strong enough to support recent gains in employment. Interest rates pulled back after that and finished the quarter around 2.6 percent, while utility shares jumped about 5 percent from their early-September lows before backing off again as the quarter came to a close.

The surge in rates produced considerable volatility for utility shares, as well as other market sectors where dividends are an important component of investor return expectations.

<table>
<thead>
<tr>
<th>Company</th>
<th>Return (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Hills Corporation</td>
<td>40.5</td>
<td>R</td>
</tr>
<tr>
<td>MDU Resources Group, Inc.</td>
<td>34.3</td>
<td>D</td>
</tr>
<tr>
<td>NV Energy, Inc.</td>
<td>33.5</td>
<td>R</td>
</tr>
<tr>
<td>NorthWestern Corporation</td>
<td>32.9</td>
<td>R</td>
</tr>
<tr>
<td>OGE Energy Corporation</td>
<td>30.5</td>
<td>MR</td>
</tr>
<tr>
<td>CenterPoint Energy, Inc.</td>
<td>27.8</td>
<td>MR</td>
</tr>
<tr>
<td>NiSource Inc.</td>
<td>27.2</td>
<td>MR</td>
</tr>
<tr>
<td>Dominion Resources, Inc.</td>
<td>24.1</td>
<td>MR</td>
</tr>
<tr>
<td>Sempra Energy</td>
<td>23.5</td>
<td>MR</td>
</tr>
<tr>
<td>ALLETE, Inc.</td>
<td>21.3</td>
<td>R</td>
</tr>
</tbody>
</table>

Note: Return figures include capital gains and dividends.

R = regulated, MR = mostly regulated, D = diversified

Source: EEI Finance Department
finance

Macro Trends Change Little
The third quarter brought little change to the broader macroeconomic trends facing the industry. Power demand remained weak as nationwide output, responding in part to mild summer weather and reduced demand for cooling, declined 2.8 percent for the quarter. But weather is not the only factor that impacts demand. In-roads made by energy efficiency and demand-side management programs into the patterns of power usage also are driving structural changes in demand, which has in recent years become increasingly linked to the pace of broad economic growth as the economy moves away from an emphasis on industrial and manufacturing activity and toward services. The expected long-term growth rate in power demand remains uncertain, although the general expectation among most industry analysts is that a rate below 1 percent is probable for the years immediately ahead.

Natural gas prices changed little over the summer, as the Henry Hub spot price started and finished the third quarter at about $3.55 per million British thermal units (MMBtu), ranging between $3.30 and $3.70. The natural gas futures curve also was relatively unchanged, having settled over the past year at levels far below the price expectations prevalent three to four years ago. With shale gas evidently plentiful and production capacity high, analysts maintained their general belief that any recovery in competitive power market fortunes continues to be deferred until well into the future.

Rate Base Growth Pauses
Slow demand growth and adequate capacity across most of the country are taking a toll on the industry’s formerly torrid pace of capex and rate base growth. eei’s latest projections (as of September 2013) for industry capex anticipate a slowing from $95.2 billion in 2013 to $92.8 billion in 2014 and $85.3 billion in 2015. The projected breakdown for 2013 among business functions is as follows: generation (37 percent); distribution (21 percent); transmission (17 percent); natural gas-related (12 percent); environmental (7 percent); and other (6 percent). Many analysts have ratcheted down slightly their expectation for earnings growth by regulated utilities, although they still expect that many are capable of low- to mid-single-digit gains in both earnings and dividends.

A review of consensus analyst estimates as of early October 2013 for the 50 publicly traded eei Index companies confirms that general outlook. The average revenue growth across the industry shows projected growth of 4.4 percent in 2013 slowing to 3.1 percent in 2014. The average projected five-year earnings growth rate for the industry is 4.1 percent as of early October, ranging from single-digit declines for some utilities exposed to weak prices for competitive generation to as high as 7-8 percent for regulated companies undertaking relatively strong capital investment programs and/or

benefitting from supportive outcomes in recent rate cases.

Bulls and Bears
It takes two sides, buyers and sellers, to make any market. For any publicly traded company, in any sector of the economy, there are usually persuasive arguments on both the bullish and the bearish views. Consistently predicting the direction of stock price moves is no easy task, as any candid observer of investment predictions will attest.

