JUNE 2017

PUBLIC UTILITIES FORTNIGHTLY

"In the Public Interest"

Tom Kuhn, Kevin Fitzgerald
Rudy Wynter, Paula Glover
Peter Terium, Jim Laurito
Mike Caranfa, EnAct
Jane Lewis-Raymond

David Owens Makes His Mark

First Recipient of PUF's Owen Young Award

In PUF, Impact the Debate

PUBLIC UTILITIES FORTNIGHTLY
"In the Public Interest"

We return to twice monthly. The mid-month digital PUF 2.0 debuts June 12.

June 2017 • Volume 155, No. 6

The cover of May's PUF featured the last drawing of Thomas Edison facing left. This cover of June's PUF features another great of our industry, David Owens, facing right. David, executive vice president of the EEI, retires this month and is the first recipient of *PUF's Owen Young Award*.

Industry Sage David Owens Retires

Honoring Him with Our First *PUF's Owen Young Award*

BY STEVE MITNICK

I first met David Owens in the mid-eighties. At the time, I was surprised the Edison Electric Institute had an intellect like David on staff. Expected an industry association to be a lobbying group, mainly, with member services mixed in. I had a lot to learn.

During my four decades in the industry, EEI has been a vigorous debater in the many scrums about utility regulation and policy. It has sponsored thorough research and offered detailed recommendations. Depending upon where you sit, you might have agreed or disagreed with its positions. But you likely found the work rigorous and well-considered. And you likely observed that David was the driver for the work and its eloquent spokesman.

Indeed, David has been the industry's debater-in-chief. This month, uncharacteristically, he's decided to put down the mic for good.

You also likely observed that David exuded passion for helping people and the public, through his intellectual prowess. All while he practiced compassion, religiously, with both proponents and opponents of his positions.

There are hundreds, nay, thousands, who would tell you a story about how David took the time (when he seemed to have little), touched them with his caring, and made a difference in their careers, in their lives. Did he touch your career and life too?

One always hears how tireless David has been. How he constantly travelled to talk, to listen, to persuade, to be persuaded. Though I believe that David was everywhere – from NARUC conferences to board rooms – because he wanted to be everywhere. Because he wanted to learn all he could learn about utility regulation and policy, and to teach all he could teach.

The Public Utilities Fortnightly team considered how we could honor David. We do so by selecting him as the first recipient of *PUF's Owen Young Award*, for devoting his powerful intellect to the public interest.

> **David has been the industry's debater-in-chief.**

Owen Young was general counsel of General Electric, GE, when he founded our company Public Utilities Reports in 1914.

Young was working with the National Civic Federation to develop and submit to Congress model legislation on utility regulation. The often-drastic inconsistency from state to state troubled both utility leaders and regulators:

"Of more immediate concern was some means of simplifying, or keeping abreast of, the diverse laws and regulations affecting the burgeoning public utilities. As power systems crossed state lines, which was rapidly becoming the rule rather than the exception, the multiplicity of jurisdictions to which these natural monopolies were subject was not merely an annoyance; it was a source of confusion to investors and »

Steve Mitnick is Editor-in-Chief of *Public Utilities Fortnightly* and author of the book "Lines Down: How We Pay, Use, Value Grid Electricity Amid the Storm."


WHAT IF
you could achieve sustainable
results in an ever-changing market?
Our expertise in customer engagement,
grid modernization, advanced automation
and cost reduction can increase revenue
and improve performance.
At Navigant, we help
turn what if into what is.
Consulting | Outsourcing | Advisory
Visit Navigant.com/energy
NAVIGANT
PROFIT FROM EXPERIENCE

management, and so, too often, of public suspicion. [Young found] the situation profitable to no one save the politician in search of an issue…"

From *Owen D. Young and American Enterprise*, by Josephine Young Case and Everett Needham Case, David R. Godine Publisher Inc., 1982.

The initiative, to have Congress enact national model legislation on utility regulation, ultimately failed:

"… The next best thing was to provide a guide for utilities and investors in the form of case reports on state laws and relevant decisions of the courts and public service commissions."

From *Owen D. Young and American Enterprise.*

Public Utilities Reports was thus founded. After a few years had passed, the first Public Utilities Fortnightly was published. Young's college roommate, Clifford Spurr, was made its first editor-in-chief, my first predecessor.

Soon after, Young led both the electricity and telecommunications industries as chairman of GE and of the Radio Corporation of America, RCA. He later, at the request of the president of the United States, engineered the settlement of Germany's World War I reparations.

To make the list, *PUF's Top 40 Innovators*, in sum, you need to be a David Owens.

And, as one of the nation's most famous and respected personalities, Young was expected to become president of the United States in 1932. He declined to run, in favor of his friend Franklin Roosevelt.

David Owens also was a friend of a president of the United States. When you ask David what's his proudest professional achievement, he'll cite his leadership role in the response to the devastation of Hurricane Sandy at the request of President Barack Obama and EEI president Tom Kuhn.

The Public Utilities Fortnightly team honors David in a second way. We're starting a new annual list, *PUF's Top 40 Innovators*. Debuting in November's Public Utilities Fortnightly, we'll announce our selections of the forty most innovative influential thought-leaders in utility regulation and policy in 2017.

We'll be issuing the criteria shortly, the specs that will guide our picks. That will support our analysis of the greatest thinkers and doers in utility regulation and policy.

But, to make the list, in sum, you need to be a David Owens. A powerful intellect that's impacting the course of our industry.

Coming up with the list should be a blast. And you have a key role. Send me your nominations, to mitnick@fortnightly.com. Tell me why John Doe or Jane Smith ought to be in *PUF's Top 40 Innovators*.

Did they reset how we thought about regulation and policy? Did they make you want to hear them out? Did they change your mind?

Did they reshape our industry's future?

Were they like Owen Young? Were they like David Owens? PUF

DESIGNS ON THE FUTURE

Building tomorrow's transmission grid

datcllc.com

Well-designed transmission projects give utilities flexibility as they determine which energy resources can help meet energy demand for decades to come. Sound transmission infrastructure can serve as a springboard for next-generation energy technologies.

With more than 160 years of combined experience designing transmission systems that are reliable, efficient and resilient under stress, Duke-American Transmission Co. has the knowledge and experience to build the grid of the future. We design unique systems with tomorrow in mind, making us a powerful partner for transmission development.

