



JULY/AUGUST 2015

EP

ELECTRIC
PERSPECTIVES

PSEG'S RALPH IZZO:

Building Tomorrow's Grid Today

28

ENVIRONMENTAL
POLICY UPDATE

32

HIGHLIGHTS FROM THE 2015
EEI ANNUAL CONVENTION





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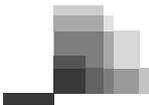
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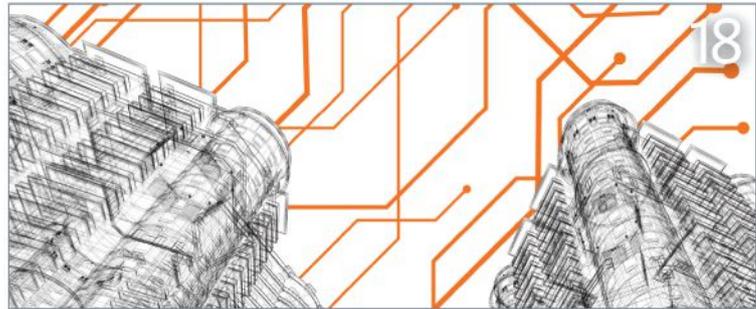
JULY/AUGUST 2015
VOLUME 40, NUMBER 4

18

Unleashing the Power of the Modern Electric Grid

PSEG is strengthening its customer relationships by investing heavily in grid enhancements, improving the efficiency and seamlessness of the transmission system, expanding energy efficiency programs, and greening its generation fleet.

BY RALPH IZZO



28

Environmental Policy Update

As the Environmental Protection Agency prepares to issue new rulemakings, EEI and its member companies continue to support achieving the nation's environmental goals in a manner that preserves fuel diversity, ensures electric reliability, and minimizes costs to customers.



32

Highlights from the 2015 EEI Annual Convention

The EEI Annual Convention showcased the ideas and innovations that are transforming the future of the electric power sector—a future that is happening now.



36

Challenge Festival Highlights

EEI sponsored the Challenge Festival, a week of events focused on finding the best ideas for global impact in education, energy and sustainability, health, and transportation and cities.



departments

JULY/AUGUST 2015 • VOLUME 40, NUMBER 4

6

powering change

Today's utilities are tomorrow's technology companies.

8

news + trends

EEl reports high levels of transmission investment...and more.

14

energycareers@work

Building the 21st-century workforce.

38

customer engagement

Improving the business customer experience.

42

energy efficiency

A custom approach for improved utility incentives.

46

plugging innovation

Utilities partner on energy storage projects.

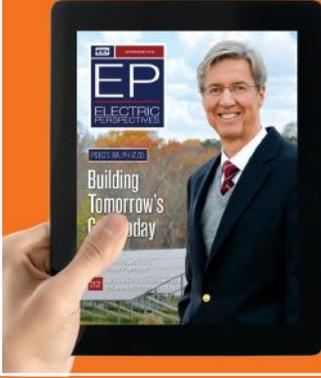
48

the edge

Thought leaders speak out: the evolving electric power industry.

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On the cover: Ralph Izzo, chairman, president, and CEO of Public Service Enterprise Group, discusses how PSEG is strengthening its customer relationships with an enhanced grid, improved transmission system, expanded energy efficiency programs, and a greener generation fleet. (Photo courtesy: PSEG)



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Today's Utilities Are Tomorrow's Technology Companies

By Brian L. Wolff, executive vice president, public policy and external affairs, Edison Electric Institute.



If there was one key takeaway from EEI's Annual Convention in New Orleans last month, I believe it was this: the electric power sector is innovating for the future today. By partnering with breakthrough technology companies like Tesla, inking new agreements with the public sector and the Administration, and looking for creative ways to find the next generation of great workforce talent, our industry is powering our nation forward.

The Annual Convention highlights that begin on page 32 of this issue get into greater detail about these partnerships and agreements, and describe how utilities are supporting STEM education to catapult our nation's talented and highly skilled youth into careers in the energy field.

Jump-starting those great thinkers is the idea behind the Challenge Festival, held in Washington, DC, in May. During the Challenge Festival, more than 70 entrepreneurs from around the world competed for \$650,000 in prizes in four areas, including energy and sustainability. It's a worthy challenge, considering the opportunity that exists to innovate around how we use energy in our daily lives, and what a significant undertaking obtaining a cleaner energy future is.

I was honored to serve as a judge in the energy and sustainability category, and, as a representative of EEI, a sponsor of the event, I was excited to see all the game-changing technologies on display. You can find highlights from the Challenge Festival Energy and Sustainability Day on page 36 of this issue, but also consider one of last year's Challenge Festival winners: PlugSurfing is a mobile app that allows drivers of electric vehicles (EVs) to quickly locate charging stations and process payments on their mobile devices, putting the power in customers' hands and making EVs more accessible.

It's a passion of mine, so I talk a lot about EVs and the steps utilities are taking to increase their adoption and expand the electrification of the transportation sector. From EVs to utility fleets to charging stations to seaports and airports, electric transportation enables utilities to support environmental goals, build customer satisfaction, reduce operating costs, and enhance national security by using more of our domestic resources.

The smart meters and smart rates being deployed nationwide also give customers more options and provide new services—bill management tools, energy use notifications, energy efficiency, and smart pricing programs. The data collected by smart meters allow utilities and customers to better analyze electricity usage to see if it can be tightened or made more productive.

The starting and end points will always be customers. Customers today expect utilities to continue to sustain a power grid that supports their needs, while also giving them flexibility and choice in how they use energy.

In today's rapidly changing energy industry, it is critical that a balance is struck between the onboarding of new technologies and the reliability and resiliency of the grid. As we continue to incorporate innovation and technology into the power system, it must be done in an evolutionary, not revolutionary, way. It is important that large-scale systems work hand-in-hand with distributed generation technologies; that microgrids and energy storage are in balance with traditional transmission towers and lines—complementing one another, instead of competing against the other.

Thoughtful planning and strategy will be needed to construct a balanced, aligned system. This is where partnerships will be critical, and where technology partners like this year's finalists can play a significant role in our industry's ongoing transformation.

While it's difficult to predict what our industry will look like 20 or 30 years from now, our success is contingent upon the strategic partnerships and collaborative efforts that we are charting today, in part through events like EEI's Annual Convention and the Challenge Festival. Through connected conversations, collaboration, and partnerships, we can define a successful energy future together. **EP**

In today's rapidly changing energy industry, it is critical that a balance is struck between the onboarding of new technologies and the reliability and resiliency of the grid.



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EI Reports High Levels of Transmission Investment

Investor-owned electric utilities continue to make significant investments to build needed and beneficial transmission infrastructure and to enhance the nation's electric power grid to meet 21st-century energy demands. "Transmission Projects: At A Glance" finds that EEl members' total transmission investment in 2013 reached \$16.9 billion (nominal \$).

"The high level of investment in our nation's transmission infrastructure improves reliability and benefits customers by enabling utilities to deploy new technologies, such as advanced monitoring systems, that help to make the grid more flexible and more resilient," said EEl Vice President of Energy Delivery Jim Fama. "These investments also relieve transmission congestion, facilitate wholesale market competition, and support a diverse and changing generation portfolio that includes more renewable resources, such as wind and solar power."

The report highlights a cross-section of more than 170 major transmission projects that EEl member companies completed in 2014 or have planned over the next 10 years. These featured projects, which represent only a portion of the total transmission investment that EEl's members anticipate through 2025, total approximately \$47.9 billion (nominal \$).

Of the transmission projects featured and the investments planned, the report also shows that \$19.2 billion (40 percent) is for large, interstate transmission projects spanning multiple states; \$22.1 billion (46 percent) is for projects that support the integration of renewable resources; \$17.4 billion (36 percent) is for projects where EEl member companies are collaborating with other utilities, including non-EEl members; and \$31.5 billion (66 percent) is for high-voltage projects of 345 kilovolts and higher. Since transmission projects are developed to address an array of needs and deliver a number of benefits, one project may fall into more than one category.

"Developing transmission has risks and challenges. In order to continue to attract the levels of capital needed to develop transmission projects and to continue to deploy advanced technologies, it is critically important that the Federal Energy Regulatory Commission continue to provide returns on investment that are commensurate with the level of risk," added Fama.

The full report is available at www.eei.org/issuesandpolicy/transmission.

Southern California Edison



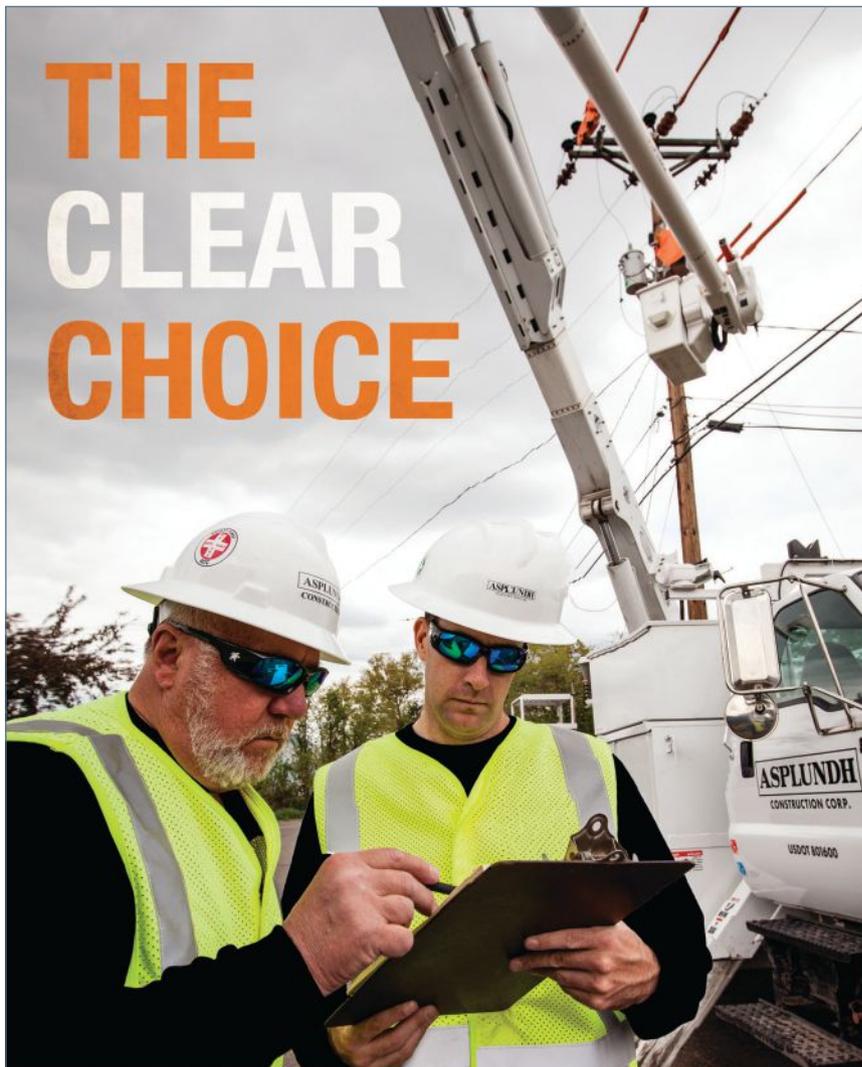
Major new transmission lines, such as the Tehachapi Renewable Transmission Project in California, are being constructed to bring more renewable energy to customers.

DUKE ENERGY BUILDS
FAST-RESPONSE ENERGY
STORAGE SYSTEM

Duke Energy, LG Chem, and Greensmith will team up to build a battery-based energy storage system at Duke Energy's retired W.C. Beckjord coal-based power plant in New Richmond, OH. Duke Energy owns nearly 15 percent of the grid-connected, battery-based energy storage capacity in the United States, according to independent research firm IHS Energy. The 2-megawatt (MW) storage project, expected to be operational by late 2015, will assist in regulating electric grid frequency for PJM, the transmission organization that powers much of the eastern United States.

"Fast-responding energy storage is recognized for the tremendous benefits it provides to grid operations, because it can instantaneously absorb excess energy from the grid or release energy," said Phil Grigsby, Duke Energy's vice president of commercial transmission. "Delivering that power in seconds, as opposed to a power plant that could take 10 minutes or more to ramp up, is the unique value the battery system provides to grid operators. This accurate and rapid response will help improve the overall reliability and economic efficiency of the grid. It also demonstrates the capabilities of new technologies and the potential for future applications, such as large-scale integration of renewable energy onto the grid."