The bearish case for utilities as a group relies primarily on a view that interest rates are on the rise. Utilities are prized by most investors for their steady, and reasonably sturdy, dividends. This characteristic makes them trade somewhat like bonds but with the added appeal of dividend growth potential. Rising rates cause investors to discount the price of fixed-income type investments so their yields keep pace with market rates. Analysts on the bearish side of the fence cite the industry’s stock price performance in historical periods of rising rates, when shares generally lagged or declined, and also caution about the potential risks to allowed rates of return as market interest rates rise.

The bullish case for utilities relies on the outlook for steady earnings growth for many companies along with strong dividend yields.
growth for many companies—the fruit of elevated investment spending and fairly constructive regulatory environments—along with strong dividend yields, which averaged 4.0 percent at the end of the third quarter. The bulls argue the combination of earnings and dividend growth offered by utilities compares favorably with the S&P 500's 2.7-percent dividend yield and only slightly higher projected growth rate, estimated in the high single digits. Moreover, with market interest rates depressed by Fed monetary policy, a case can be made that bond yields have headroom to rise, in relation to historical patterns, without overly threatening utility price-earnings ratios.

Both sides, however, warily watch stagnant power demand and agree that recent cost cutting in areas such as operations and maintenance can only go so far to help earnings. The demand for power, direction of interest rates, and future moves in natural gas prices are mostly beyond the control of utility managements—and these forces are likely to persist as the primary drivers of utility stock price performance in the near to intermediate term.

Widespread Dividend Increases Continue

The investor-owned electric utility industry added to its near-decade-long trend of widespread dividend increases during the third quarter. Although only three companies raised their dividend during the quarter (typically a quiet one for industry dividend changes), the total of 31 companies that either increased or reinstated their dividend during the first nine months of 2013 matches the 2012 total and exceeds the 23-26 seen during the same period from 2005-2012 total and exceeds the 23-26.

The percentage of companies that raised or reinstated their dividend in 2012 was 73 percent, up from 58 percent in 2011 and 60 percent in 2010. The 2012 result is the highest on record, based on data going back to 1988. The 15-percent dividend tax rate has supported the high number of increases in recent years.

As of September 30, 2013, all 50 publicly traded companies in the EEI Index were paying a common stock dividend. The percentage of companies that either increased or reinstated their dividend in 2012 was 73 percent, up from 58 percent in 2011 and 60 percent in 2010. The 2012 result is the highest on record, based on data going back to 1988. The 15-percent dividend tax rate has supported the high number of increases in recent years.

As of September 30, 2013, all 50 publicly traded companies in the EEI Index were paying a common stock dividend. The industry's average dividend increase during the first nine months of 2013 was 5.1 percent, with a range of 1.2-13.8 percent and a median increase of 3.7 percent.

Payout Ratio and Dividend Yield

The industry's dividend payout ratio was 60.9 percent for the 12 months ending June 30, 2013, surpassing all other U.S. business sectors except the broader utilities sector (consisting of electric, gas, and water utilities), which recorded a 63.0 percent ratio.

While the industry's net income has fluctuated from year to year, its payout ratio has remained relatively consistent after eliminating non-recurring and extraordinary items from earnings. From 2000 through 2012, the annual payout ratio ranged from 62.0 percent to 69.6 percent, with the highest figure coming in 2009 due to the weak economy and the weather's negative impact on earnings.

The industry's average dividend yield was 4.0 percent on September 30, 2013, higher than all other business sectors. (See Table 2.) The industry's yield was unchanged from June 30, 2013, and just above the 3.9 percent on March 31, 2013. This follows yields of 4.3 percent at year-end 2012, 4.1 percent at year-end 2011, 4.5 percent at year-ends 2010 and 2009, and 4.9 percent at year-end 2008. The strong dividend yields prevalent among most electric utilities have helped support their share prices in recent years, especially given the period's historically low interest rates.