A POWERFUL PARTNER

DATC

DUKE American Transmission Co.®

Letters to the Editor

Response to Mitnick RE: *Cold Hard Truths*

The Times, They are a-Changin'

A response to the May 2017 From the Editor by PUF Editor-in-Chief Steve Mitnick

In the May 2017 From the Editor column and other online columns, Steve Mitnick outlined the constraints facing those who would rely on wind and solar generation for most of their electricity supply. He also outlined the problems with electricity storage. The column can be seen at the PUF website, www.fortnightly.com.

Ed Smeloff takes issue with Mitnick's presentation of those problems.

By Ed Smeloff

Back in the 1970's, concepts like flexible demand and distributed generation wouldn't have meant much to electric utility managers or their regulators. Energy storage in the form of batteries powered flashlights and transistor radios, not cars or computers. Today, these cool concepts have materialized into hard technologies that are disrupting the way electricity is provided and consumed.

Constraints that were once thought to be immutable are giving way to information and communications technologies that are empowering consumers, improving the operation of power systems and expanding awareness of network use.

Widespread understanding of the consequences of climate change, right now and for future generations, has motivated many younger and not-so-young Americans to push for a low carbon future. This convergence of idealistic aspiration and technological advancement should be seen as an opportunity for those in the electricity business.

The accelerating growth in the use of wind and solar power generation across the U.S. has been nothing short of amazing. In 2016, more than half of the twenty-four thousand megawatts added in the U.S. came from renewable sources. There are now more than one million residential solar installations nationwide.

States like Iowa, Kansas and Oklahoma are big exporters of wind energy and could export more, with added transmission. California's investment in solar is driving regionalization of the transmission system operation across the west. Companies like Microsoft, Apple, General Motors and Walmart are setting off on their own to procure renewable resources in a more open market.

Many utilities are adapting to a future with many more variable output resources connected to the grid. Rural electric cooperatives are now paying customers for the right to use their hot water heaters as energy storage systems. San Diego Gas and Electric and Southern California Edison are piloting large-scale electricity storage as an alternative to leaky underground gas storage.

Companies as diverse as Google and WeatherBug are going beyond smart thermostats to provide automated real-time control of energy demand. Some electric utilities are again recommending all-electric homes as safer, healthier, more environmentally friendly and better for the grid.

On the other hand, utility regulators in many states are recognizing the increasingly important role of distributed energy resources.

> Regulators in many states recognize the increasingly important role of distributed energy resources.

There is one cold hard fact that has surprised some utilities and regulators. Businesses are figuring out how to produce more goods and services with less electricity use. And consumers are using less electricity with increased comfort and security.

Electricity productivity, according to the Energy Information Administration, has increased by fifty-eight percent from 1990 to 2015, which is more improvement than in any other advanced economy in the world during that period. We are getting more from less.

This declining rate of growth in electricity use has raised concerns about the profitability of parts of the electric industry. That challenge has prompted short-term responses like the introduction of demand charges for residential customers that reduce utility risk, but introduce barriers to longer-term innovation. It has also spawned interest in out-of-market solutions to preserving nuclear power, such as the award of zero-emission credits in New York and Illinois.

They are beginning to set in place a framework of market prices and regulated charges to create a balanced portfolio of cost-effective resources, both centralized and distributed.

Vote Solar expects the interplay between the aspiration for a low carbon future, market and technological innovation and fair regulatory treatment of past utility investments will unfold state-by-state.

A more active and informed citizenry, involved in plotting electricity's path forward, isn't a cold, hard truth. It's a good thing. PUF

Your strong opinions are most welcome. Send them to mitnick@fortnightly.com. We'll publish the best. Letters typically range from 200 – 700 words but can be lengthier.

Ed Smeloff leads Vote Solar's regulatory team. Vote Solar is involved in regulatory activities in twelve states. He is the author of "Reinventing Electric Utilities: Competition, Citizen Action and Clean Power."

Xcel Energy®
RESPONSIBLE BY NATURE®

Delivering solutions for smart, sustainable cities

Public-private partnerships explore emerging energy storage technologies, build expertise, and inform plans for a shared energy future.

Inspired by the success of its Fujisawa Sustainable Smart Town just outside Tokyo, Panasonic Corporation is spearheading development of a North American showcase sustainable city in Denver. The operations hub for Panasonic Enterprise Solutions serves as the anchor for the smart, mixed used development and Xcel Energy is one of several partners helping to bring the living lab to life.

"Today's customers want more choices when it comes to renewable energy, as well as tools and technology for managing their own energy use," said Jerome Davis, Xcel Energy regional vice president of Customer and Community Affairs. "Our goal with this project is to provide a foundation for how to efficiently manage more renewable energy on our system, provide our customers with more choices, and create a blueprint for a wired and smart city infrastructure."

Named Peña Station NEXT, this eco-inspired neighborhood and its next generation technology will be powered largely by renewable energy. The transit-oriented development will also feature all-electric driverless shuttle buses and other intelligent mobility solutions. Street lights have already been outfitted with LED bulbs and connected with an internet of things networking technology to monitor and control the lighting. Visitors and residents are linked to the city's downtown, airport, and nearby communities by an electrified light rail station.

"Our aspiration is to build one of the smartest, most sustainable developments by combining clean energy solutions, smart mobility solutions, and smart buildings," said Peter Bronski, head of marketing for Panasonic CityNOW. "When you package it all together, you see a comprehensive set of solutions in one place and a 21st century 'live, work, play' experience."

One of the early initiatives underway is the development of a microgrid energy storage solution. As the price of battery storage continues to fall, Xcel Energy has been working directly with customers to closely study and evaluate this emerging technology.

The battery storage system will support grid operation and manage the integration of renewable energy sources into the power supply. The system will be powered by two solar arrays—a smaller solar array on top of the building and a larger, 1.6-megawatt carport solar installation in the parking lot. Construction of the carport solar array and the storage system, featuring a lithium ion battery, is under way and will become operational in the spring of 2017.

The battery storage system will help Xcel Energy better manage voltage and flicker issues caused by solar energy, potentially finding ways to accommodate more customer-sited solar power onto the grid. In the event of a power outage, the battery will automatically switch to a microgrid mode and provide backup power for specific defined functions within Panasonic's facility.