With the addition of the new project, the company will operate a total of 4 MW of energy storage at Beckjord, where a separate 2-MW storage system already exists. (For additional energy storage news from electric utilities that are harnessing the power of technology, see "Plugging INnovation" on page 46.)



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Southern Company

SOUTHERN COMPANY TAKES ENERGY INNOVATION TO NEW HEIGHTS

As one of the first U.S. utilities to receive Federal Aviation Administration (FAA) approval to pilot unmanned aerial systems (UAS), Southern Company is seeking innovative ways to more safely and efficiently meet customers' energy needs using this emerging technology in its system.

Among their potential benefits, UAS could help utilities reduce the duration of storm-related outages, perform power line inspections more safely, lower operating and maintenance costs, and reduce environmental impacts. With utility infrastructure that includes more than 27,000 miles of transmission lines across 120,000 square miles in the Southeast, Southern Company could use UAS to provide a quicker and more detailed assessment of areas and infrastructure impacted by severe weather.

"Families across the Southeast depend on us to quickly and safely get the lights back on after major storms," said Southern Company Executive Vice President and Chief Operating Officer Kimberly Greene. "Our innovative approach to exploring the use of unmanned aerial systems in damage assessment could speed the process of restoring power to affected communities—further delivering on our commitment to the customers our utilities serve."

The company will conduct initial UAS research operations at subsidiary Georgia Power's Klondike Training Facility in Lithonia, GA, and, following research operations, may deploy the technology across the Southern Company system.

Additional utilities have been granted permission to pilot UAS, including San Diego Gas & Electric.

PG&E CLAIMS TOP SPOT IN LARGE-SCALE UTILITY SOLAR DEPLOYMENTS

Pacific Gas & Electric (PG&E) claimed the number one spot in the Solar Electric Power Association's (SEPA's) Top 10 rankings of U.S. utilities with the most megawatts of solar on the grid in 2014. The eighth annual Top 10 rankings are part of the educational nonprofit's "2014 Utility Solar Market Snapshot" report.

The full report identifies key industry trends, including:

- ▶ the ongoing importance of utility-scale solar as a main driver of market growth;
- ▶ the emergence of dynamic solar markets outside California and Arizona; and
- ▶ the impact of the industry's continuing focus on cutting non-hardware "soft" costs, along with utilities' efforts to improve their interconnection processes.

Utilities ranked in this year's Top 10 accounted for 72 percent of all new solar interconnections on the grid in 2014. California's other two investor-owned utilities—Southern California Edison and San Diego Gas & Electric—were numbers two and three, respectively, on the Top 10 list.

"We are 100-percent committed to solar energy and its role in California's energy future," said Laurie Giammona, PG&E's senior vice president and chief customer officer. "Together with our customers and partners, we have worked to shorten connection times and help solar grow in our state."

Berkshire Hathaway Energy



PG&E purchases the electricity from the Topaz Solar Farms project in California under a 25-year power purchase agreement.



Hurricane Andrew caused 65 fatalities and \$26 billion in damage in 1992 and is currently the fifth-costliest hurricane in Atlantic hurricane history.

NOAA

NOAA FORECASTS BELOW-NORMAL ATLANTIC HURRICANE SEASON

The 2015 Atlantic hurricane season likely will be below-normal, according to the National Oceanic and Atmospheric Administration's (NOAA's) Climate Prediction Center, but that's no reason to believe coastal areas will have it easy.

For the hurricane season, which officially runs from June 1 through November 30, NOAA is predicting a 70-percent likelihood of six to 11 named storms (winds of 39 miles per hour or higher). Three to six of these could become hurricanes (winds of 74 miles per hour or higher), and up to two could become major hurricanes (winds of 111 miles per hour or higher). While a below-normal season is likely,

there also is a 20-percent chance of a near-normal season, and a 10-percent chance of an above-normal season.

"A below-normal season doesn't mean we're off the hook. As we've seen before, below-normal seasons can still produce catastrophic impacts to communities," said NOAA Administrator Kathryn Sullivan, referring to the 1992 season in which only seven named storms formed, yet the first was Andrew—a Category 5 major hurricane that devastated South Florida.

"The main factor expected to suppress the hurricane season this year is El Niño, which is already affecting wind and pressure patterns, and is forecast to last through the hurricane season," said Gerry Bell, lead seasonal hurricane forecaster with NOAA's Climate Prediction Center. "El Niño may also intensify as the season progresses and is expected to have its greatest influence during the peak months of the season. We also expect sea surface temperatures in the tropical Atlantic to be close to normal, whereas warmer waters would have supported storm development."

For more information on preparing for hurricanes, visit www.eei.org.

EXELON EMPLOYEES WIN TOP NUCLEAR INDUSTRY INNOVATION AWARD

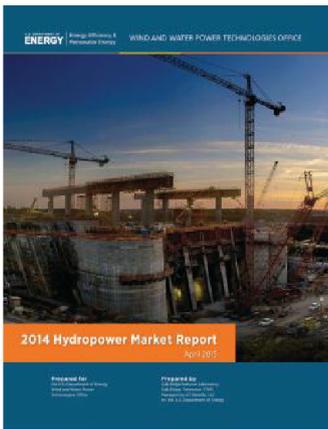
A team of Exelon employees recently received the nuclear energy industry's highest innovation award for implementing a digital process for managing plant maintenance work. The employees were honored for their Electronic Work Package (eWP), a digital process through which work packages are created, managed, monitored, and stored. It replaces paper-based work packages and enhances worker safety, efficiency, and productivity during plant maintenance work.

The B. Ralph Sylvia Best of the Best Top Industry Practice (TIP) Award was presented at the Nuclear Energy Institute's annual meeting in May. The TIP awards recognize achievements in 12 categories—four reactor vendor awards and eight process awards for innovation to improve safety, efficiency, and nuclear plant performance—as well as an overall award for vision, leadership, and ingenuity.

The eWP digital work package, the first of its kind in the nuclear energy industry, is efficient and user-friendly. Personnel can easily view, revise, and approve the latest work package information from any Exelon computer, including tablets, in the field.

"Innovation is absolutely key to the ongoing success of our organization," said Bryan Hanson, president and chief nuclear officer of Exelon Nuclear. "The Electronic Work Package is an important innovation that will make the performance of work packages throughout Exelon's nuclear fleet even safer and more efficient, and it will benefit the entire organization for years to come."

On average, operations and maintenance expenses constituted 56 percent of a nuclear energy facility's electricity generation cost in 2013, according to the Electric Utility Cost Group. Exelon will implement the eWP process at all of its nuclear plant sites, allowing the company to improve worker productivity and reduce costs.



DOE HIGHLIGHTS SUCCESS AND POTENTIAL OF HYDROPOWER

In support of the President's all-of-the-above energy strategy, the Department of Energy released the "2014 Hydropower Market Report," the first-ever report to quantify the current size, scope, and variability of U.S. hydropower supplies. Hydropower currently provides approximately seven percent of the U.S. electricity supply—enough to power more than 20 million homes—and has experienced significant growth industry-wide. Within the last decade, the industry has supported more than 55,000 direct domestic jobs across the country and has helped offset 200 million metric tons of carbon emissions per year, equivalent to the emissions from more than 42 million passenger vehicles. The report also explains how hydropower can be rapidly integrated with other renewable energy sources into the electric grid—contributing to the Administration's goal of doubling the United States' renewable energy supply again by 2020.

The report highlights the critical investment of more than \$6 billion during the last decade to strengthen the existing hydropower fleet and the economic benefits that have resulted from support of the industry. Today, the hydropower manufacturing supply chain

spreads across 38 states, with more than 170 companies producing one or more of six major hydropower components: turbines, generators, transformers, penstocks, gates, and valves. With more than 77 gigawatts (GW) of untapped hydropower resources, the country must continue to innovate to help unleash that potential. By making use of existing water resources and infrastructure, the vast majority of new hydropower projects built over the last decade have added electric generating equipment to dams that previously were not powered. The current hydropower development pipeline contains a diverse mixture of projects proposed at non-powered dams, conduits, and previously undeveloped rivers and streams.

For more than 100 years, hydropower has delivered a source of clean, renewable electricity in almost every state. Today, it plays a key role in providing flexibility to the nation's power grids, allowing utility operators to quickly meet spikes in electrical demand. Further expanding this system flexibility, more than 50 pumped-storage hydropower projects are in various stages of planning and development, and will add strength and stability to the country's electric grids.

WHITE HOUSE RECOGNIZES XCEL ENERGY AND MINNEAPOLIS FOR ENERGY-EFFICIENCY SYSTEM

The White House and Department of Energy (DOE) recognized the City of Minneapolis and Xcel Energy for designing a system that makes it easier for large-building owners to understand how their buildings use energy. Owners and managers of buildings larger than 50,000 square feet are now required to disclose data on their energy use, a requirement that aims to increase energy awareness and spur action to increase efficiency. But reporting the data has been a manual process, and managers of multi-tenant buildings have had to collect spreadsheets or bills from tenants separately. The new web-based tool allows building owners and managers to access whole-building data that then can be automatically uploaded into Energy Star Portfolio Manager, the software they use to report energy usage.

The new system is a tool in DOE's Better Buildings Energy Data Accelerator initiative, launched to build a cleaner, more sustainable energy future. The initiative is part of President Obama's Climate Action Plan to engage leaders in state and local governments, utilities, and industry to demonstrate innovative policies and programs that will transform the energy-efficiency market and cut building energy waste. In 2013, Minneapolis and Xcel Energy joined 19 city-utility pairs across the United States that have committed to developing tools to help building owners understand their energy use to save energy and money.



The City of Minneapolis and Xcel Energy designed a system that makes it easier for large-building owners to understand how their buildings use energy.

Meet Minneapolis

COASTAL UTILITIES TEST PREPAREDNESS AND RESPONSE PLANS

Florida Power & Light Company (FPL) recently held its annual storm drill, testing more than 3,500 employees and their response to Hurricane Falcon—a virtual Category 3 storm. During the drill, FPL tested new technology, including a mobile damage assessment application that will help the company speed restoration in the aftermath of a hurricane.

As part of FPL's exercise, the Electricity Subsector Coordinating Council (ESCC), in coordination with government communications professionals, exercised an industry-government public affairs call 24 hours prior to the Category 3 hurricane striking Florida. Participants included senior communicators from the Departments of Energy and Homeland Security and the Federal Emergency Management Agency, along with four potentially affected utilities, a dozen unaffected utilities, and representatives from the ESCC leadership.

"A lot has changed since Hurricane Wilma struck our state 10 years ago," said Eric Silagy, president and CEO of FPL. "FPL has invested more than \$2 billion to build a stronger, smarter grid to deliver electricity our customers can count on in good weather and bad. We continue to leverage new technology to enhance our storm response. Hurricanes are devastating forces of nature and power outages will occur; however, the significant investments we've made in recent years have placed FPL in the best possible position to restore power to our customers faster following a storm."

This year, FPL is rolling out a new mobile command center, which allows the company to monitor and manage its network remotely, assess damage, and assign restoration crews closer to the hardest hit areas—all within hours of a storm making landfall. FPL also showcased a new mobile application that its restoration crews will use to assess damage following a storm—previously a manual task recorded on paper, now handled more quickly and efficiently with smart phones and tablets.

Since Hurricane Wilma, FPL has made significant technological changes to the electric grid to make it stronger and smarter, including:

- Strengthening more than 570 main power lines serving critical community facilities, such as hospitals, police and fire stations, and emergency communication systems;
- Installing 4.8 million smart meters and 12,000 intelligent devices along the grid using cutting-edge technologies that help detect and restore service faster when outages occur;
- Clearing vegetation from more than 120,000 miles of power lines; and
- Inspecting all power poles—more than 1.2 million—and upgrading or replacing those that no longer meet FPL's standards for strength.

Florida Power & Light Company

Pacific Gas and Electric Company (PG&E) conducted a two-day, large-scale exercise to test its preparedness and response plans for a simulated magnitude 7.2 earthquake along the San Andreas Fault in mid-May. The drill involved more than 750 employees working in coordination with 24 emergency centers throughout PG&E's service area. These annual exercises test new technology and processes that the utility has implemented to improve its response to catastrophic events, including damage models and assessments, rapid logistics support, gas leak detection tools, and portable information technology.

PG&E's Emergency Preparedness and Operations organization ensures the company responds safely and effectively to all types of emergencies. The utility plays a key role in returning communities back to normal following a natural disaster, including training and coordination between PG&E employees and local first responders and working with local governments to establish base camp locations that help expedite restoration in the most-impacted communities. In the Bay Area alone, PG&E has 14 base camp agreements to support local communities in the aftermath of a disastrous earthquake or storm. **EP**



Deputy Energy Secretary Elizabeth Sherwood-Randall and FPL President and CEO Eric Silagy address media at the company's annual severe weather training drill.