Business Category Comparison

The regulated and mostly regulated categories shared the highest dividend yield by category on September 30, 2013, at 4.0 percent, compared to the diversified's 2.5 percent. However, diversified category metrics have become less meaningful indicators of broad industry trends in recent years since category membership has fallen to a single publicly traded company as industry business models have migrated back to a regulated emphasis. The yields for all three categories are below their levels at December 31, 2012, when

<table>
<thead>
<tr>
<th>Sector Yield</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEI Index companies*</td>
<td>4.0</td>
</tr>
<tr>
<td>Utilities</td>
<td>4.0</td>
</tr>
<tr>
<td>Consumer staples</td>
<td>2.9</td>
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<tr>
<td>Materials</td>
<td>2.3</td>
</tr>
<tr>
<td>Industrial</td>
<td>2.0</td>
</tr>
<tr>
<td>Technology</td>
<td>2.0</td>
</tr>
<tr>
<td>Energy</td>
<td>1.9</td>
</tr>
<tr>
<td>Financial</td>
<td>1.9</td>
</tr>
<tr>
<td>Health care</td>
<td>1.8</td>
</tr>
<tr>
<td>Consumer discretionary</td>
<td>1.4</td>
</tr>
</tbody>
</table>

*EEI Index companies' yield based on last announced, annualized dividend rates. S&P sector yields based on 2013E cash dividends.
Source: Altavista Research, SNL Financial, and EEI Finance Department.
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the regulated, mostly regulated, and diversified yields were 4.2 percent, 4.4 percent, and 4.0 percent, respectively. The mostly regulated group’s dividend payout ratio was 69.0 percent for the 12 months ended June 30, 2013, compared to 59.7 percent for the regulated group and 31.5 percent for the diversified group. The regulated group typically has produced the highest annual payout ratio, having done so in 2010 and 2011 and each year from 2003 through 2008. It was exceeded by the mostly regulated group in 2009 and again in 2012.

Share Repurchases Remain Low
Ten of the industry’s publicly traded companies repurchased an aggregate $281 million of common shares during the first six months of 2013 as an alternate way of returning cash to shareholders. This compares to 12 companies and $190 million in the year-ago period. On a calendar-year basis, 14 companies repurchased $821 million during 2012 compared to 15 companies and $1.8 billion in 2011, 13 companies and $2.7 billion in 2010, 11 companies and $908 million in 2009, and a total of $2.4 billion in 2008—all levels that were far below the $11.9 billion of 2007.

Free Cash Flow Deficit Continues
The industry’s aggregate free cash flow remained in a deficit during the first six months of 2013, with a negative $15.8 billion compared to a negative $14.8 billion for the comparable 2012 period. Calendar-year free cash flow was a negative $26.7 billion in 2012, down from a negative $13.5 billion in 2011, marking the eighth consecutive year of deficits. The vast majority of the decline was due to an $11.9-billion, or 15.1-percent, increase in capital expenditures.

Common dividends paid increased $1.2 billion, or 6.0 percent, while net cash provided by operations was nearly unchanged. The industry’s capital spending remains historically high due to elevated levels of investment in environmental compliance, transmission and distribution upgrades, and new generation capacity. Total aggregate industry-wide cash dividends paid to common shareholders rose by $100 million, or 1.0 percent, in the first half of 2013 compared to the year-ago period. On a calendar-year basis, dividends increased by $1.1 billion, or 6.0 percent, to $20.5 billion in 2012 from $19.3 billion in 2011. From 2003 through 2012, total industry-wide cash dividends rose 66 percent, to $20.5 billion from $12.3 billion.

The industry’s capital spending remains historically high due to elevated levels of investment in environmental compliance, transmission and distribution upgrades, and new generation capacity.

The project breakdown for 2013 among business functions is as follows:

- Generation: 37%
- Distribution: 21%
- Transmission: 17%
- Natural gas-related: 12%
- Environmental: 7%
- Other: 6%

(As of September 2013)
Industry’s Average Credit Rating Remains Steady

BY AARON TRENT

The industry’s average credit rating for the first nine months of 2013 was BBB, a level that has been steady for the past nine years. Total ratings activity, at 40 changes, continued to reflect the slow pace of the prior four years. (See Figure 1.) Year-to-date actions were largely positive, with 34 upgrades outnumbering six downgrades. (See Figure 2.) The Edison Electric Institute (EEI) captures upgrades and downgrades at the subsidiary level, therefore multiple actions within a single parent holding company are included in the upgrade/downgrade totals. Parent-level upgrades centered on companies’ migration toward regulated business strategies, generally through divestitures of merchant generation and other unregulated operations.