The two-year battery demonstration project is part of Xcel Energy's Innovative Clean Technology program, which was approved by state regulators and encourages tests of emerging technologies with potential to lower greenhouse gas emissions and provide other environmental benefits. It is also a component of the company's multi-faceted Our Energy Future plan, which is focused on powering technology, powering the local economy, and empowering customer choice.

"Our goal with this project is to provide a foundation for how to efficiently manage more renewable energy on our system, provide our customers with more choices, and create a blueprint for a wired and smart city infrastructure."

Jerome Davis, Xcel Energy regional vice president of Customer and Community Affairs

David Owens Makes His Mark

David Owens sitting with United States Energy Association's Chairman Vicky Bailey at the recent national conference of the American Association of Blacks in Energy.

First Recipient of *PUF's Owen Young Award*

Kudos by Tom Kuhn, Jim Laurito, Hilda Pinnix-Ragland, Kevin Fitzgerald, Ralph Cavanagh, Paula Glover

While an elementary school student in inner city Philadelphia, David K. Owens heard President John F. Kennedy's dramatic call for the U.S. to put a man on the moon. It changed the course of David's life. The young boy was attracted to math, science, engineering, and the idea of aiming high.

As an adult, Owens' career became a moon-shot ascension within the electric power industry. He rose from a challenging childhood to become one of the most respected voices in the electric power industry and a leader at the Edison Electric Institute, the industry's largest trade association.

In the process, he achieved many accomplishments, from shaping the modern response to storm disasters and cyber threats to mentoring and leaving a legacy of talent. He is responsible for policy innovations that will influence the industry for years to come.

Owens, sixty-eight years old, will retire in June as executive vice president of EEI, an organization he joined in 1980. In many ways, he has been a public face of EEI for decades, especially for regulators.

In a sign of the influence and respect he commands, Owens has received a send-off that is a tribute to both what he has done and how he's done it, as a skilled and thoughtful consensus builder.

Upon announcing his retirement, Owens received a standing ovation from the EEI Board of Directors. Separately, more than a thousand regulators gave him a standing ovation at the National Association of Regulatory Utility Commissioners' winter meeting in Washington, D.C.

"David is really a unifier," said EEI President Tom Kuhn. "He's a consensus builder, and he knows how to bring people together. He can be very persuasive." If he has a weakness, Kuhn quipped, it may be excessive modesty. "But it's hard to call humility a fault," he added.

Owens was raised by his mother and grandmother in Philadelphia. He started at the University of Pennsylvania but transferred to Howard University in Washington, D.C. for the more hospitable atmosphere at the historically black university.

He earned Bachelors and Masters of Engineering degrees at Howard; later he earned a Masters in Engineering Administration degree at George Washington University in Washington, D.C.

Owens started his career as a design and test engineer at General Electric and at Philadelphia Electric Companies. Then, in an experience that helped him understand the perspective of regulators, he worked at the Federal Power Commission, helping to evaluate proposed power plants. Later, he worked at the Securities and Exchange Commission, where he served as chief technical officer.

Owens joined EEI in 1980 as director of rates and regulations, representing the industry in public hearings. He advanced rapidly to senior director, vice president, senior vice president, then executive vice president. He was the first African-American to serve as an officer at EEI.

As executive vice president, Owens has been Kuhn's right-hand man and confidant since Kuhn became president of EEI in 1990. "*Our* incredible run" is how Kuhn described the last twenty-seven years. "There's an incredible chemistry, and I think we have similar judgment on issues. We provide a sounding board for each other," Kuhn said.

Owens set the stage for an industry moving into the modern era of electricity competition, smart grids and fuel diversity.

Sometimes, the colleagues have thrown cold water on each other – literally. In 2014, Owens dumped a bucket of ice water on Kuhn as part of the ALS Ice Bucket Challenge. Kuhn returned the favor by challenging Owens to be drenched by ice water as part of that fundraising phenomenon.

Owens' diplomatic skills played a key role in keeping EEI together through a time of turmoil. In 1992, the Energy Policy Act forced the industry into a major restructuring. "It was a very, very turbulent time," Kuhn said. "People were talking about the breakup of EEI at that point."

Owens helped the industry and EEI emerge stronger than before. He set the stage for an industry moving into the modern era of electricity competition, smart grids and fuel diversity. The increased policy cohesion and influence of EEI over the last quarter century can be significantly attributed to Owens' persistence with elected officials and regulators in state capitals and in Washington, D.C.

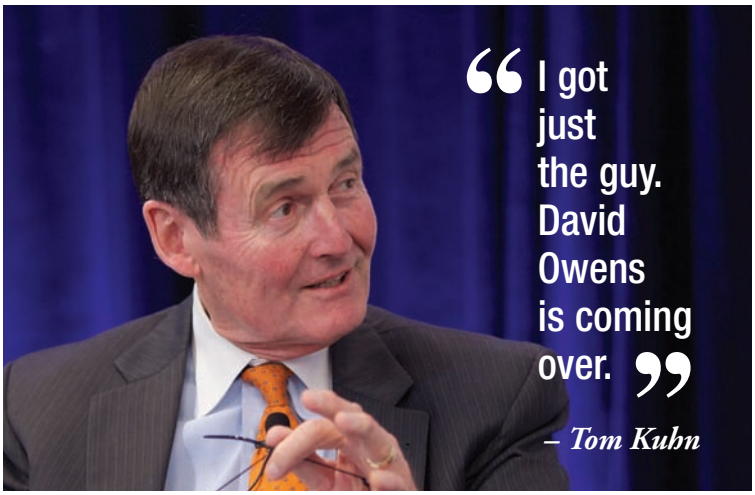
He has testified many times before Congressional committees, appeared more than fifty times in state capitals, lectured at universities, made hundreds of presentations to business groups, and has been quoted countless times in the news media. He has made more than a dozen appearances on C-SPAN.

"He is incredibly articulate and makes fabulous presentations," Kuhn said. "He leads on issues. He's probably led this industry on every major issue we've faced."

Superstorm Sandy may be the greatest example of Owens' ability to define a problem and get diverse groups to coalesce around a solution. As the devastating storm approached the

Northeast in 2012, the White House asked if EEI could send someone to the Federal Emergency Management Agency to improve coordination on the ground. "I got just the guy," Kuhn said. "David Owens is coming over."