Building the 21st-Century Workforce

By Geisha Williams, CEWD chair and executive vice president, electric operations, Pacific Gas and Electric Company.

There's never been a more important time for building tomorrow's workforce than right now, and I could not be more excited about what's in store for the Center for Energy Workforce Development (CEWD). As I take over for Tom Graham as chair of this great organization, I hesitate to think where we would be without his leadership over the past year. I express my sincere thanks to Tom for his hard work and dedication as our chair and the many successes of CEWD during that time.

As you may know, our industry is in the midst of a profound transition, and in order to meet the needs that accompany these changes, the entire energy industry needs to be more innovative and creative in how we think about our business and interact with our customers. That is why this issue of *Electric Perspectives* is dedicated to exploring the many ways that technology, customers, and partnerships are transforming the utility landscape.

One of the key drivers that will enable this evolution is the work that's taking place to attract, develop, and retain the workforce of tomorrow. This topic was front and center at the EEI Annual Convention in New Orleans in June, and rightfully so. At the Convention breakout session on "Competing for Talent: Building the 21st-Century Workforce," a group of leading member company executives and experts shared examples of the

work utilities are doing to develop new hiring and training practices that build and engage a highly skilled, innovative, and diverse 21st-century workforce.

All of the panelists shared what their companies are doing to face these challenges and take action, including partnerships with *FIRST*® (For Inspiration and Recognition of Science and Technology). *FIRST* engages 400,000 youths in its programs, encouraging them to think about how to solve real-world problems.

According to *FIRST* President Donald Bossi, kids who participate in *FIRST* are 50 percent more likely to go to college and twice as likely to pursue a career in the engineering field. EEI and CEWD's new "Get into Energy/Get into STEM" initiative is a one-of-a-kind sponsorship of *FIRST*.

Two industry-sponsored *FIRST* Robotics teams were in New Orleans to showcase their robots and discuss how their participation in *FIRST* is preparing them for careers in the engineering and technology fields. Several high school students from Slidell, LA, joined the breakout session to share their experiences and highlight what they learned about leadership, teamwork, professionalism, problem-solving, and communication. It was incredibly encouraging to hear these students' passion for engineering and STEM, and I can't wait to see where they and others like them will go in their future careers. **EP**



Industry-sponsored *FIRST* Robotics teams were in New Orleans to showcase their robots and discuss how their participation in *FIRST* is preparing them for careers in the engineering and technology fields.

Formed in March 2006, the Center for Energy Workforce Development (CEWD) is a non-profit consortium of electric, natural gas and nuclear utilities and their associations: the Edison Electric Institute (EEI), American Gas Association (AGA), Nuclear Energy Institute (NEI), and National Rural Electric Cooperative Association (NRECA).



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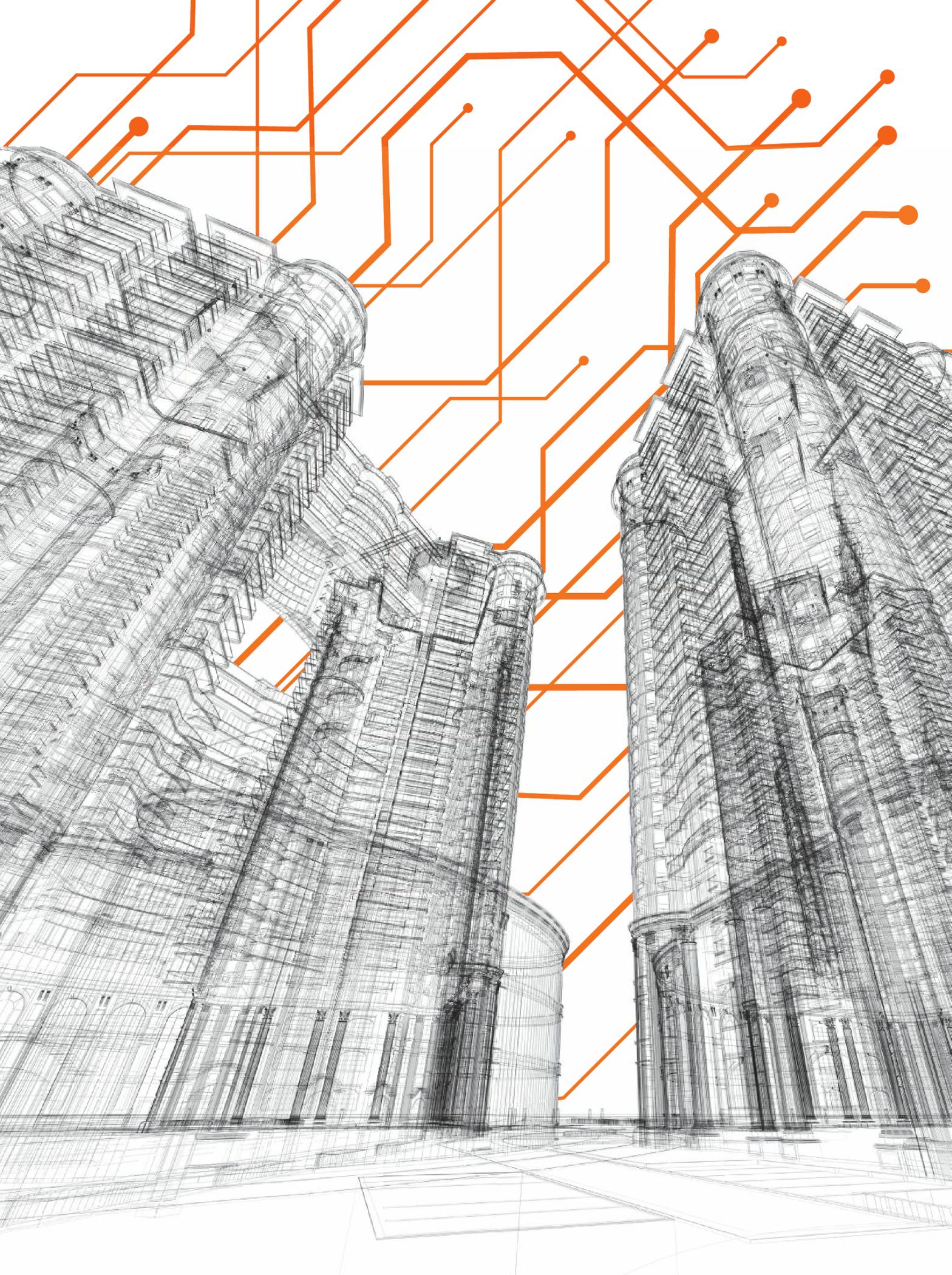
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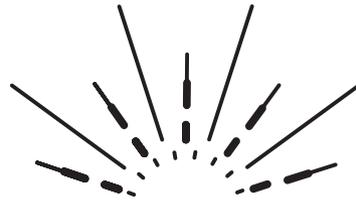
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UNLEASHING
the POWER of the

MODERN ELECTRIC GRID

BY RALPH IZZO

Chairman, President, and CEO,
Public Service Enterprise Group (PSEG)

PSEG is strengthening its customer relationships by investing heavily in grid enhancements, improving the efficiency and seamlessness of the transmission system, expanding energy efficiency programs, and greening its generation fleet.

If Alexander Graham Bell were suddenly transported from 1876 to today, he would not recognize the telecommunications industry. In contrast, the founder of the electric industry, Thomas Edison, might think he was just waking up from one of his famous afternoon naps. The fundamentals of the electric grid—centralized power distributed along wires to homes and businesses—look much the same.

Some in our industry say this is about to change—that we are entering a new, fundamentally different age of energy; that utilities are headed the way of the dinosaurs; and that centralized power is

doomed. I agree that change is coming—and already is underway—but I believe that utilities and central power will be at the center of the 21st-century grid.

The utility model has been very powerful in bringing universal access to natural gas, electricity, and water. The utility of today and tomorrow can play a similarly critical role in ensuring universal access to new technologies, from thermostats that promote energy efficiency to solar panels, batteries, and other devices. Utilities have scale and access to customer information that will allow for optimal deployment of these new technologies in a way that maximizes benefits at the lowest cost.

The utility of today and tomorrow can play a similarly critical role in ensuring universal access to new technologies, from thermostats that promote energy efficiency to solar panels, batteries, and other devices.

Utilities can ensure that access to these new technologies is not just mostly available to upper-income customers or regressively subsidized by lower- and middle-income customers.

I also believe that grid modernization must differ from utility to utility, reflecting the unique geography, history, situation, and regulatory structure for each company. Our New Jersey utility, Public Service Electric and Gas Company (PSE&G), is a great example. We are investing heavily in grid enhancements to make it more resilient and reliable, improve the efficiency and seamlessness of the transmission system, expand energy efficiency programs, and make our electric generation environmentally friendly.

Improving Reliability and Resiliency

In 2012, Superstorm Sandy broke all records for PSE&G in terms of the number and length of outages, as well as the amount of destruction. But possibly even more telling is that Sandy was the third record-breaking storm in less than 18 months. Storms are not just getting worse; they are coming at us more often.

PSEG has long been an advocate for utilities playing their role in trying to mitigate climate change, but with these three storms something else became crystal clear—a major part of modernizing the electric system must include adapting to and planning for the impacts of climate change.

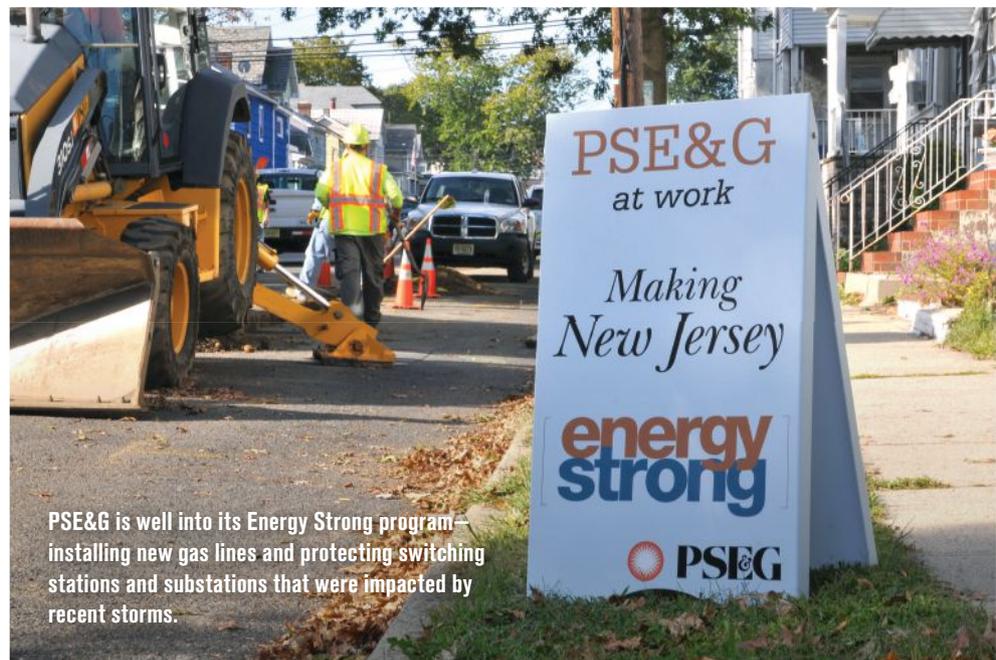
It would be unwise, especially for those utilities that serve our nation's coastal regions, to think that powerful storms coupled with rising sea levels will not continue to strain current electric and gas distribution systems.

These storms also illustrate that people have become more dependent on electricity than ever. The average home now has dozens of electric appliances and devices that need to be plugged in or recharged. And with more mobile devices, wider screen TVs, and other gadgets—people are becoming less tolerant when they lose electric service. Quite simply, they expect an ever-increasing level of reliability.

A priority of today's utilities must be to upgrade our infrastructure so that it cannot only withstand the impacts of frequent and more violent storms, but recover from those storms faster.

After Sandy, PSE&G received approval for a three-year, \$1.22-billion program—which we dubbed our “Energy Strong” initiative. Work is underway to upgrade, raise, or fortify 28 substations affected by Superstorm Sandy or Hurricane Irene, as well as to replace and modernize 250 miles of gas pipes in flood-prone areas. In addition, we are adding smart technology to help us monitor our system and speed restoration when there are outages.

This is just a start, targeting those especially vulnerable facilities affected by past storms. As those in our industry know all too well, every storm is different and presents its own challenges. Our efforts to harden and increase the resiliency of our facilities need to go beyond the storms we have just weathered and prepare for the storms of the future. Our customers don't just want this, they expect it.