The industry’s shift away from competitive businesses is a theme that has produced positive ratings actions each year since 2010. Companies’ creditworthiness and credit ratings also benefited, in a number of cases, from stronger regulatory relationships and from careful management of capital expenditures and operations and maintenance costs.

As 2013’s fourth quarter began, approximately 84 percent of ratings outlooks at the parent level were stable, 9 percent were positive or watch-positive, and 7 percent were negative or watch-negative. Following is a summary of the year’s parent-level ratings actions by quarter.

First Quarter Upgrades

Ratings changes in the first quarter included five parent company-level upgrades.

S&P upgraded Alliant Energy and subsidiary Interstate Power & Light to A- from BBB+ and Wisconsin Power & Light to A from A- on January 11, 2013. The moves reflected Alliant’s plan to sell its renewable energy and construction business and pursue a fully regulated strategy, along with S&P’s belief that its credit metrics would remain “robust.” S&P maintained the companies’ ratings outlook at stable, citing expectations that Alliant would focus on its core utility operations while supporting elevated capital expenditures and weathering a challenging economic environment that has resulted in weak industrial and wholesale sales. S&P projected that Alliant’s cash flow metrics would weaken as construction projects moved ahead and the benefits of bonus depreciation diminished. However, the agency forecast that Alliant’s credit ratios, under a base-case scenario, would include “funds from operations (FFO) to debt of more than 20 percent, debt to EBITDA (earnings before interest, taxes, depreciation, and amortization) of about 4x, and debt to capital averaging about 55 percent.”

Aaron Trent is manager of financial analysis at Edison Electric Institute.

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FIGURE 1

TOTAL RATINGS ACTIONS
U.S. Investor-Owned Electric Utilities

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Fitch</td>
<td>41</td>
<td>17</td>
<td>14</td>
<td>24</td>
<td>23</td>
<td>26</td>
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<tr>
<td>Moody’s</td>
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<td>20</td>
<td>17</td>
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<td>Standard &amp; Poor’s</td>
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<td>36</td>
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<td>Total</td>
<td>121</td>
<td>50</td>
<td>57</td>
<td>80</td>
<td>57</td>
<td>76</td>
<td>64</td>
</tr>
</tbody>
</table>

Note: Full year, except where noted.
Source: SNL Financial and EEI Finance Department
The agency also placed these ratings on Credit-Watch with positive implications to reflect a “high probability” of further upgrades if the transaction closed successfully. S&P further noted that, even if the proposed deal did not close, “Ameren would still sell its merchant business to another third party under similar terms.” The deal announcement followed Ameren’s announcement in December 2012 that merchant generation was no longer core to its business strategy. Also on March 11, S&P affirmed its CCC+ ratings for Ameren Energy Generating (Genco). S&P’s negative outlook on Genco reflected its expectations that credit metrics and profit margins would fall over the next few years because of continued weak power prices, weak U.S. economic growth, and low natural gas prices.

S&P upgraded CMS Energy and its electric utility subsidiary Consumers Energy to BBB from BBB- on March 18. The move reflected improvement in CMS’s business risk profile. S&P cited consistent credit-supportive outcomes in rate cases since the passage in 2008 of Michigan’s Energy Law and noted that, by controlling costs and capital expenditures, CMS successfully executed its strategy to limit customer base-rate increases to 2 percent or less on an annual basis. S&P further cited a slowly improving economy in Michigan and observed that state legislators were unlikely, in the near to medium term, to lift Michigan’s 10-percent customer choice cap, which limits the percentage of sales that can be provided by competing suppliers.

**Second Quarter Actions**

Ratings changes in the second quarter included five parent company-level upgrades.