Owens embedded with FEMA and set out to turn conflict into cooperation. He worked long hours, sometimes sleeping on a cot at FEMA's command center. The result was a new level of industry-government cooperation that extended far beyond the Sandy recovery effort.



Today, the lasting impact of Owens' efforts can be seen in the establishment of a permanent Electricity Subsector Coordinating Council for storm recovery and cybersecurity. In public policy, Owens helped embed the idea that, in a storm disaster, electric company workers are first responders, not adjuncts. They need to be involved in decision-making, because getting the power back on is what the public needs immediately.

"David will take on a challenge any time," Kuhn said. "It was a monumental time.

We established a partnership that everybody now says is incredibly important for storm recovery and cybersecurity."

On economic issues, Owens' role has been equally important. He's worked relentlessly to improve the public policy climate to make the electric power industry an attractive investment. Because of his deep technological knowledge, Owens foresaw how energy grid modernization, the digital world, and environmental policy would change the electric power industry.

He got out in front on grid modernization issues, so the industry could be prepared to pursue smart grids, clean energy, customer solutions, and much more. As Owens put it at a recent conference, "I wouldn't say we're in a period of transition. I'll say we're in a period of transformation."

Leading is not always easy, especially when views by companies, regulators and the marketplace can be at odds. Because he has a heart for other people, Owens has a great ability to influence others. He's beloved by EEI staff and beyond, because of the personal interest he has in individuals.

He rose from Philadelphia's inner city to the top of his profession. Owens has spent enormous amounts of time helping others succeed. He served as chair of the board of trustees of IDEA Public Charter School, where he and the board successfully restructured the struggling school over three years to become one of the top performing public high schools in Washington, D.C.

In March, City Year presented Owens with its Idealist of the Year award for his work with the school. He has also served on the Board of the National Academy of Sciences and as chair of the National Institute of Standards and Technology's Smart Grid Advisory Committee.

Owens' efforts have earned him the industry's most prestigious awards. The American Association for Blacks in Energy twice awarded him its highest honor, the James E. Stewart Award, and later its Chairman's Cup for outstanding service on energy policy.

The Women's Council on Energy and the Environment gave Owens its Champion Award for mentorship of women in the industry. This year, he won the John D. Dingell Award from the National Labor and Management Public Affairs Committee for advancing the mutual goals of organized labor and the electric power industry.

"David cultivates people. He mentors people. That's inspiring," Kuhn said.

As for retirement, Kuhn says Owens' golfing ability is a bit weak, but he does have a great family and young grandchildren who he can mentor in his free time. ❍

Jim Laurito

By Steve Mitnick with Jim Laurito

Jim Laurito, EVP, Fortis: I've known David for probably close to fifteen years, through my work on the Edison Electric Institute Board of Directors. I first went on the board back in early 2003, and David was the first to stretch a hand out and make me feel very welcome in the organization.

At the time, I was just coming into the electric industry as CEO of New York State Electric and Gas and Rochester Gas and Electric, two subsidiaries of Energy East Corporation, and really didn't know anyone in the industry. David reached out to me and walked me through the chairs, which is a typical David Owens move. I've always appreciated that from him. We've been great friends.

PUF's Steve Mitnick: You used the term, "through the chairs."

Jim Laurito: I would say he got me to understand EEI, how it operates. Who the people were in the organization, how to leverage the organization in order to get the maximum benefit for us as a member company, and he also helped me meet the other directors.

EEI is a large organization with probably close to fifty directors from all walks of the industry, co-ops, generation companies, and the large vertically integrated companies.

He made me feel at home. Even though we weren't the largest company in the industry, he made me feel like our voice was as important as anyone else's.

PUF's Steve Mitnick: And it seems like you two did things over the years together.

Jim Laurito: We did. We worked on a variety of projects. Mainly I would say under two umbrellas. One, regulatory. Any time there were technical considerations of a complicated nature, you could rely on David to help you understand the issue and help the company position its strategy.

The second umbrella is innovation. David thinks out on the cutting edge. Not of what utilities are doing today, but where they should be in the future.

He traveled to St. John's, Newfoundland and Labrador a few years ago to speak to our board of directors at Fortis Inc. regarding the utility of the future. That was a very important discussion for our board to hear. With utilities all across Canada, the United States, Caribbean, and Central America, we're literally doing business from tip to tip to tip of the whole North American continent.

We see so many different types of regulatory jurisdictions and we have board members from all walks of life across that geography. It was very important for them to hear David's view on the utility of the future.

A lot of the more innovative and cutting edge developments were happening in a couple of parts of the United States where we have operations: namely New York and Arizona. He explained these innovative technologies and their potential impact to our board. Along with the regulatory and business implications for your companies. You need to make sure you understand it, engage in it, and embrace it because it's coming towards you.

It was a classic David Owens presentation. Very candid. Very passionate. Very forward-looking. Our board really appreciated it.

PUF's Steve Mitnick: He's been around for a while and has touched so many people.

Jim Laurito: When I think of David, I think of a few different adjectives for a guy like this. David's breadth of experience is so broad. I see him as a visionary. I see him as extremely dedicated. A really hard worker. Committed to everything he does.

He's always prepared. In fact, he over-prepares for things. David is very passionate about what he does, but at the same time, when he looks at other people, he is very compassionate as well.

He is very driven by the things that he does in his personal life: on the philanthropic side, on the social side. Extremely candid, which is very hard to find, especially in an industry association, where at times the associations want to placate the members. David is very candid with the members, yet he's very grounded and authentic.

He is a tireless advocate for the industry. I mean, the guy works twenty-four/seven, three hundred and sixty-five days a year. He's been in the industry a long time, yet he's a catalyst for change. He is always pushing companies to think in different ways. When we get into a discussion with David, the discussion is very provocative. He is always trying to push you to think

in new ways and be innovative and think about what's coming ahead, not where you've been.

Last, but not least, he's a great friend to me and just a great man. I know all the other directors in EEI feel the same way. He's known and respected by everyone in the organization. He asks the tough questions, but does it in a very professional and constructive way, as only David can.

We recently had the EEI International Utility Executive conference in Washington. We had CEOs there from all over the world. I was privileged to speak on one of the panels. Once again, in true David style, regardless of who the CEO was, he was asking the tough questions.

When you engage in a conversation with David, you can expect to be challenged in a very intellectual way. I always say, when you sit down to have a discussion with David, you better be ready because he always brings his "A" game.