PSE&G is well into its Energy Strong program—installing new gas lines and protecting switching stations and substations that were impacted by recent storms.

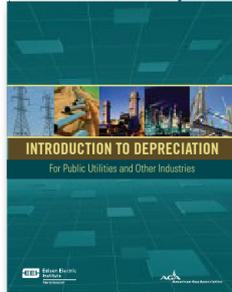
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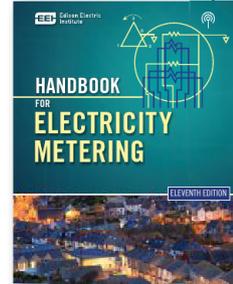
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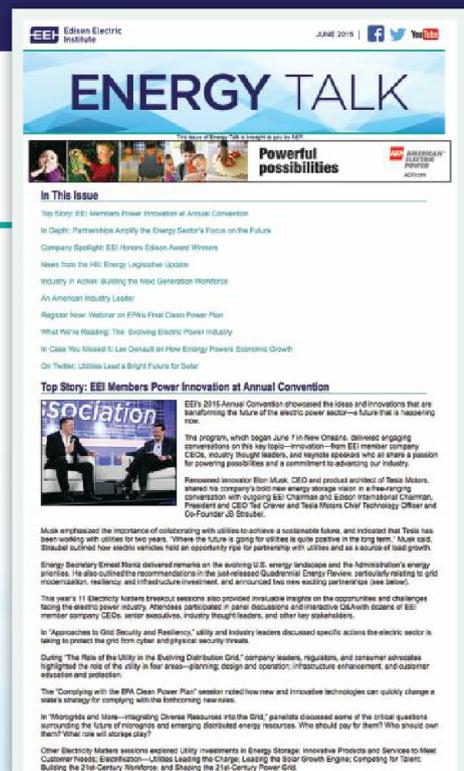
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Helicopters were used for transmission projects to transport crews and install towers in environmentally sensitive areas.

PSEG

Modernizing the Transmission System

The building of the electric grid has been called one of the greatest engineering achievements of the 20th century. However, the backbone of the transmission system needs to be modernized due to the massive increase in electricity being used and moved around the grid. PSE&G was among the first public utilities to create a high-voltage transmission system that was efficiently linked into the PJM network. This system provides widespread access to reliable energy and helps lower costs through achieving economies of scale.

The first transmission line to cross New Jersey was built in the 1920s by crews using teams of mules, horses, and oxen to pull wagons loaded with heavy equipment over barely existing roads. PSE&G is replacing and upgrading that line along with other parts of its system. Now, instead of using mules, helicopters

are transporting equipment and workers to aid construction in remote areas while also helping limit impacts on pristine land.

In 2014, we completed construction of the \$390-million North Central reliability line and placed into service the \$400-million Burlington-Camden line. These two 230-kilovolt (KV) lines will make an important contribution to system reliability. In 2015, we energized the 500-KV Susquehanna to Roseland line, which will ease transmission congestion and lower prices in northern New Jersey. These and other transmission

projects are being completed on time and on budget.

In all, more than 60 percent of PSEG's \$10-billion, 5-year capital investment program is related to transmission. The tools in our kit may have changed over the last 100 years, but reliability remains fundamental. We will continue to pursue an aggressive transmission modernization program to support the high standard of reliable service that is our company's and industry's hallmark.

Expanding Energy Efficiency Investments

This is an area that Thomas Edison, the tireless promoter of expanding uses of electricity, would find hard to fathom. However, I do believe that at the core of our efforts to modernize the grid must be an emphasis on energy efficiency. A utility CEO who believes in climate change—as I do—and understands the impact of power generation on the environment has to look seriously at energy efficiency. Investments in energy efficiency are wins for the customer, for the environment, and for our shareholders—and they create jobs.

My company estimates that reducing energy consumption by 2 percent in New Jersey would put \$130 million in the pockets of the state's consumers and would eliminate 1 million tons of carbon emissions—equal to taking 200,000 cars off our roads.

The cheapest, cleanest energy is the energy you don't use. Energy

A priority of today's utilities must be to upgrade our infrastructure so that it cannot only withstand the impacts of frequent and more violent storms, but recover from those storms faster.



Devastation following Superstorm Sandy was widespread. Crews from around the country and Canada worked tirelessly to bring service back to customers.

PSEG

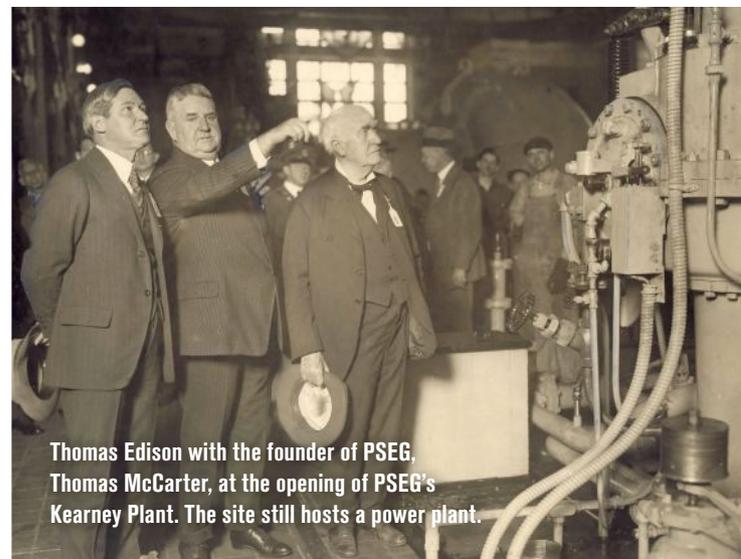


Sandy was the third record-breaking storm in less than 18 months.

PSEG



More than 60 percent of PSEG's \$10-billion, 5-year capital investment program is related to transmission.



Thomas Edison with the founder of PSEG, Thomas McCarter, at the opening of PSEG's Kearney Plant. The site still hosts a power plant.

PSEG



Chiller being installed at Morristown Memorial Hospital as part of PSE&G's energy efficiency program.

PSEG

efficiency can make a meaningful contribution to the fight against climate change. A McKinsey report found that by reducing demand, efficiency improvements could move the world about 25 percent closer to the ultimate goal of avoiding the worst impacts of climate change. The Environmental Protection Agency estimates that energy efficiency can achieve about 20 percent of the target it laid out to reduce carbon emissions through the year 2030.

However, for too long, energy efficiency has been the forgotten option. The United States ranks 13th out of the 16 largest economies in energy efficiency, according to a recent report by the American Council for an Energy-Efficient Economy.

If efficiency is so beneficial, why aren't customers doing it on their own? Research has documented the many barriers to customers investing in energy efficiency. Most consumers lack information about the benefits of efficient products,

have limited resources (money or time) available for energy-related investments, or are skeptical about whether energy savings will actually materialize and justify their investment. Landlords also are reluctant to make efficiency upgrades in heating and cooling systems when the benefits of lower bills will flow through to the tenants (residential and commercial) who pay the utility bill.

To put it simply: Energy efficiency just isn't a priority for most people or businesses—even when it makes strong economic sense.

Utilities can be instrumental in closing the energy efficiency

investment gap, putting to work our low-cost capital, our brand and customer relationships, and our focus on serving everyone. When a utility invests in energy efficiency, it creates a dynamic where even if rates go up, bills can come down.

I am proud of the results PSE&G has achieved with energy efficiency programs: a total investment of about \$300 million so far. For example, we have a program that helps hospitals make energy efficiency improvements, saving them more than \$11.5 million a year in energy costs. Those savings can make it easier for a hospital to afford new, life-saving medical equipment, benefiting our customers who use those facilities.

We recently received approval to invest an additional \$95 million in three popular energy efficiency programs, but we want to do much more. Energy efficiency will be most powerful when all customers are taking advantage of new technologies that lower costs and usage. We need to maximize the benefits of energy efficiency by moving toward universal participation. Utilities, with a role defined beyond the meter, can be critical in making this happen and doing so in the lowest-cost manner.

Making energy efficiency universal is a role that's tailor-made for a utility. It's doable if we build on the real advantages of being connected together in a strong network, serving all.

We have a diverse country, so it makes sense to customize strategies to match the particular situation, energy profile, and characteristics

Utilities can be instrumental in closing the energy efficiency investment gap, putting to work our low-cost capital, our brand and customer relationships, and our focus on serving everyone.



Chris Johnson, Project Controller
Sukhwinder Kaur, Electrical Designer
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of each state. But I believe utility involvement can go a long way toward moving our nation from 13th place in energy efficiency to 1st place where it should be.

Greening Our Generation Fleet

The electric industry has spent billions of dollars greening the fleet. We have increased the effectiveness and capacity of existing emissions-free nuclear plants; invested in technology at coal plants that dramatically reduces mercury, sulfur oxides, nitrogen oxides, and particulate emissions; and shifted to greater use of comparatively green natural gas. And electric utilities are at the forefront of investing in renewables.

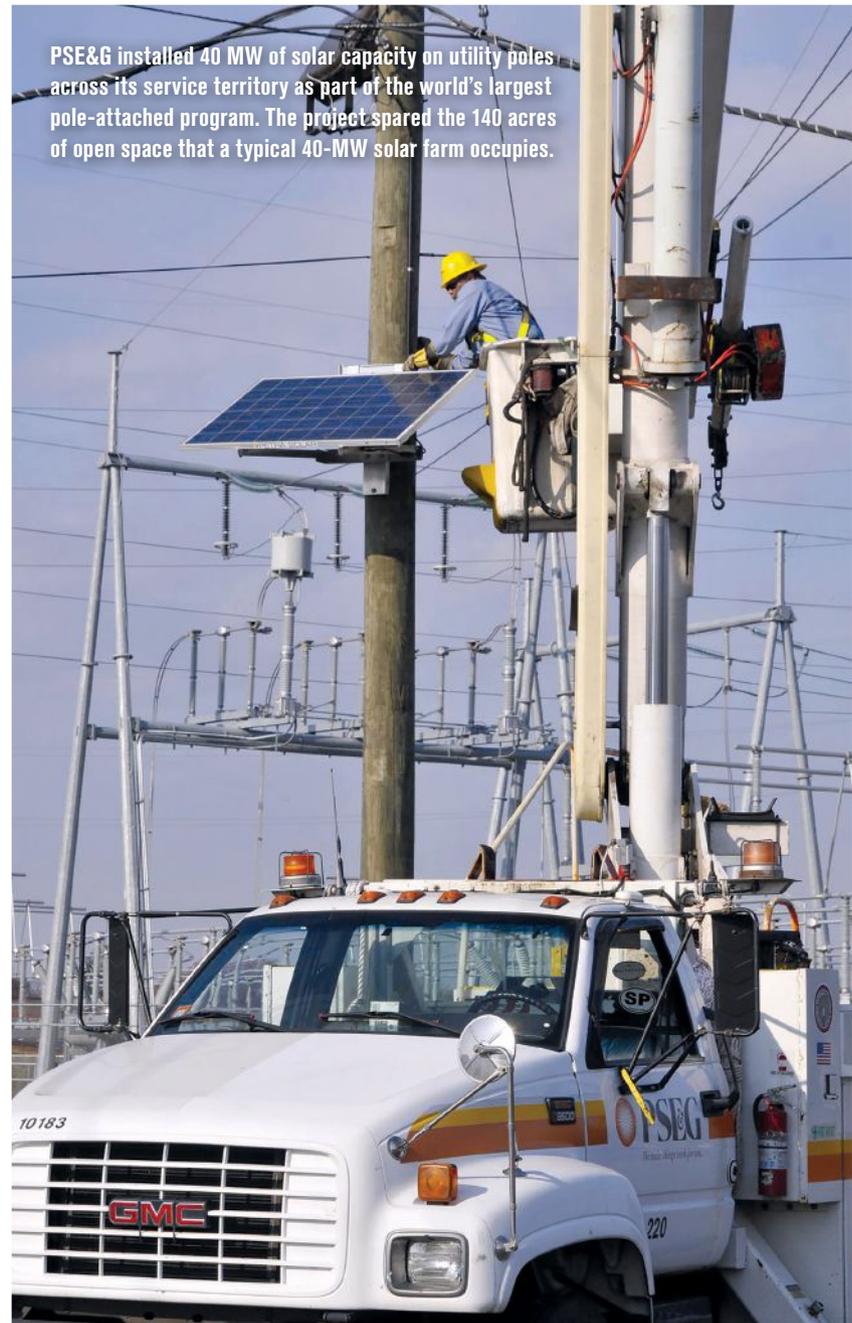
At PSEG, through a program we call “Solar 4 All,” we have installed solar at many of our facilities, on old landfills and brownfields, and on 180,000 utility poles throughout PSE&G’s service territory. We currently operate more than 100 megawatts (MW) of utility-scale solar in our New Jersey-based utility. In addition, our unregulated business, PSEG Solar Source, has 11 solar facilities in nine states totaling 123 MW.