---

**F I G U R E 2**

DIRECTION OF RATINGS ACTIONS

<table>
<thead>
<tr>
<th>U.S. Investor-Owned Electric Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade %</td>
</tr>
<tr>
<td>100%</td>
</tr>
<tr>
<td>75%</td>
</tr>
<tr>
<td>50%</td>
</tr>
<tr>
<td>25%</td>
</tr>
<tr>
<td>0%</td>
</tr>
</tbody>
</table>

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On February 20, S&P raised its corporate credit rating for NV Energy and subsidiaries Sierra Pacific Power and Nevada Power to BBB- from BB+, a move to investment-grade status. S&P said the higher ratings resulted from the company’s successful regulatory strategy in Nevada, which S&P views as a credit-supportive state. S&P said it expects credit metrics to improve through continuing supportive regulation and a significant reduction in capital spending. The agency said that its base forecast assumed FFO to debt of 14 percent and a debt-to-capital ratio of about 60 percent.

Due to constructive regulatory outcomes in Missouri, which S&P viewed as a challenging jurisdiction, the agency upgraded Empire District Electric (EDE) to BBB from BBB- on March 6. S&P cited EDE’s recent achievement of a rate settlement that included a 6.8-percent rate increase. Other positive factors included further recovery in the company’s service territory from a May 2011 tornado and financial performance that exceeded expectations. Looking ahead, S&P saw potential for further rate increases, cost controls, and a planned equity issuance to limit EDE’s debt-to-capital ratio to 55 percent and maintain FFO to debt above 15 percent. S&P explained that its base forecast included increasing capital spending along with an expectation that EDE management would maintain “cash flow protection and debt leverage measures” consistent with the BBB rating.

In response to Ameren’s proposal to sell its merchant generation business to a subsidiary of Dynegy, S&P on March 11 upgraded the corporate credit ratings for Ameren and subsidiaries Ameren Illinois and Union Electric (d/b/a Ameren Missouri) to BBB from BBB-. S&P said the upgrades reflected “management’s commitment to credit quality, increased certainty in terms of strategic direction, and execution of a revised strategy to exit the merchant power business.” The agency also placed these ratings on Credit-Watch with positive implications to reflect a “high probability” of further upgrades if the transaction closed successfully. S&P further noted that, even if the proposed deal did not close, “Ameren would still sell its merchant business to another third party under similar terms.” The deal announcement followed Ameren’s announcement in December 2012 that merchant generation was no longer core to its business strategy. Also on March 11, S&P affirmed its CCC+ ratings for Ameren Energy Generating (Genco).
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Citing increasingly favorable regulatory relationships in New Mexico and Texas and improved credit metrics due to PNM’s divestiture of its unregulated businesses, S&P raised its corporate ratings on PNM Resources and subsidiaries Texas-New Mexico Power and Public Service Company of New Mexico to BBB from BBB- on April 5. S&P’s action marked its second upgrade of PNM and its utility subsidiaries since PNM’s September 2011 announcement that it would sell its unregulated businesses in Texas and pursue a pure-play regulated utility strategy. Prior to that announcement, PNM and its utility subsidiaries’ ratings were BBB-, four notches below BBB. S&P set the companies’ outlook to stable and said that any further upgrades would require regulatory outcomes that allowed the company to achieve credit ratios of FFO to debt at or exceeding 25 percent and an adjusted debt-to-capital ratio of less than 52 percent. The agency noted that reaching these levels might require lower-than-expected capital expenditures for environmental controls.

Reflecting regulated utility Public Service Electric & Gas’s (Pseg’s) increasing influence on holding company Public Service Enterprise Group’s (PSEG’s) consolidated cash flows, S&P raised its corporate ratings on Pseg and subsidiaries PSEG and PSEG Power to BBB+ from BBB on April 23. S&P noted that PSEG would account for about 80 percent of the group’s capital expenditures over the following three years, shifting and reducing PSEG’s business risk away from merchant subsidiary Pseg Power.

S&P raised its long-term corporate credit ratings on OGE Energy and subsidiary Oklahoma Gas & Electric (OGE&E) to A- from BBB+ on May 2. The agency cited a reduced business risk profile that reflected the “strength and stability” of regulated operations at OGE and OGE’s decision to contribute subsidiary Enogex’s midstream natural gas assets to a joint venture with CenterPoint Energy. In setting the companies’ outlook to stable, S&P stated its expectation that OGE management would not pursue riskier business lines and would fund capital expenditures carefully.