But again, he does it in the right way and that's why he's so well respected throughout not just the industry, but throughout Congress and the Department of Energy. He's on a first-name basis with everyone and it's because he's earned their respect over the years.

There's only one David Owens that comes around in your lifetime in an industry like this. He's left an indelible mark on it. While I think he is making the right decision to move into other things that he wants to focus his time on, we will sorely miss him.

PUF's Steve Mitnick: Can you remember anything funny about David?

Jim Laurito: I think one of the things I would say is classic David. I didn't find out about this until after the fact, but it happened when I had him come speak to our board a few years ago. It was our biggest board meeting of the year in the summertime in St. Johns, Newfoundland and Labrador.

I called David up and said, "David, I really need a big favor." He says, "Sure, what?" I said, "Well, David, you know, we have this strategy session at the board. We're really looking to educate and inform our directors about the utility of the future.

We have people coming from all over the North American continent who want to get a better understanding of what's happening in New York and I really need somebody to level set them on where the future is." He said, "Sure. I'd be happy to. No problem." I said, "Okay, great. I'll send you the dates and we'll see you there." You know, classic David, "I'm there."

David, as you know, is on the road probably five days a week. So to him, this was just another road trip, right? Unbeknownst to me, he hangs up the phone, he gets my email, and he goes to his assistant, Kim, and he says, "I'm going off to talk to the Fortis Board about this in St. Johns, Newfoundland and Labrador." She says, "Where?" He says, "St. Johns, Newfoundland and Labrador." She says, "Where is that?" He says, "I don't have a clue. I have no idea where that is."

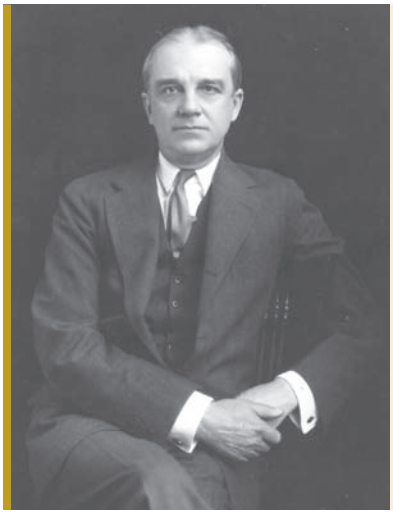
How was your trip David? He said, it was quite an experience.

That starts a trickle-down series of events where David has to figure out how to get himself from Washington, D.C. to a part of the world he never even knew existed. Lo and behold, I don't know any of this is going on because he's not whining to me about it, but we get up to the board meeting and I have dinner with him the night before and I said, "So how was your trip here, David?"

He said, "It was quite the experience. First, I had to figure out where on the map Newfoundland and Labrador were. We had to figure out whether there was a way to get there from where I started out. And then it took me a day and a half to get here, but I'm glad to be here."

We had a good laugh over that because that's classic David. He's just dedicated, committed. He'll commit to it before he even knows he can do it.

This issue of PUF will be a great tribute to him. He deserves it. ❍



David Owens is the first recipient of *PUF's Owen Young Award*, for devoting his powerful intellect to the public interest. Owen Young, pictured here, founded our company Public Utilities Reports and led both the electricity and telecommunications industries in the early twentieth century as chairman of General Electric, GE, and the Radio Corporation of America, RCA. He later engineered the settlement of Germany's World War I reparations and was expected to become president of the United States in 1932, but didn't run in favor of his friend Franklin Roosevelt.

Hilda Pinnix-Ragland

By Steve Mitnick with Hilda Pinnix-Ragland

Hilda Pinnix-Ragland, former VP, Duke Energy: I have known David for much of my career, working with him through the American Association of Blacks in Energy and with several energy organizations. His family, like mine, is originally from North Carolina. We both served on the board of AABE for almost 15 years.

Even though we have rotated off the board, we remain actively engaged on the Executive Advisory Board. For this new advisory board, David is a critical leader with a wealth of energy expertise. He is joined by several prominent leaders, including Dave Velazquez, CEO and President of PEPCO Holdings.

We have a great group of visionary and strategic leaders who are focused on advancing the overall mission of AABE. We are building on forty incredible years where everyone is committed to leaving a legacy.

PUF's Steve Mitnick: Did you and David have a role in making the organization as great as it is?

Hilda Pinnix-Ragland: Of course. Both of us are mission driven to make an indelible impact.

To make sure all customers understand energy and the various opportunities such as jobs, supplier diversity, and regulatory policies. We gave the organization our leadership, vision and strategic skills in addition to execution skills. While I was Chair, and even afterwards, David was Chair of the Policy and Legislative committee. He remains on the committee and is instrumental with significant issues.

PUF's Steve Mitnick: I suppose that you and David probably feel that the work of AABE is hardly done and there's still a long way to go. Can you talk a little about how you feel about it and how David might feel about that too?

Hilda Pinnix-Ragland: David has incredible public affairs acumen. He was responsible for convening the team that authored many of AABE's current policies and white papers. In essence, David did what AABE originally set out to do 40 years ago. If there was an opportunity to make sure LIHEAP, net metering or any other initiative continued, David led that effort.

He strongly believes people of color who are economically challenged must have representation at the table. He was instrumental in making the case with state and federal government in addition to the electric utilities.

If there were new regulators or even exiting regulators who needed to have more insight into the industry than they thought they possessed, David was sensitive and eager to share information. It's making sure we share what we value. Of course, he provided a comprehensive and neutral perspective.

David often educated Members of Congress on energy. He shared the pros and cons as well as the challenges with respect to all people.

PUF's Steve Mitnick: A lot of people feel that David touched many lives and had a big impact on the industry.

On the right, Pinnix-Ragland enjoying the recent American Association of Blacks in Energy national conference. With Gayle Lanier, SVP, Duke Energy.