As we transform the grid, we will need to ensure that it can accommodate an expansion of distributed energy resources, including rooftop solar, wind, and storage. This includes increasing the “eyes and ears” in the distribution system to better integrate these resources and manage their impact.

However, there is a limit to what can be done to add solar in a highly developed state such as New Jersey. Not everyone can put solar on their home or on a warehouse.

Many of our customers live in apartments that simply cannot take advantage of rooftop solar. As more suburban and rural customers adopt solar (and the large subsidies that all customers pay for), the burden for maintaining the grid shifts to those who have not or cannot take advantage of solar.

Subsidies are needed to help nurture and grow new technologies, but asking all customers, including those struggling to pay their bills, to subsidize installations primarily used by high-income customers is not right.



PSE&G installed 40 MW of solar capacity on utility poles across its service territory as part of the world’s largest pole-attached program. The project spared the 140 acres of open space that a typical 40-MW solar farm occupies.

PSEG

Subsidies are needed to help nurture and grow new technologies, but asking all customers, including those struggling to pay their bills, to subsidize installations primarily used by high-income customers is not right. It is simply more efficient and fair for the utility to deploy the technology and share both the benefits and the costs among all its customers.

While solar is having a positive impact, we need to keep in mind that energy efficiency delivers more environmental bang for the buck and, if done right, can be made universally available.

Our efforts to clean our generation need to continue. These initiatives will lessen the negative impact of our industry and will support the next big wave of environmental improvements in air quality, including reduced carbon emissions as we electrify the transportation sector. Energy produced by centralized generation is by its nature more efficient than lots of mobile power generation in the form of combustion engines. But the real payoff for the electrification of transportation comes as we continually improve the environmental profile of the electricity behind it.

A New Regulatory Framework
There is one more area that needs to be modernized—the regulatory framework under which utilities make investments. Going forward,

A new framework also is critical to making sure that the power of the utility is unleashed so that all customers have access to the benefits of new technologies.

we need a new way of thinking, with greater partnering between regulators and utilities. If all parties can work together—and not against each other—the rewards to customers, our economy, and our environment will be enormous. This new framework must align the interests of our consumers, shareholders, and society.

Today, utilities' revenues are directly tied to the amount of electricity they sell. This model reaches back to Thomas Edison's days when regulators wanted to reward utilities for adding new customers to the burgeoning electric grid.

As effective as these incentives were, they are out of step with what our customers and society need today. Utilities need incentives to reduce energy use and customer bills, not sell more. Utilities need a construct that supports long-term plans to make existing infrastructure smarter and more resilient—investments that make the grid work better but do not necessarily add new customers. Modernizing the way we regulate utilities will help make energy more reliable, cleaner, and more affordable for all customers.

A new framework also is critical to making sure that the power of the utility is unleashed so that all customers have access to the benefits of new technologies.

I believe utilities are essential to ensure universal access to newer, cleaner energy options. That's why I am a fervent advocate for a new regulatory model that doesn't impose an artificial boundary limiting us to one side of the meter, but instead allows us to do much more for our customers, especially to reduce their bills.

Finally, utilities need to be encouraged to take an "all of the above" approach to meeting system needs, solving issues with the cheapest and cleanest solution, whether that is a battery, smart thermostat, energy efficiency program, or traditional infrastructure.

Maybe the utility of the future will be unrecognizable by our founder, but I am convinced that utilities are at the core of modernizing our electric grid. Now, more than ever, we need a regulatory framework that releases and unlocks that power. **EP**



Ralph Izzo is chairman, president, and CEO of PSEG.

Environmental Policy Update

The electric utility industry is committed to providing safe, reliable, affordable, and increasingly clean electricity to power the U.S. economy and to enrich the lives of all Americans. As part of that commitment, utilities are investing more than \$90 billion each year, on average, to transition to a cleaner generating fleet and to enhance the electric power grid to meet the needs of our 21st-century economy.

The industry has made—and continues to make—tremendous progress in reducing its environmental impact. In fact, emissions of nitrogen oxides (NO_x) and sulfur dioxide from power plants have been reduced by 74 and 80 percent, respectively, from 1990 levels, during a period when electricity use has grown by 36 percent. In addition, the industry's carbon dioxide (CO₂) emissions have been reduced by approximately 15 percent below 2005 levels (as of 2013).

Faced with a number of proposed and final Environmental Protection Agency (EPA) rulemakings, EEI and its member companies continue to support achieving the nation's environmental goals in a manner that preserves fuel diversity, ensures electric reliability, and minimizes costs to customers.

Clean Power Plan

On June 2, 2014, EPA proposed guidelines under Clean Air Act section 111(d) for states to regulate CO₂ emissions from existing fossil-based electric generating units (EGUs). EPA is expected to finalize these guidelines, known as the Clean Power Plan (CPP), later this summer.

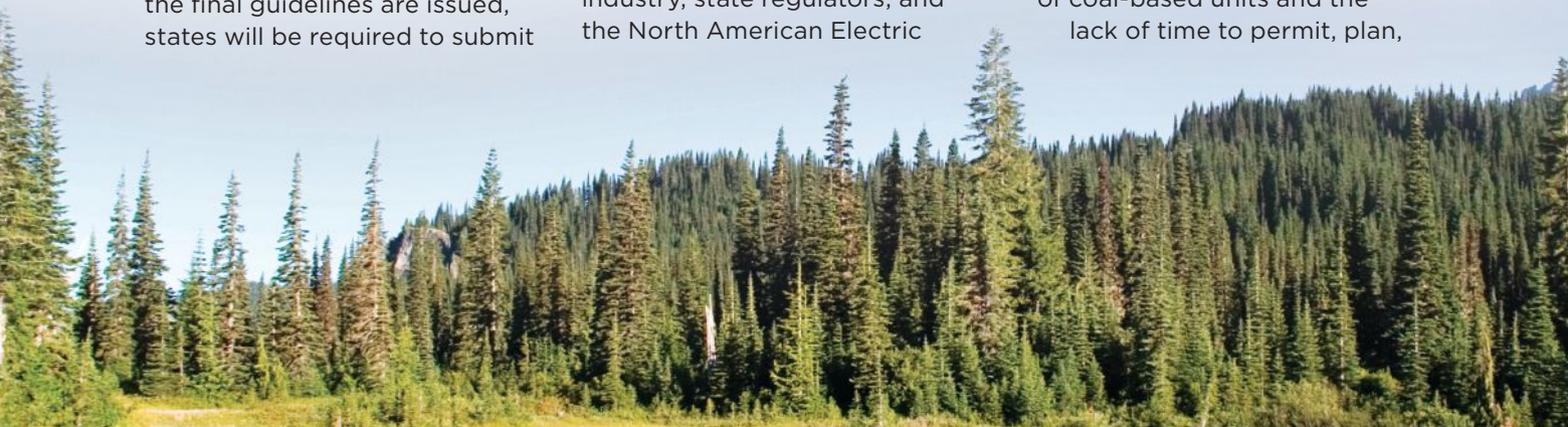
In the 111(d) guidelines, EPA proposed emission rate goals for 49 states, measured in pounds of CO₂ emitted per megawatt-hour of electricity generation. (Vermont and the District of Columbia have no goals because there are no existing fossil-based EGUs in either location.) Each state has an interim goal and a final goal. Interim goals are average goals that cover the period 2020-2029, and final goals cover 2030 and beyond. No later than three years after the final guidelines are issued, states will be required to submit

compliance plans for EPA review that demonstrate how they will achieve these goals.

EPA proposed the individual state goals based on the agency's assessment of what constitutes the best system of emission reduction (BSER). In a departure from past practice, EPA's proposed BSER for the power sector guidelines includes four building blocks that look at the reductions achievable not just at existing units, but throughout the interconnected power system. The building blocks include heat-rate improvements at existing coal-based units; increased utilization of existing natural gas combined-cycle units; increased generation from renewable resources and preservation of some existing nuclear units; and increased end-use efficiency.

A key concern raised by industry, state regulators, and the North American Electric

Reliability Corporation (NERC) is that EPA's proposed BSER does not consider reliability and may create reliability challenges. In particular, EPA assumes that states could make major shifts between coal-based and natural gas-based generation before the start of the interim compliance period. This creates a compliance cliff, whereby 80 percent of the regulated states would have to achieve at least 50 percent of the total required reductions by 2020—just five years from now (and less than two years from the time that EPA is expected to approve most state compliance plans). Many stakeholders have identified concerns about the reliability impacts of making these kinds of changes in the generation mix in such a short time frame. The expected shutdown of coal-based units and the lack of time to permit, plan,



and construct needed natural gas and electric transmission infrastructure raises concerns about resource adequacy and reserve margins—and possible violations of NERC standards.

The Federal Energy Regulatory Commission (FERC) held a series of technical conferences in March and April so that experts could weigh in on concerns about reliability, infrastructure, and market impacts. Many suggested that EPA revise the interim goals to provide adequate time to build infrastructure and incorporate other measures to protect reliability in the final guidelines.

In May, the FERC commissioners wrote a letter to EPA asking that a reliability safety valve be included in the final rule. The letter notes that the commission, working through NERC, independent system operators, regional transmission organizations, and other regional planning authorities, would assess the interstate reliability implications of state plans, in an effort to help identify potential reliability concerns during the interim compliance period.

In the weeks before EPA sent the guidelines for the inter-agency review that is required before finalization, agency officials acknowledged potential reliability concerns, particularly those associated with the cliff

created by the interim goals. As EPA finalizes the guidelines later this summer, many stakeholders will be looking to see what tools EPA has incorporated to ensure that states and EGUs have enough time to make changes in the resource mix without endangering reliability.

Proposed Ozone Standards

In December 2014, EPA proposed to tighten the primary (health-based) and secondary (welfare-based) national ambient air quality standards for ground-level ozone from the current 75 parts per billion (ppb) to within a range of 65-70 ppb. A final rule is required by October 1. While most industry groups and almost half of the states recommended that EPA not tighten the standards, it is all but certain that EPA will do so. The effects of ozone on respiratory health and vegetation at current and proposed levels are debatable.

Many areas of the United States already cannot meet the current 75-ppb standard—in Clean Air Act terminology, this failure results in an area being designated as non-attainment. Lowering the ozone standard will force many additional areas into non-attainment—especially

in the West and Midwest. EPA predicts (outside of California) that of counties with monitors, 358 and 558 would fail 70-ppb and 65-ppb standards, respectively.

To address these non-attainment areas, states could require new emission reduction requirements for power companies and their customers, even though EGUs are responsible for only 12-15 percent of U.S. man-made NO_x emissions and less than one percent of volatile organic compounds (the key ozone precursor emissions). In addition, the sector already has cut NO_x emissions by 74 percent from 1990 levels and will reduce them further under other EPA regulations.

Other key consequences of being in non-attainment include increased difficulty in permitting new or modified existing EGUs, including the need to obtain emission offsets in non-attainment areas. Tight ozone standards also could negatively impact compliance with EPA's proposed CPP, as expanded non-attainment designations will complicate the permitting of the new and expanded natural gas-based EGUs needed to comply with the proposed CPP goals.

EPA estimates the proposed ozone rule's 2025 annual costs across all sectors at \$3.9 billion for a 70-ppb standard and \$15 billion for a 65-ppb standard, although



some stakeholders reject these estimates as being far too low. New or more complicated permitting requirements for new and modified units can add significant costs. For example, emissions offsets (if available at all) can cost \$100,000 per ton of NOx. Permitting costs and compliance costs associated with retrofitting controls like selective catalytic reduction technology can lead to facility retirements.

High levels of background ozone from stratospheric intrusion, wildfires, and long-range transport from sources outside the United States, especially in the West and along international borders, also can make compliance difficult if not impossible, even in rural areas with virtually no emission sources. EPA claims that the Clean Air Act provides relief mechanisms to ensure that uncontrollable background ozone does not create compliance challenges for states, but these mechanisms have been rarely or unsuccessfully used in the past. A tighter new standard also will require EPA and states to deal with the difficult and controversial issue of interstate transport of ozone and its precursors.

Coal Combustion Residuals

EPA published its final coal combustion residuals (CCR) rule on April 17. The rule, which takes effect October 19, regulates CCR, commonly known as coal ash, as a non-hazardous waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA). While EPA decided to regulate CCR as non-hazardous waste, the agency makes clear in the preamble to the rule that it is still evaluating whether to reverse

its regulatory determination and regulate CCR as a hazardous waste under RCRA Subtitle C.