Also on May 2, S&P raised its long-term ratings on CenterPoint Energy and subsidiaries CenterPoint Energy Resources and CenterPoint Energy Houston Electric to A- from BBB+. S&P’s rationale was largely similar to its reasons for upgrading OGE: CenterPoint Energy’s decision to contribute its higher-risk midstream assets to the joint venture with OGE reduced CenterPoint Energy’s overall business risk. S&P stated that CenterPoint Energy’s financial risk had also decreased, and the agency expected credit metrics to continue to improve over the next few years, primarily through incremental debt reduction.

CenterPoint Energy continues to wholly own regulated electric and gas distribution and retail gas supply businesses. Rounding out the quarter’s positive actions, S&P on June 21 upgraded Otter Tail to BBB from BBB-. The agency again cited a reduced business risk profile, as Otter Tail sold a significant portion of its unregulated businesses over the prior 12 to 18 months. S&P estimated that, going forward, about 85 percent of Otter Tail’s EBITDA would come from regulated utility operations with the remainder from unregulated businesses. S&P also cited Otter Tail’s “effective management of regulatory risk” and consistently improving financial metrics. In setting the company’s outlook to stable, S&P forecast that Otter Tail would generate consolidated FFO to debt of about 18 percent and that its ratio of adjusted debt to EBITDA would be about 4x over the next 12 to 18 months.

Third Quarter Upgrades
Ratings changes in the third quarter included three more parent company-level upgrades, again due largely to companies’ regulated focus and effective management of regulatory risk.

S&P upgraded Black Hills Corporation and subsidiary Black Hills Power to BBB- from BBB- on July 24. The agency cited Black Hills’ divestiture of a significant portion of its unregulated businesses during the prior 12 to 18 months and the resulting improvement in the company’s business and financial risk profiles; the latter was supported by the use of divestiture proceeds to pay down debt. Additionally, S&P noted that credit metrics had improved following completion of construction projects in Colorado. Regarding Black Hills’ business risk profile, S&P observed the company still maintains several unregulated business lines including oil and gas exploration and production, merchant power generation, and coal mining. Furthermore, the company’s broad service territory and production, merchant power generation, and coal mining. Furthermore, the company’s broad service territory
(covering five regulatory jurisdictions) makes regulatory risk management relatively challenging. In setting Black Hills' outlook to stable, S&P described its base forecast as supporting credit ratios of adjusted FFO to total debt of about 18 percent and debt to EBITDA of about 4x; the agency said that effective regulatory risk management would be “fundamental” to achieving these levels.

Reflecting improvement in the companies’ consolidated financial condition, S&P raised its long-term corporate credit ratings on Cleco Corporation and subsidiary Cleco Power to BBB+ from BBB on July 26. Additionally, S&P emphasized Cleco’s increasing focus on regulated operations and the resultant impact on the company’s business and financial risk profiles. S&P noted that Cleco had worked to reduce holdings of merchant generation assets and had only one remaining gas-fired merchant plant, which it planned to transfer into rate base. S&P described its base-case scenario for the company as assuming “constructive regulatory outcomes,” the successful transfer of its remaining merchant plant into rate base, and “significant free cash flow” (as evidenced by FFO to total debt between 20 percent and 25 percent and debt to EBITDA between 3x and 2.5x) barring any increase in planned capital expenditures or acquisitions. S&P also expected that Cleco would not implement any large-scale share buybacks or increase its dividend payout ratio beyond the 50 percent to 60 percent target range before 2015.

S&P raised its long-term corporate ratings on Tucson Electric Power, the largest subsidiary of UNS Energy, by two notches, to BBB+ from BB+ on August 19. S&P said the revised rating reflected Tucson Electric’s improved relationship with its regulator, the Arizona Corporation Commission, including a “relatively favorable” rate case settlement in 2013. S&P noted that, while it had viewed Arizona as a “less credit-supportive” state, Tucson Electric and other utilities in the state had achieved more favorable outcomes in recent years and it was watching to see if these mark a trend. S&P described Tucson Electric’s financial risk profile as “significant,” with consolidated leverage (at 64.5 percent on June 30) that “remained high” but was incrementally better than in early periods.