Hilda Pinnix-Ragland: Oh, without a doubt. I think there's much more work to do over the next forty years with AABE. To really take it from where Clarke Watson and the founders started to another level of excellence and inclusion. Without AABE, we would not have LIHEAP or advancements in net metering, new meter technologies, or many other initiatives. ❍

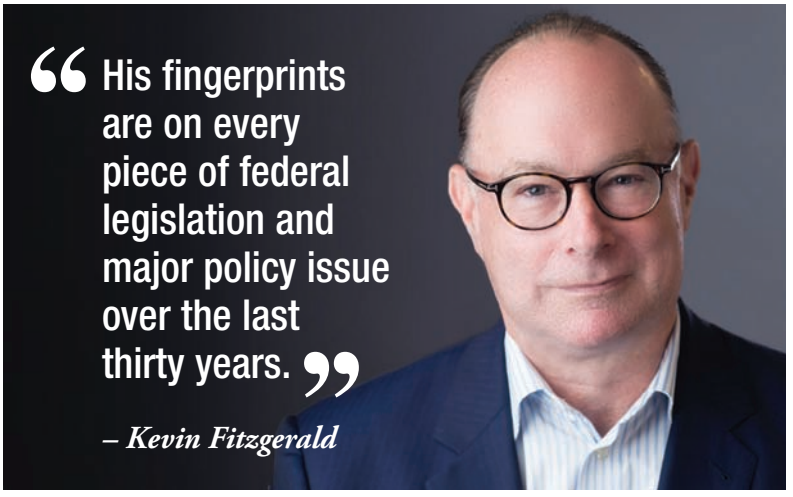
Kevin Fitzgerald

By Steve Mitnick with Kevin Fitzgerald

PUF's Steve Mitnick: When did you first meet David?

Kevin Fitzgerald, Chief Utility Officer, Energy Impact Partners: The first time I met David Owens, he was sitting on Ray Dacek's couch having a conversation with "Dr. Dacek." Ray was senior partner at Reid and Priest and an industry legend.

As a junior lawyer, I was asked to sit in along with a senior associate, Greg Nelson (now GC at Ameren), and listen to a new issue that David and EEI were analyzing. The issue – tax and regulatory matters associated with normalization – was complex.



David jumped up from the couch, grabbed my hand, and said, "So you're the ball player! Nice to meet you, grab a seat and listen because we have a big ball game in front of us."

He was fired up. And after twenty minutes of railing about all the horrible things that would be done to the industry if the proposed changes were allowed to stand, I found myself getting fired up too! That was David – only he could make normalization accounting and ratemaking exciting.

I then saw him weekly after that at the EEI Washington rep meetings. David always took an interest in what I was working on, or what I thought about a policy issue in the industry. He always valued input, even from someone low down in the ranks like I was. That had a big impact on me – that a leader in the industry actually cared what I thought.

PUF's Steve Mitnick: Lots of people say he's touched so many lives and made such a big impact on policy in the last thirty years. How would you describe that?

Kevin Fitzgerald: His fingerprints are on every piece of federal legislation and major policy issue over the last thirty years. From the Energy Policy Act of 1992, subsequent FERC orders, retail choice matters, and RTO market developments, to the net metering debates of today, David has always been in the middle of each issue finding common ground for the industry to stay united.

As outside counsel to many different utilities during this time, I was continually amazed that David and Tom Kuhn were able to keep the industry together. But they did, and because of that the industry has survived and flourished.

PUF's Steve Mitnick: In recent years when you and your colleagues had a lot of challenges at Pepco Holdings, it seems like you were often talking during those years, too.

Kevin Fitzgerald: David was an incredible help to me and others at Pepco as we worked through our challenges. He had become a mentor of mine during my years in private law practice, and ultimately he and EEI became my client.

When I moved to Pepco, he said, "Fitz, I am just a phone call away – buzz me anytime." He was someone that I could bounce concepts and ideas off as we worked through some challenging times at the company.

David's strong and unwavering support of me and Pepco during our merger with Exelon was something I will never forget. His insight into the regulatory processes in each of our jurisdictions was uncanny. He was dead on in his predictions as to where the risks were and possible ways to get various approvals.

When everybody else on Wall Street and in the industry were saying, "The deal is dead," David kept reassuring me, "Keep the faith, Kevin, keep the faith. Stay positive. We're going to get there." Frankly, he was the only person who was saying that throughout the process. That leadership and moral support meant a great deal to me and kept me positive.

PUF's Steve Mitnick: You've made a change and now you're at this remarkable fund – Energy Impact Partners. As you were making the transition, did you talk? This was a pretty big move for you.

Kevin Fitzgerald: Yes. We did talk, and honestly his guidance and counsel had a big impact.

After the merger closed, David and EEI's Richard McMahon asked me to share some M&A best practices with the EEI CFOs. At that meeting, David bought me lunch. He knew I was mulling over an offer to take a C-level opportunity that was somewhat peripheral to the utility space.

David said, "Fitz, is that really what you want to do? You have

a lot of fire left. At Pepco, you stood up a utility-of-the-future vision that the industry recognized and embraced. Why not work on that vision and help the entire industry in the process? Don't you want that to be your legacy?"

Those words hit home. When Hal Clark (retired banker from Evercore) and Tom Fanning (Chairman and CEO of Southern Company) discussed EIP with me, something just clicked.

Joining EIP as a partner and Chief Utility Officer affords me the opportunity to work with our electric utility investors from around the globe on the evolving utility of the future, as well as the new technologies and companies that will have a significant impact on the industry.

Ralph Cavanagh

By Steve Mitnick with Ralph Cavanagh

Ralph Cavanagh, Co-director, Energy program, NRDC: I started at NRDC in 1979. David started at the Edison Electric Institute soon after. At the time, the utility sector was about as male-dominated and as non-diverse as is possible to imagine.

Look at how the cultural expectations and support structures in utilities have shifted over the years. Not just utility staff but also utility boards and utility leadership. David has been tireless in pushing forward and mentoring candidates who don't look like the people who dominated the system when he got there.

EEI has gone out and recruited more diverse board members. It has quietly, but I think effectively, made efforts to advance the cause of female leadership. And there are a lot more CEO's now, and there are a lot more senior VP's, who come from diverse backgrounds.

The overall diversity of the industry has shifted, and continues to shift. And I think a lot of people have contributed to that. Tom Kuhn has been an important force, but I think that David, over thirty-five years, has done more than anyone else.

Now, he doesn't advertise this, but it is part of his story. And he hasn't done it by going out grandstanding or denouncing anybody. He's done it by quietly working across the full spectrum of his extraordinary list of contacts.

And he finds and helps promising young people as they emerge. I have cause to know this, because he and I teach together every year at the University of Idaho in their summer program for utility executives.

It's basically billed as a daylong debate between David Owens and me. He always wins because, of course, it's his hometown crowd.