The rule contains varying deadlines. Many of the obligations are required to be in place by the effective date; other more involved requirements, such as the installation of a groundwater monitoring program, are not required to be in place until two or more years after the effective date.

Since the rule is self-implementing, affected facilities must comply with the new regulations regardless of whether a state adopts the rule. If a state adopts the rule and incorporates its criteria into the state's solid waste management program, the federal rule remains in place as an independent set of federal criteria that must be met. The rule does not require regulated facilities to obtain permits, does not require the states to adopt and implement the new rules, and cannot be enforced by EPA. The rule's only compliance mechanism is for a state or citizen group to file a citizen suit under RCRA in federal district court against any facility that is alleged to be in non-compliance.

The rule applies to new and existing landfills and surface impoundments used to manage CCR generated by coal-based power plants. It also applies to inactive surface impoundments—impoundments not receiving CCR on or after the effective date of the rule but that still contain CCR and liquid—located at power plants producing electricity regardless of fuel type. If an inactive surface impoundment closes within three years of the rule's publication date, it is excluded from further regulation. Inactive surface impoundments that

cannot close within this three-year time period are regulated in the same manner as existing CCR surface impoundments and are subject to the rule's full regulatory requirements.

The rule aims to prevent catastrophic releases of CCR and to protect groundwater by establishing standards for disposal unit safety, inspections, design, and operating criteria—including groundwater monitoring/protection standards—as well as closure and post-closure care. The rule will distinguish between CCR disposal facilities that qualify as sanitary landfills and CCR disposal facilities classified as open dumps, which are prohibited under RCRA. CCR landfills and surface impoundments determined to be in non-compliance with the rule will be deemed open dumps and either will have to rectify any regulatory deficiencies or cease receiving CCR and close.

Due to the self-implementing nature of the rule, utilities are left to interpret its provisions. Thus, the utility industry will be investing huge capital resources to comply with the rule with little or no regulatory certainty.

To cure the flaws in the new coal ash rule that stem primarily from its self-implementing nature, a broad group of stakeholders—including the utility industry, ash marketers, and the states—are actively supporting congressional efforts to amend RCRA so the rule can be implemented in an effective and practical manner. The House is expected to pass H.R. 1734, the Improving Coal Combustion Residuals Act, in July. This legislation would authorize the states to implement the rule, provide state regulatory agencies with certain flexibility

in the implementation of CCR regulations, and provide regulatory certainty by regulating CCR under Subtitle D of RCRA. The industry and its allies are working to find a path forward for the bill in the Senate.

Waters of the United States

EPA and the Army Corps of Engineers finalized a joint rulemaking revising the definition of “Waters of the United States” (WOTUS) under the Clean Water Act (CWA) on May 27. The rule will become effective on August 28, 2015.

The WOTUS rule is a substantial expansion of federal authority under the CWA. It was opposed by a broad array of agriculture, development, energy, and industry groups; 33 states; and many associations representing state and local government interests.

The final rule lists eight categories of waters that will be subject to federal regulation and increases federal oversight by defining those categories very broadly and by providing only limited exemptions. Even ditches and land features that are dry for extended periods of time but are subject to water flow occasionally may be considered jurisdictional “tributaries.” Jurisdiction also extends to “adjacent” waters that can be as far as 1,500 feet from other jurisdictional waters. As a result, many industrial operations may face new regulatory oversight unless specifically exempted. Such broad definitions expand the potential for citizen lawsuits challenging jurisdictional determinations.

By broadly defining tributaries, ditches, and adjacent waters, the rule will have the practical

effect of regulating more water and negatively impacting projects near these waters (such as most utility generation, transmission, and distribution operations). It likely will trigger substantial new CWA regulatory requirements for critical utility operations, and will subject utility projects that otherwise qualify for relatively streamlined permitting processes under national or regional general permits to lengthier and costlier individual permit procedures.

The rule also will intensify the cumulative effect that multiple environmental regulations are having on the utility industry. This will increase the costs of critical infrastructure projects, such as new transmission for renewable generation, and will incrementally impede a smooth transition to low-emitting generation sources and a lower carbon future.

Some improvements were made in the final rule. Waste treatment systems are largely excluded from jurisdiction as are most artificial lakes and ponds, including cooling ponds. Certain engineered water management systems common at utility sites, such as fire control ponds, storm water control features, and other conveyances, also are excluded from federal regulation. However, these exclusions are not absolute.

The CWA gives federal and delegated state authorities regulatory jurisdiction over navigable waters. Congress used the term “navigable waters” to establish a meaningful limit on federal authority under the Commerce Clause of the U.S. Constitution. Waters that fall within this definition are subject to CWA regulatory controls and permitting requirements. Waters that

do not fall within this definition can be regulated by the states. EPA and the Corps have long sought to interpret WOTUS broadly. After issuing opinions in both 2001 and 2006 limiting the agencies’ jurisdiction, the U.S. Supreme Court called on the agencies to issue more careful regulations, which the agencies have used as the predicate for the current rulemaking.

The electric utility industry supports the protection of navigable waters under the CWA and believes that such waters already are well-protected under the Act without the broad expansion of authority created by this rule. The industry also believes that the agencies significantly underestimated the costs, given the increased need for permits, required mitigation, land use constraints, and permit delays associated with expanding federal jurisdiction, as well as third-party litigation. Concerns remain about the impact of the proposed rule on the electric sector’s ability to continue to generate and transmit energy in a cost-effective, efficient, and reliable manner.

Both the House and Senate are currently considering bipartisan legislative initiatives that would require EPA to withdraw the final regulation and propose an alternative rule for notice and comment. The electric utility industry continues to coordinate with companies and states regarding potential implementation challenges, as well as with stakeholders discussing litigation options. **EP**

HIGHLIGHTS FROM THE 2015 EEI ANNUAL CONVENTION

The Edison Electric Institute's (EEI's) Annual Convention showcased the ideas and innovations that are transforming the future of the electric power sector—a future that is happening now.

The program, which began June 7 in New Orleans, delivered engaging conversations on this key topic—innovation—from EEI member company CEOs, industry thought leaders, and keynote speakers who all share a passion for powering possibilities and a commitment to advancing our industry.



Entergy's Leo Denault addresses Convention attendees.

Opening General Session

Entergy Chairman and CEO Leo Denault officially opened the Annual Convention on June 8 and welcomed attendees to New Orleans.

“There is no question that the way power is generated and delivered is changing. As we look to the future, there is no reason to believe we can't or won't meet whatever challenges come our way. It is clear that a strong, healthy power sector will be as critical in the next century as it was in the last,” he said.



Secretary Moniz highlights the need for collaboration.

New Industry Partnerships

Following Denault's remarks, Energy Secretary Ernest Moniz discussed the evolving U.S. energy landscape and the Administration's energy priorities. He also outlined the recommendations in the just-released Quadrennial Energy Review, particularly relating to grid modernization, resiliency, and infrastructure investment.

Moniz also made two exciting announcements about the energy sector's new partnerships with the Department of Energy (DOE) in the areas of workforce recruitment and fleet electrification. First, a Memorandum of Understanding signed by EEI and DOE will accelerate the deployment of plug-in electric vehicles (EVs) and charging infrastructure. The EV-Everywhere Utility Partnership builds on EEI's established record of advocating for transportation electrification.

“Today's announcement enhances the kinds of private-public partnerships needed to remain at the forefront of advanced vehicle technologies that reduce our emissions and provide safe, reliable transport for the American people,” Moniz said.

In addition, Secretary Moniz announced that DOE will partner with EEI and a number of government agencies and utility industry groups to form the Utility Industry Federal Agency Workforce Initiative, a multi-year effort dedicated to facilitating the recruitment, training, and retention of exiting service members, veterans, and their spouses into employment in the utility industry.



Tom Kuhn and Secretary Moniz sign on to the EV-Everywhere Utility Partnership.



JB Straubel, Elon Musk, and Ted Craver talk about the future of energy.

Tesla’s Energy Vision

Renowned innovator Elon Musk, CEO and product architect of Tesla Motors, shared his company’s bold new energy storage vision in a free-ranging conversation with outgoing EEI Chairman and Edison International Chairman, President and CEO Ted Craver and Tesla Motors Chief Technology Officer and Co-Founder JB Straubel. They also discussed electrification, customer needs, and the role of ground-breaking innovation in the energy industry.

Musk emphasized the importance of collaborating with utilities to achieve a sustainable future, and indicated that Tesla has been working with utilities for two years. “Where the future is going for utilities is quite positive in the long term,” Musk said. “How do we engage in a dialogue on how what Tesla is doing can be most useful to the utility industry? How do we build stationary storage technology to take things to a whole new level?”

Straubel outlined how electric vehicles present an opportunity ripe for partnership with utilities and as a source of load growth. “Making the permitting, installation, usage, and metering of EV charging easy and transparent for end customers is key to more EV sales,” he said.



TECO Energy President and CEO John Ramil accepts Tampa Electric’s Edison Award.



Ergon Energy CEO Ian McLeod accepts his company’s International Edison Award.

Edison Award Winners Exemplify Innovation

The electric power industry’s highest honor, the prestigious annual Edison Awards recognize distinguished leadership, innovation, and contributions to the advancement of the electric industry for the benefit of all. EEI congratulates Edison Award winner Tampa Electric and International Edison Award winners Ergon Energy and SaskPower.

Tampa Electric was honored for its innovative design and construction of a cutting-edge wastewater cooling and disposal system at its Polk Power Station in Polk County, FL.

Ergon earned the International Edison Award for developing and implementing the innovative ROAMES Virtual World Asset Management System, designed to improve risk management, disaster response, and safety performance while reducing costs and enhancing its customer service and value proposition.

SaskPower earned the International Edison Award for its pioneering work at its Boundary Dam Integrated Carbon Capture and Storage (CCS) Project, which launched in 2014 as the world’s first CCS process on a coal-based power plant using post-combustion technology.



Tom Kuhn, Tom Fanning, Nick Akins, Chris Crane, and Pat Vincent-Collawn discuss the industry's goals and challenges.

EEI Elects New Leadership

On June 9, EEI's Board of Directors elected Nick Akins, chairman, president and CEO of American Electric Power, as EEI Chairman for the 2015-2016 cycle. Also elected were four vice chairmen: Tom Fanning, chairman, president and CEO of Southern Company; Chris Crane, president and CEO of Exelon Corporation; Pat Vincent-Collawn, chairman, president and CEO of PNM Resources; and Greg Abel, chairman, president and CEO of Berkshire Hathaway Energy.

"Nick has been an invaluable member of our leadership team, and his wealth of experience and strong leadership will be of tremendous benefit to the industry during this exciting time of change," said EEI President Tom Kuhn. "I would like to extend our sincere gratitude and thanks to outgoing EEI Chairman Ted Craver for his leadership, vision and contributions during this transformational time for our industry," he said.

Kuhn also praised the vice chairs who will be supporting Akins as part of EEI's leadership team, calling Fanning, Crane, Vincent-Collawn, and Abel an "exceptional team of executives and industry leaders with a strong passion and commitment to the electric power industry."



Convention attendees talk with *FIRST* Robotics teams.

their robots and discuss how their participation in *FIRST* is preparing them for careers in the engineering and technology fields. Helping America's youth reach their full academic and career potential has been a longstanding priority for the energy industry. CEWD programs and partnerships provide students with unique opportunities, mentoring, and motivation as they make their journey from the classroom to the workplace.

The CEWD member sponsors include: Ameren, Consumers Energy, DTE Energy, Duke Energy, Edison International, Exelon, MidAmerican Energy, National Grid, NextEra Energy, Pacific Gas and Electric, and Southern Company.

Get into Energy/Get into STEM

Throughout the Convention, EEI and the Center for Energy Workforce Development (CEWD) highlighted the industry's new Get into Energy/Get into STEM program. Under this initiative, 11 CEWD member companies sponsored *FIRST*® Robotics competitions and the *FIRST*® Tech Challenge. CEWD's support for *FIRST* (For Inspiration and Recognition of Science and Technology) provided funding at the national, regional, and local levels for onsite robot doctors and charging stations during the 2015 national and super-regional competitions and covered registration fees for more than 180 new *FIRST* Tech teams.

Two industry-sponsored *FIRST* Robotics teams were on site at the Convention to demonstrate

Electricity Matters

This year's 11 Electricity Matters breakout sessions provided invaluable insights on the opportunities and challenges facing the electric power industry. Attendees participated in panel discussions and interactive Q&A with dozens of EEI member company CEOs, senior executives, industry thought leaders, and other key stakeholders.