In Tucson Electric’s rate case settlement, which was not yet final as of this writing, the company received a rate increase and two credit-supportive rate mechanisms—a lost fixed-cost recovery mechanism and an environmental compliance adjustor. In setting the company’s outlook to stable, S&P said it expected these changes would contribute to improved credit metrics, though it also said Tucson Electric would need to continue to closely manage its operation and maintenance costs.

Looking Ahead
Early in the third quarter, S&P and Moody’s each updated their industry outlooks for the investor-owned electric utility sector. Both expected relative stability for utilities’ creditworthiness in the near to intermediate terms and emphasized the importance of the regulatory construct (including improvements to regulatory models through new tracking mechanisms) to maintenance of strong credit ratings given elevated capital spending across much of the industry and slow economic growth. Moody’s noted several emerging risks that may affect credit metrics and stability for many companies:

- the impact on cash flow metrics at some companies due to expiration of bonus depreciation at year-end;
- the possibility that “financial engineering” responses to limited organic growth, such as mergers and acquisitions, master limited partnerships, and hybrid securities, might increase financial risks at some companies;
- public policy initiatives that increase the use of renewables and distributed generation and that may require changes to rate structures to fairly balance the related costs; and
- the risk that faster-than-expected adoption of carbon limits by the Environmental Protection Agency could drive new investments that would pressure credit metrics over the build cycle.

The “back to basics” strategy and focus on regulatory relationships the industry continued to pursue in 2013 should help to mitigate these or other risks that may become more prominent in the next several years.
bengoa announced in early October that the Solana Generating Station has successfully passed final production tests and entered commercial operation. At 280 megawatts (MW), Solana is the world’s largest parabolic trough plant and the first solar plant in the United States with thermal energy storage, which allows for electricity to be produced at night.

Unlike other solar-powered plants, Solana produces electricity at full capacity for up to six hours after sunset, using concentrating solar power (CSP) technology with solar thermal storage. Solana is Abengoa’s first utility-scale solar plant in the country to begin operation. Arizona Public Service (APS) will purchase the full output from Solana for its customers, adding to the company’s already substantial solar portfolio.

“Solana is a game-changer in that it is a large-scale solar power plant that continues to produce electricity even after the sun goes down, using an innovative process that is new to the United States,” said Don Brandt, chairman, president, and CEO at Pinnacle West Capital Corporation and APS. “Abengoa has been a great partner. We worked with them to bring a plant of this size and this technology to Arizona, along with jobs and a positive impact on the state’s economy, all while producing clean, renewable energy for our customers.”

The ability to generate electricity when needed is one of the unique characteristics of the CSP technology versus other types of renewables. Solana’s thermal storage system will help satisfy Arizona’s peak electricity demand by storing energy that can be used by APS to produce electricity when needed by customers during the summer evenings and night-time hours. Solar thermal storage also eliminates variability issues that other renewables, such as wind and photovoltaics, contend with, providing stability to the grid and thus increasing the value of the energy generated by CSP.

“Abengoa is very proud to put the first solar plant with this scale of storage capability in the United States into commercial operation and to supply APS with the added value that dispatchable concentrating solar power provides,” said Abengoa’s CEO Manuel Sanchez Ortega.

The process begins with 2,700 parabolic trough mirrors, which follow the sun to focus its heat on a pipe containing a heat transfer fluid (synthetic oil) that can reach a temperature of 735 degrees Fahrenheit. The heat transfer fluid then flows to steam boilers, where it heats water to create steam. The steam drives two 140-MW turbines to produce electricity, much like a traditional power plant.

In addition to creating steam, the heat transfer fluid is used to heat molten salt in tanks adjacent to the steam boilers. The thermal energy storage system includes six pairs of hot and cold tanks with a capacity of 125,000 metric tons of salt, and the molten salt is kept at a minimum temperature of 530 degrees Fahrenheit.

When the sun goes down, the heat transfer fluid can be heated by the molten salt to create steam by running it through the tanks instead of the field of parabolic mirrors.

The total investment in the plant is approximately $2 billion, and, during financing, Solana received a federal loan guarantee for $1.45 billion from the Department of Energy Federal Loan Guarantee Program. This support, along with APS contracting to purchase the power, made the construction of Solana possible, creating more than 2,000 jobs and a national supply chain that spans 165 companies in 29 states.