We perform that same role frequently at meetings of utilities and their customers, from the American Association of Blacks in Energy to the major regional associations.

The audiences expect us to be in conflict. Yet people generally respond favorably to what always turns out to be a civil discourse. It's clear that the debaters are listening to each other, which is rare.

We don't get up and deliver our talking points and sit down. We actually have a conversation. We've been doing that for now more than a quarter century, and for that entire time we have had the same jobs.

PUF's Steve Mitnick: It's like the Lincoln-Douglas debates.

Ralph Cavanagh: Yeah, it is a little. Now, I have to say, in these debates, there's no question as to who is Lincoln and who is Douglas.

It's the Harlem Globetrotters against the Washington Generals.

In these debates, there's no question as to who is Lincoln and who is Douglas.

That's the way the utility audiences enjoy seeing it. But I think that there has been enduring value in terms of helping them get a sense of the many bridges that can be forged between traditional adversaries.

PUF's Steve Mitnick: Why do you do that?

Ralph Cavanagh: Was it planned like that all along? No. To be fair, it started out as simply a theatrical event involving two people who both appreciate good theater. But then we discovered that we were listening to and learning from each other.

I often say that I started out in 1979 at NRDC assuming that I would spend my entire career suing the utility industry. But things have turned out differently, in part because of people like David Owens, who were interested in partnerships and in opportunities for mutual progress as opposed to an endless sequence of clashes.

I like to think that we have helped to reshape the relationship between the environmental community and the utilities sector, which was once purely adversarial and is now much more about mutual progress towards a clean energy future.

And Steve, you are in a good position to reflect on how different things are now than they were back in the late 70s, when much of the leadership of the environmental community simply defined itself in opposition to whatever utilities wanted to do.

It's dramatically different and dramatically better now.

There's been tangible progress across the board on energy efficiency, renewable energy, pollution emissions, and clean energy progress.

David has been an important thought leader in that. He spends a lot of his time going around the country to utility commission proceedings. He's frequently an expert witness. He is very active at the state level.

The typical trade association executive sits in Washington, represents the trade association and is visited by the people from the field. David goes out into the field. He's there all the time.

And as you watch the evolution of the utility sector, as you watch the emergence of energy efficiency as a utility system resource, and as you think about utilities' efforts to drive their capital budgets in the direction of a clean energy transition, he's in the middle of all that.

PUF's Steve Mitnick: You and he made an electrifying announcement in 2014.

Ralph Cavanagh: In 2014 we were coming out of a period during which the solar industry in particular and the utility industry had been at each other's throats. There were adversarial TV ad campaigns running in multiple markets.

The narrative that was emerging was one in which the distributed resource industry at large, and solar in particular, were inevitably going to be in conflict with entrenched monopolists who didn't want distributed renewable resources and would fight them at all costs.

The joint statement that we released in February 2014 made the point that utilities were essential partners in a clean energy transition. We said that utilities and distributed resources were better off working together and integrating their efforts than fighting each other.

And indeed, they couldn't achieve their joint promise if they kept fighting each other. It was a statement of optimism about the future. Technology innovation and distributed resources are not disruptors of the grid. They're not alternatives to the grid. They're grid enhancements. They should be understood as ways to make grids work better, and deliver more economic and environmental benefit. The joint statement was a commitment to work together to make all that happen. And thanks to David's prominent role, people took it seriously.

PUF's Steve Mitnick: How did it happen?

Ralph Cavanagh: David and I were part of it, but we had groups of people from the EEI staff and board, from NRDC, and from other groups with a stake in the issues, working together to try to frame these proposals.

There were contentious and difficult meetings in which people did a certain amount of shouting at each other. In the end, what made it work out was a mutual sense of possibility. We knew that we could make a difference if we were able to reach agreement.

David and I believed very strongly that there were no fundamental conflicts here, and that if we worked at it long enough, it wasn't a matter of compromising away principled differences. It was a process of identifying common interests and then figuring out how to express them in a way that everyone was comfortable with.

The discovery of common interests is the most important part of a successful negotiation. As opposed to a process where people feel like they're giving up fundamental convictions in a desperate effort to cobble something together.

It never felt like that. If you go back and look at EEI/NRDC joint statements over more than a decade now, they also helped to drive progress at the state level on multiple issues, starting with what is called decoupling, removing the link between utilities' financial health and commodity sales. We also have worked together on vehicle electrification, on performance-based regulation, on a whole host of clean energy transition issues. No one would suggest we're anywhere near done, but we were taking on, and have been taking on, the biggest issues surrounding the future of the utility business model.

David and I believed very strongly there were no fundamental conflicts.

David has been fearless in doing that, and he has a uniquely deep understanding of all the dimensions of the problem.

PUF's Steve Mitnick: Seems like you and David could write a book on art of the deal.

Ralph Cavanagh: I hope David does. He is an ideal candidate for memoir writing. The first chapter should be what he was doing during Hurricane Sandy and its immediate aftermath.

The President of the United States figured out that someone needed to be managing the emergency response on the electricity side, and picked David to bring order out of that chaos, and guide a recovery that affected tens of millions of people.

PUF's Steve Mitnick: Is there any interesting experience that you had with him that we wouldn't know?

Ralph Cavanagh: First of all, he is completely unscriptable. On that February 2014 day at NARUC he insisted, over the outraged objection of his media advisor and me and every one else, that he was going to spice things up by converting himself during his presentation into his "evil twin Skippy."

The advice we gave him was "David, if you go into your evil twin Skippy mode, that's all anyone will remember," because it's a little too theatrical and colorful. But no, he had to go ahead and do it anyway.

There is spontaneity about him, and mischievousness.

Something else about him that is unique and delightful to watch is his teaching style.

He uses many PowerPoint slides, and looks like a conventional teacher at the outset. But, within a minute or so of starting his class, he starts wandering through the room. He walks up and down the aisles, and periodically he will stop and place his hand on the shoulder of someone in the immediate vicinity, and begin an interrogation.

This keeps the entire class constantly on edge, because David's wandering around and you never know when he may reach out in your direction. And then suddenly you're having a highly public and unscripted conversation with David Owens.

Yet he doesn't humiliate people. Never. I've seen professors use variations on this technique. In law school it's called the Socratic method. It's used to intimidate and harass. But David finds a way to have a friendly conversation. You're on the spot, of course. You want to perform. And this is a way of getting the best out of a class, and keeping all the students thoroughly engaged.