PPL Corporation Chairman, President and CEO Bill Spence moderated the "Approaches to Grid Security and Resiliency" panel. Utility and industry leaders discussed specific actions the electric sector is taking to improve grid security and resiliency.

During "The Role of the Utility in the Evolving Distribution Grid," company leaders, regulators, and consumer advocates highlighted the role of the utility in four areas—planning; design and operation; infrastructure enhancement; and customer education and protection.

The "Complying with the EPA Clean Power Plan" session noted how new and innovative technologies can quickly change a state's strategy for complying with the new rules. "Things may be different in 2025 than they are in 2020. So there is flexibility that comes into the equation with time as well. Give us some time to assess customer impacts and absorb new technologies," said Gerry Anderson, chairman and CEO of DTE Energy.

In "A View from the EEI Leadership," EEI Vice Chairmen Nick Akins, Chris Crane, and Tom Fanning, and outgoing EEI Chairman Ted Craver shared their insights on the future of the integrated grid. Dominion Resources Chairman, President and CEO Tom Farrell moderated the discussion, which also touched on transportation electrification and distributed generation. "Our industry in the future is going to be around optimization and efficiency, around relationships with the customer as a trusted advisor," said Akins.

In "Microgrids and More—Integrating Diverse Resources into the Grid," panelists discussed some of the critical questions surrounding the future of microgrids and emerging distributed energy resources. Who should pay for them? Who should own them? What role will storage play? How can these technologies best be managed to ensure affordability, reliability, and safety?

Other Electricity Matters sessions explored Utility Investments in Energy Storage; Innovative Products and Services to Meet Customer Needs; Electrification—Utilities Leading the Charge; Leading the Solar Growth Engine; Competing for Talent: Building the 21st-Century Workforce; and Shaping the 21st-Century Power Grid.



David Petraeus sits down with Nick Akins to talk about the changing energy landscape.

military career and his experience leading the Army in Iraq and Afghanistan.

In addition, he offered some thoughts on the changing energy landscape in the United States, fuel diversity, cybersecurity, and the need for infrastructure investment.

The conversation between Akins and Petraeus concluded a full agenda of headline-making speakers and thought-provoking topics at this year's Convention. Mark your calendars for next year's EEI Annual Convention in Chicago, June 12–15. [EP](#)

Wrap-Up

The EEI Annual Convention wrapped up with remarks from new EEI Chairman Nick Akins and former CIA Director and decorated general David Petraeus at the Closing General Session.

Akins thanked outgoing EEI Chairman Ted Craver for his outstanding work in leading EEI over the past year, and welcomed incoming EEI Vice Chairmen Tom Fanning, Chris Crane, Pat Vincent-Collawn, and Greg Abel.

Petraeus talked with Akins about the significant global challenges facing countries and organizations today, including ongoing international security issues, macroeconomic trends, energy policy, and strategic leadership in the 21st century. He also reflected on his distinguished, 37-year

Challenge Festival Highlights

THE BEST IN TECH INNOVATION

EEI sponsored the Challenge Festival in May, a week of events focused on finding the best ideas for global impact in education, energy and sustainability, health, and transportation and cities. The festival culminates in the Challenge Cup, where more than 70 entrepreneurs compete for \$650,000 in prizes and investments for their transformational businesses. The Challenge Festival is hosted by 1776, a business incubator that focuses on startups looking to break into these fields.

EI President Tom Kuhn opened the Challenge Festival's Energy and Sustainability Day on May 12. He discussed the importance of collaboration among innovators, saying, "Today's Challenge Cup reinforces what can happen when innovators gather. Those of you here today are not only today's innovators—but also our partners of tomorrow."

PG&E Chairman, CEO and President Tony Earley delivered the keynote and discussed how innovation is changing the electric utility industry. "We're at the beginning of what I believe is going to be a golden era of energy innovation," Earley said. He then reinforced the idea that innovation itself is only part of the equation, touting the value of integration and collaboration. "The reality is that all of these new technologies are far more powerful and far more valuable when they're connected,"

Earley said. "The companies that are going to be successful are the ones that reach out and develop robust partnerships."

EI Executive Vice President of Public Policy and External Affairs Brian Wolff served as a judge for the Challenge Cup and also penned an article for *The Hill* highlighting the opportunities and challenges presented by incorporating technology into the electric grid. [EP](#)



EII President **Tom Kuhn** and PG&E Chairman, CEO and President **Tony Earley** at the Challenge Festival Energy and Sustainability Day in Washington, DC.

Behind the Scenes of the Challenge Festival with 1776 Co-Founder Evan Burfield

What is the Challenge Festival and why is it important? From Austin to Amman and from Boston to Berlin, we've traveled the globe over the past six months to find the world's most audacious entrepreneurs working to develop ground-breaking solutions to big, intractable problems that affect us every day. The Challenge Festival is where it all comes together—with the top startups in the world coming to DC to spend a week connecting to the intellectual, social, and financial capital that will enable them to grow, scale, and, ultimately, excel.

Evan Burfield is the co-founder and co-CEO of 1776, where he works with startups around the world to tackle important challenges in areas like education, health, energy, transportation, and cities.



Radiator Labs Wins Energy Category

Dan Swartz

Radiator Labs, which won the energy category of 1776's 2015 Challenge Cup, converts old cast-iron radiators into smartphone-controlled heaters using patented technology. The solution, called The Cozy, is a drop-on, retrofit cover for radiators. Residents can control the temperature of their radiator-heated apartments without opening their windows. Across the country, those open windows—and subsequently wasted heat—cost \$7 billion every year, equating to roughly 40 billion pounds of carbon dioxide emissions.

Radiator Labs' secret sauce isn't just The Cozy's patented design; it's data—and that's the domain of Meg Sutton, Radiator Labs' chief data scientist. Sutton, whose background is in climate science, has developed algorithms to help building owners and supervisors manage their buildings' heat.

"Our target right now is fully installing on the building level," Sutton said. "With the value proposition of saving energy, we can do our best work in full building installations where we have more control."

Radiator Labs can combine information about the temperature in each tenant's apartment, the boiler itself, and overall energy use to help redirect heat to the coldest spaces in the building. However, the big vision is to move into energy storage and demand management.

That vision also caught the eyes of judges at the Challenge Festival—Radiator Labs beat out 19 energy entrepreneurs from around the world. Radiator Labs now becomes a 1776 portfolio company and receives a \$100,000 investment from the 1776 seed fund.

Other energy finalists included BaseTrace (technology that enables companies to better find leaks and trace them back to their original fluid source), Strauss Energy (Nairobi startup that has developed specialized solar roof tiles that could facilitate solar energy in East Africa), and EcoEnergy Finance (clean energy distribution network currently bringing power to about 10,000 off-grid people in rural Pakistan).



Radiator Labs Chief Data Scientist **Meg Sutton** pitches her company at the Challenge Festival.



The **1776 Challenge Festival** in Washington, DC, where more than 70 entrepreneurs from around the world competed for \$650,000 in prizes in four areas, including energy and sustainability.

Improving the Business Customer Experience

BY DAVID HELLIWELL

Perhaps the biggest and most exciting change unfolding over the next several years for electric utilities is the increased focus on customer engagement. Customers have more choices than ever to manage their energy-cost drivers, and they're demanding more personalized energy solutions.

The success of leading customer engagement companies like Amazon can serve as a compass for utilities, and many utilities are already applying similar techniques to their own customer service operations. Ultimately, leveraging customer data is the key to better understanding and engaging a highly diverse business customer market.

On top of managing customer needs, utilities constantly juggle competing system and business issues: complying with new mandates and regulations, managing grid constraints, and integrating new smart grid technologies and distributed energy resources into the grid are just some of their priorities. And it all has to be done while keeping electricity safe, reliable, and affordable for customers.

Companies also consider energy management to be vital to their financial competitiveness, and large business customers want their utilities to be good partners that communicate effectively and deliver on their commitments.

Business end users want to manage their energy spending, and they have more choices than ever to do so, but they need help with decoding the vast array of options to make the right decisions. The choices for buying energy are becoming broader by the year. In fact, some surveys have shown that business customers would buy electricity from an alternative (non-utility) provider like Google, Honeywell, or

David Helliwell is vice president of utility solutions for EnerNOC.

Comcast if they could. This makes it imperative for utilities to continue to improve customer satisfaction and secure their customers' loyalty.

Many customers see "energy advisor" status as being an important building block to establish trust with their utility. If utilities can provide customers with an enhanced experience and help them to make informed energy management decisions, utilities can become their trusted energy advisor.

Of course, business customers have long been considered a valuable asset, but their diversity as a segment has historically made them difficult to serve effectively and cost-efficiently. Large commercial and industrial (C&I) customers tend to be energy-savvy, and

The success of leading customer engagement companies like Amazon can serve as a compass for utilities, and many utilities are already applying similar techniques to their own customer service operations.

their energy-sensitive processes and sophisticated needs require high-touch support and custom solutions. On the other hand, small and medium enterprise (SME) customers demand personalized

engagement and easy-to-implement, cost-effective actions. So what does the path forward look like?

Winning the Customer Engagement Race

The top companies for customer satisfaction in the United States come from a variety of industries and frequently include the following household names: USAA (insurance and financial services), Amazon (retail), Chick-fil-A (fast food), and Publix (groceries).



Many companies, including Southwest Airlines, leverage customer data to improve satisfaction and the overall customer experience.

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A leader in customer engagement, Amazon offers highly tailored solutions based on each customer's unique preferences, suggestions on what to buy next, and infallible complaint resolution strategies.

The companies that make this list share two common characteristics in their approaches to superior customer service. First, they excel at conducting customer interactions day-to-day, providing customers with reliable assistance for basic service demands. It's fair to say that many utilities and energy retailers do this, and do it well.

The second characteristic is what many companies lack, regardless of industry: the next-level customer engagement that companies like Amazon provide. Amazon, for example, offers highly tailored solutions based on each customer's unique preferences, suggestions on what to buy next, and infallible complaint resolution strategies, all of which make Amazon a top player when it comes to customer engagement. This is all possible because of the e-commerce giant's access to customer data.

By tracking a customer's previous purchases and what's on his or her wish list, Amazon uses its technology to guess what a site visitor might like and customizes the browsing experience

with the help of its customers' data. Its "One-Click Buy" feature also makes it simple for customers to get exactly what they want, with zero hurdles to overcome. Amazon is a clear example that companies not only can excel in the customer experience department, but redefine it entirely.

Amazon is certainly not the only leader in this space. Many companies leverage customer data to improve satisfaction and the overall customer experience. Southwest Airlines, for example, leverages a similar personalized communications approach, mining social media data to offer custom deals tailored to individual customers. This leads to better conversion rates with customers clicking to and purchasing their customized deals, and to increased satisfaction.

This social media data mining for better customer satisfaction is a strategy that many business-to-customer organizations are embracing, and it presents opportunities for utilities as well.

In stark contrast, companies at the bottom of the customer satisfaction rankings are missing the mark on meeting even the most basic of customer needs, let alone delivering the personalized services customers are demanding.

Cable, health insurance, and rental car industries, among others, are not known for their customer service, which might indicate that they don't heed the insights that customer data might present to them. The real reason for lackluster efforts to satisfy customers is often an absence of competitive motivation to improve service.

Companies at the bottom of the customer satisfaction rankings are missing the mark on meeting even the most basic of customer needs, let alone delivering the personalized services customers are demanding.

The Path to Happier, More Engaged Customers

There are many steps utilities can take on the path to better customer engagement. Listening to customers, taking actions to meet their demands, and communicating about the changes made because of their feedback can help any organization improve its customer experience and increase trust.

Engaged customers are satisfied customers, and satisfied customers trust their utilities. Communication is essential for improving customer engagement, and customer data have the potential to improve utilities' communications by leveraging the personalized insight they provide.

► *Use your customer data.*

Customer data come in many forms from across the utility: real-time, historical interval, third-party, utility customer information systems, tariff, and customer profiles. Utilities already are making significant investments to get better meter readings from their customers, but smart meters also provide access to a wealth of data and an opportunity to improve a utility's return on its investment by leveraging that data for purposes beyond creating more accurate bills and estimating grid capacity. Many customers expect personalized advice on actions they can take to reduce their bills, and this advice has great potential to improve the overall customer experience.

► *Make every customer feel like a VIP.*

Personalized communications and online services that help customers analyze their energy use to find relevant offers and services not only improve utilities' cash flow through cross-promotion, but also show customers that their utility wants to help them succeed—and improve their bottom line.