With the addition of Solana, APS will have 750 MW of solar power on its system by the end of 2013, enough to serve 185,000 Arizona customers.
The Edison Foundation Institute for Electric Innovation’s Partner Roundtable is a select group of technology companies dedicated to advancing innovation in the electric power sector. Each year the roundtable brings together chief executives from electric utilities and technology companies to discuss how innovations are transforming the electric grid and enabling an affordable, reliable, secure, and clean energy future.

**Partner Roundtable Membership Includes:**

- Eligibility for one company seat on the Partner Roundtable
- Invitation to attend one of the Institute’s quarterly roundtable discussions with utility CEOs
- Company project highlighted in the Institute’s *Innovations Across the Grid* book
- Invitation to Powering the People (PTP) events
- Opportunity to showcase in Innovation Alley at Powering the People events
- Two subscriptions to EEI’s Daily Energy News Clips
- Company logo and link on the Institute’s website
- Subscription to EEI’s Electric Perspectives magazine

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Collaboration Wins

By Lisa V. Wood, executive director of The Edison Foundation Institute for Electric Innovation and vice president of The Edison Foundation.

As 2013 came to a close, electric utility and technology company executives, policymakers, and other stakeholders gathered in Washington, DC, to discuss how partnerships and collaboration are transforming the electric power sector. At the event, we released our new book, “Innovations Across the Grid: Partnerships Transforming the Power Sector,” which provides an in-depth look into more than 70 utility-technology company partnerships currently underway across the country, and also unveiled our new name, The Edison Foundation Institute for Electric Innovation. The complete book may be downloaded at www.edisonfoundation.net.

Spanning Two Worlds

As energy technology meets information technology, the electric power grid is getting even more interesting—and complex. By joining the so-called basic grid infrastructure—poles, wires, substations, and transformers—with entrepreneurial thinking, new technology, and engineering know-how, we are working to make the power grid more reliable, more efficient, and more productive.

“Innovations Across the Grid” provides an inside look at how utilities are deploying digital communications, sensors, control systems, and millions of digital smart meters to position the electric power grid for the 21st century and beyond. In doing so, they are merging previously separate power, information, and telecommunication systems into an intelligent, resilient, modern, and digital grid. While much of the initial excitement about “smart grid” was on the “customer side” of the meter, the book shows that most of the early gains from investments in new technologies are upstream, on the “utility side” of the meter. By reading the book, you will learn how smart grid investments around the country are producing a two-way power and information highway.

Looking Forward

“This book highlights the projects we are undertaking as an industry to meet the opportunities and challenges of a rapidly evolving world,” said Institute for Electric Innovation Co-Chair and NorthWestern Energy President and CEO Bob Rowe. “Innovations Across the Grid” exemplifies the electric utility industry’s commitment to making the grid more reliable, resilient, secure, and efficient for our customers and American businesses.

It’s up to us in the utility industry, working with technology partners, to design and build the innovations that will keep our nation and the world supplied with secure, reliable, affordable, and increasingly clean energy. In doing so, we are enabling electricity to deliver even more value—to grow the economy, protect the environment, and provide a platform for the innovations of the future. This story is far from over.

EP
Hedge program evaluation typically relies on simplistic back-casting and over-emphasizes how different hedge strategies would have performed through the most recent “event” or market environment. This inadequate screening process promotes counter-productive program revisions and can lead to the next big mistake: freezing hedging before the next unseen upswing spawns a double-digit rate hike.

A better approach to hedge evaluation starts with simulating performance through all market conditions, not just the most recent cycle. Only by stressing decision processes through a variety of acute markets can an understanding of the potential range of hedge outcomes be thoroughly understood. If you can tolerate a program’s performance through extreme up and down markets, then you truly have a handle on your risk.

Pace Global combines a structured assessment process with powerful hedge simulation tools and flexible hedge program objective functions to help you decide what risk management structures will (and won’t) best meet your program objectives.

To learn more, contact Bo Poats or Jack Nirenberg at (703) 818-9100.

Worried about your hedge program?

You’re not alone...inadequate program design can lead to big mistakes. Pace Global’s structured process and robust tools can help put your program on track.
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