Not all business customers are equal, and many have different needs when it comes to their level of energy insight. Where SMEs need clear and simple recommendations on how they can improve their energy use, larger C&I customers may want to dive deeper into their data and analyze where they can be doing better. It's no surprise that overall satisfaction

is usually highest among industrial business customers, since these massive energy consumers typically have a dedicated key account manager who helps them solve problems and explore further opportunities for savings.

It is not economical to provide every business customer with a dedicated account manager, but simply opening the door and providing actionable and relevant insight are steps in the right direction.

► *Invest in technology.*

Companies at the top of the customer satisfaction rankings invest in technology that enables them to be successful. Many utilities also are leveraging technology to improve their ability to better understand and engage their customers, especially those in the hard-to-reach SME segment and valuable large C&I population. These utilities have made a commitment to investing in technology as the engine of their customer

service strategies—proving that cost-effective engagement is possible.

Ramping up the customer experience to Amazon's standards is possible over time. Technology

typically is the backbone of great customer experience tools, and providing energy management programs and self-serve products that are available on all of today's communication

devices will help to provide better service than customers have ever experienced or expected before.

Leveraging data also is a great approach for utilities to better understand their customers and their needs, and it empowers utilities to provide personalized, tailored communications and content to one of their most important stakeholders: business customers. With a bit of hard work and investment, utilities could soon be providing an experience that rivals other leading customer service industries. **EP**

With a bit of hard work and investment, utilities could soon be providing an experience that rivals other leading customer service industries.



A Custom Approach for Improved Utility Incentives

BY HOLLY CARR

Grocery stores seek to deliver convenience to their customers. However, this convenience—large-scale refrigeration, open refrigerated cases, industrial cooking equipment—also causes the sector to struggle with energy management.

The Department of Energy (DOE) created the Better Buildings Challenge in 2011 to showcase energy leadership and to share energy efficiency solutions with building managers, investors, and local communities across the country. (See the sidebar, “Better Buildings Challenge.”) One key way the program does this is by sharing “implementation models,” which serve as playbooks for

energy efficiency approaches that can be replicated by others.

Better Buildings Challenge partner Whole Foods Market created such a playbook because it was grappling with how to fit the complex nature of its infrastructure into existing utility incentives. The company realized that with a willing utility partner, Eversource Energy, and a strong, comprehensive plan, it

The incentive was a simple fixed rate per annual KWH saved, which allowed Whole Foods Market to aggressively combine a variety of grocery-specific measures that work in concert to save significant energy.

essentially could design a “build your own incentive” program that achieved significant energy savings and worked for its sector-specific needs.

Whole Foods Market’s Energy Capital Upgrade project for 20

stores across the North Atlantic region began in 2010 with about 500,000 square feet of building space and has increased every year since then. Together, the utility/grocery team achieved an estimated 7 million kilowatt-hours (KWHs)—or about \$1.2 million—in annual energy savings. The lessons learned from the collaboration can be applied to utilities across the country and to other sectors with specific operational needs or constraints.

Think Outside the Box

Despite the availability of utility incentive funds, many incentive dollars go unclaimed, particularly in the commercial building space. For example, an E-source review of 2012 non-residential incentive program budgets for 24 U.S. utilities revealed that 45 percent of incentive components went unspent.

One issue is that many standard incentive offerings do not apply to grocery stores. They often are categorized in specific groups—for example, motor replacements or one-for-one equipment change-outs. When this happens, the large-scale view of overall energy reduction is often lost.

Holly Carr is a fellow in the Building Technologies Office of the Department of Energy.



Whole Foods Market

Whole Foods Market worked with Eversource to develop a grocery-specific incentive package to address both new construction and existing buildings.



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The 2014 Conference was a resounding success with more than 38 utilities and energy companies representing more than 20 countries in Asia, North and South America, and Europe. This year's conference will deliver state-of-the-art panels with Asia's most recognized industry and financial

players. They will present their perspective and outlook on critical issues, including:

- **Dynamic Growth Centers: Indonesia and India**
- **LNG 2030**
- **Renewables 2030**
- **Carbon: Resurrection or Retirement?**
- **Barriers to Financing: Challenges and Opportunities**
- **Risk: The New Frontier**
- **Market Reform: What's Working, What's Not**
- **Asian Investment in European and North American Energy**

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True to its mission, Whole Foods Market wanted to pursue a more holistic approach. It examined how different systems interact and impact each other's energy use, while always considering operational schedules.

Eversource worked with Whole Foods Market to create a streamlined, custom utility incentive that allowed for more flexibility to fully explain proposed measures, energy savings calculations, and equipment and engineering details. The incentive was a simple fixed rate per annual KWH saved, which allowed Whole Foods Market to aggressively combine a variety of grocery-specific measures that work in concert to save significant energy. Eversource achieved demand reduction across its territory in 20 buildings that commonly house high-use energy customers.

"We are excited by this custom approach, which allows us to be an active partner in achieving more energy savings and leveraging more incentive dollars," said Kathy Loftus, global leader of sustainable engineering and energy management for Whole Foods Market. "All of this helps us achieve faster paybacks and move on to the next efficiency project."

Partner Like You Mean It

A true partnership between utilities and commercial enterprises is needed for successful "build your own incentives" programs. In this case, mutual trust and collaboration were built through more standard incentive projects, which led to continued communication between the two parties. One of the most important outcomes of this relationship was expedited review.

Eversource developed a custom application form for Whole Foods Market, which can be used by customers who are not applying for the standard incentive offerings. The easier application and streamlined

approval process enabled Eversource to reduce the waiting period by 3-6 months. A reduction in waiting time meant that energy efficiency projects were able to hit the ground earlier, meaning even deeper energy savings.

Industry-Specific Everything

Every industry has its own way of doing business—from the equipment it uses, to its hours of operation, and its needs for employee comfort and customer service.

Whole Foods Market noted that many energy conservation measures that utilities incentivize focus on commercial office spaces, overlooking the specific needs of the grocery industry. So Whole Foods Market worked with Eversource to develop a grocery-specific incentive package to address both new construction and existing buildings. Those industry-specific technologies and strategies included:

- ▶ LED lighting upgrades for refrigerated cases, walk-in coolers, sales areas, and garage/parking lot lighting;
- ▶ anti-sweat heater controls for refrigerated cases;
- ▶ strip curtains for walk-in coolers and freezers to help mitigate cold air spill;
- ▶ various refrigeration system improvements and replacements; and
- ▶ control systems for HVAC equipment, including specialized kitchen ventilation.

For a grocery store, sub-meters are essential for tracking energy use in specific parts of the store (such as the produce display, kitchen, stock room, and checkout). Through sub-metering, Whole

In total, Whole Foods Market invested \$4.3 million, received more than \$1 million in utility incentives from Eversource, and achieved estimated annual savings of more than \$1.2 million in energy and maintenance costs from the upgrades.

Foods Market was able to see that controls upgrades resulted in the deepest cuts in annual energy and maintenance expenses—more than \$309,000 across 13 stores. It found that the highest annual energy savings,

more than 200,000 KWH, were due to a refrigeration system replacement in one store. However, sub-metering across portfolios is an expensive proposition for most enterprises.

"We knew it was important to sub-meter systems in order to accurately track savings and receive alerts if our savings were not being sustained," said Loftus. "Some utilities require sub-metering to begin an energy efficiency program, but do not fund it. We believe that sub-metering should be funded initially, even partially."

Share Results, Share Solutions

Through this model, Whole Foods Market was able to implement Energy Capital Upgrade projects throughout the North Atlantic region, resulting in tremendous savings—an annual reduction in KWH consumption of 17.8 percent. In total, Whole Foods Market invested \$4.3 million, received more than \$1 million in utility incentives from Eversource, and achieved estimated annual savings of more than \$1.2 million in energy and maintenance costs from the upgrades.

As a Better Buildings partner, Whole Foods Market has committed to sharing these results and the solutions it pursued with Challenge partners. This sharing should allow more commercial enterprises and utilities to take advantage of proven tactics to increase energy efficiency, lower energy bills, and reduce greenhouse gas emissions. Whole Foods Market is currently working with other utilities around the

Eversource developed a custom application form for Whole Foods Market, which can be used by customers who are not applying for the standard incentive offerings.

country to create similar structures to the one brokered with Eversource.

Communicate Scale of Impact

As more and more consumers are scrutinizing the actions taken by corporations and utilities to reduce greenhouse gas emissions, communicating tangible outcomes is more important than ever. And as Whole Foods Market has shown, focusing on holistic outcomes, rather than just the tactics, can lead to additional flexibility in executing more energy efficiency upgrades. Combined, the result is a better story about increased impact.

One new way that DOE is ensuring that this information gets to the right people is its Solution Center—a new

Better Buildings Challenge

When President Obama launched the Better Buildings Challenge in 2011, he stated that the energy to operate the buildings in which we work, shop, study, and live costs the United States about \$200 billion annually, accounting for a significant portion of our nation's energy use and greenhouse gas emissions.

So far, more than 250 organizations have taken the Better Buildings Challenge, representing more than 3.5 billion square feet of building space across diverse public and private sectors. These participants are on track to save 2.5 percent annually. By sharing their solutions publicly, partners are showcasing what is possible when it comes to energy efficiency savings.

web portal that will make it easier for partners in the same sector or in similar funding situations to find proven models that worked well for other parties. The

site also will showcase projects where partners share real-life case studies using cutting-edge energy efficiency approaches to individual facilities. **EP**



Whole Foods Market was able to implement Energy Capital Upgrade projects throughout the North Atlantic region, resulting in tremendous savings—an annual reduction in KWH consumption of 17.8 percent.

Utilities Partner on Energy Storage Projects

The transformation of the electric power grid is underway, and utilities are leading the charge. As technology is interconnecting millions of consuming devices, flexible distributed energy resources, and back-up generation, the grid also is enabling a wide array of leading-edge technologies and innovations, including electric vehicles, energy storage, and microgrids.

In keeping with this commitment to innovation, a number of utilities already have announced plans to work with Tesla on the Powerwall, a rechargeable lithium-ion battery designed to store energy at a residential level for load shifting, backup power, and self-consumption of rooftop solar power generation. Other utilities will offer a commercial solution called Powerpack (available in 100-kilowatt-hour battery blocks) that allows businesses to reduce peak demand charges, shift energy-consumption profiles, and participate in available grid markets.

“We are excited to work with a cutting-edge company like Tesla to help create a market for battery storage systems,” said Ron Litzinger, executive vice president of Edison International and president of Edison Energy. “The ability to store energy in batteries by both residential and commercial customers is key to expanding the nation’s use of clean renewable power.”

Southern California Edison (SCE), an Edison International subsidiary, is working with Tesla on two demonstration projects that can help reduce the cost of battery storage systems for residential and business customers. These demand-response demonstration projects will test communication capabilities and explore rebates to customers who allow SCE to manage their battery charging in order to increase the use of renewable energy while ensuring continued grid reliability.

Green Mountain Power (GMP) will be one of the first energy companies in the country to offer the Powerwall to customers. “The Powerwall offers greater energy independence for customers and offers GMP an opportunity to reduce peak demand on our system, which saves our customers money,” said GMP President and CEO Mary Powell.

“This is a great example of how GMP, as Vermont’s Energy Company of the Future, is empowering customers to have more control over their energy choices while saving money and increasing reliability.”

Southern Company Chairman, President, and CEO Tom Fanning recently announced that his company has reached an agreement with Tesla to test

commercial-scale battery storage. By bringing together two companies with a shared commitment to innovation, the agreement will provide for the examination of potential applications for the energy storage technology in helping to meet customers’ energy needs.

Many other utilities are planning energy storage projects in the future, including AES, Consolidated Edison, Duke Energy, Entergy, Oncor, Pacific Gas &

Electric, San Diego Gas & Electric, and Tucson Electric Power. In fact, GTM Research expects the United States to deploy 220 megawatts (MW) of energy storage in 2015—11 percent of which will be behind the meter.

In 2014, nearly four gigawatts of large-scale utility solar capacity were installed. And, Entergy New Orleans will soon build the city’s first utility-scale solar project that not only harnesses the power of the sun, but stores it as well. The 1-MW project will consist of more than 4,000 solar panels and is estimated to be in service by late 2016.

“As part of our resource planning process, we are committed to studying and evaluating renewable energy resources that make sense for the customers and city we serve,” said Charles Rice, president and CEO of Entergy New Orleans. “This project will allow us to study the feasibility of utility-scale solar here in New Orleans and also the extent to which battery storage can help compensate for the intermittency of sunlight.” **EP**

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Power Export	120-240 volts 14.4 kW @ 2x30 amps
Li-on Batteries	23 kWh
Battery Voltage	350 Volt
Milage <small>Based on 60 miles a day</small>	100 MPG

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