It's the most compelling teaching technique I've ever seen. ❍

Paula Glover

By Steve Mitnick with Paula Glover

Paula Glover, Executive Director, American Association of Blacks in Energy: What I have always loved about David Owens is that he is authentic. He is always going to be who he is – a Philly boy.

As brilliant as he is, and he's incredibly brilliant, David is dynamic, a great mentor, a supporter and caring to so many people. He's still a young man from Philly. He had this dream and understood that if he was the best that he could be at whatever he did, big things would happen.

I think David has touched more people's lives than he will ever come to know. The fact that I get to work with him now is such a pleasure. I can remember seeing him and being amazed by the fact that an African-American man was the person being sought after. And at the same time, you can't help but be really impressed. He easily navigates an environment where he is the only one. And I've watched people flock to him, because he is truly the smartest guy in the room.

We all love him. PUF

Be A Star, PUF Short Vids

Shine bright, shine far, don't be shy. Be a star.
Where you live, where you are, shout it out, be a star.
Shine bright, shine far. Be a star.
Where you live, where you are, be a star.

Forget this was from the Disney flick you saw as a kid. Tyra Banks, model, businesswoman and – yes – star, was awesome and inspiring singing these lines.

You too can be a star. Because Public Utilities Fortnightly has introduced *PUF Short Vids*. It's the new way for you to impact the debate about utility regulation and policy. Thirty to sixty second videos where you voice your view, succinctly, visually, to our broad readership.

A colleague can take the vid on his or her iPhone. You just need to boil down your ideas to something so succinct that PUF readers, as busy as they are, will take the time to take it in.

Check out the *PUF Short Vids* that we've done. They started showing at our web site, fortnightly.com. The vids we've done were fun to do and – we hope – fun to watch (as well as thought-provoking). Our advice is, after the first thirteen, be enthusiastic. Be a star!

Just Two FERC Commissioners

We sat down with Acting Chairman Cheryl LaFleur and Commissioner Colette Honorable as their extraordinary time as the only members of FERC continues

By Pat McMurray, PUF Editor at Large

In May, President Donald Trump announced the nomination of two new commissioners to the Federal Energy Regulatory Commission. The Senate must approve the nominees, who are NARUC President Rob Powelson and Neil Chatterjee, energy policy advisor to United States Senate Majority Leader Mitch McConnell of Kentucky.

Since early February, FERC has faced an unprecedented freeze of certain major agenda items when one of its three remaining commissioners resigned, leaving just two. The agency usually has five commissioners, and typically needs a quorum of at least three to approve certain projects. FERC has never been in a situation in which it had just two commissioners until this year.

PUF's Pat McMurray met with Acting Chairman Cheryl LaFleur and Commissioner Colette Honorable to discuss this historic time at FERC.

FERC Acting Chairman
Cheryl LaFleur

PUF's Pat McMurray: What was it like when you came here, and what it's been like for the past seven years?

Commissioner LaFleur: It's really been a wonderful experience. I've been in the energy field a long time, since 1986, but when I got the call from the White House to be considered for the commissioner position in 2009, it was a surprise.

I had not even known there was a vacancy, so this is a little different than how it usually happens. When I reflect on how many changes have happened in my life in the last eight years since then, the wonderful experience being on the commission and living in D.C., and all the people I've met all around the country, it has been an unbelievable opportunity.

When I arrived here, I joined a full commission. We had four sitting commissioners, and I became the fifth. Jon Wellinghoff was chairman, and the issues that were top of mind then were demand response and transmission planning, working on the order that later became Order 1000.

There were many other issues as well, but those were two of the big ones. Since that time, I've seen and worked with seven other commissioners, and have seen a lot of changes in the industry as well as at the commission.

PUF's Pat McMurray: If you had to name the top three issues that you've dealt with over these years, what would they be?

Commissioner LaFleur: I usually start with reliability and grid security. That's been one of my top priorities from the day I walked in.

We got this authority in 2005, certified NERC as the Electric Reliability Organization a couple of years later, and when I got here, a lot of the work was still finalizing the baseline standards that were developed in response to the 2003 blackout – tree trimming, relay setting, and so forth.

We've seen a lot of changes in the markets driven by the changes in the resource mix in the country.

In recent years, our work has evolved to focus more on the emerging issues of cybersecurity – physical security, geomagnetic disturbances, electromagnetic pulse. That's been a very important body of work.

Second, the work on the competitive wholesale markets in the electric area has been another one of my big priorities.

We've seen a lot of changes in the markets driven by the changes in the resource mix in the country. The growth of natural gas, increased deployment of renewables and the environmental regulations that have taken effect in the last several years have really impacted the resource mix. We have done a lot of work to make sure that the markets fairly compensate the attributes of all types of resources, including demand response, variable resources, and storage. We have also worked to make sure that the resources that are counted on during times of system scarcity are appropriately compensated.

Third are the infrastructure cases, particularly involving gas pipelines and liquefied natural gas. With the growth of domestic natural gas, much of our production is coming from a different part of the country than it had previously, so we've seen a tremendous amount of infrastructure buildup.

To give an example of how this change is impacting our infrastructure work: when I had my hearing in 2010, we were still focusing on LNG import applications, and I prepped for questions on all the import applications at my confirmation hearing. That seemed to turn on a dime, and in recent years we have had many applications to export with all the attendant pipeline infrastructure.

PUF's Pat McMurray: The White House has declared it intends to nominate two new commissioners. There are only two commissioners sitting right now, and there is no quorum. A quorum would be three, of the five commissioner positions. Is that right?

Commissioner LaFleur: That's correct.

PUF's Pat McMurray: One of the things that I've noticed recently is, with the lack of the quorum, that many stakeholders in the industry have been anxious.

Commissioner LaFleur: Without the quorum, we did delegate some authority to staff, primarily to take actions in certain cases to protect customers and to make sure nothing went into effect by operation of law if it needed a commission order.

But, other types of things, including infrastructure projects, mergers, major changes in market rules, and hydro licenses, could not be finalized without a quorum. Normally we issue about a hundred orders a month at the Commission level, and we've issued only a fraction of that under the new delegated authority.

So, many people are eager for us to regain a quorum and be able to deal with their applications. They have commercial reasons, deadlines that they're waiting for orders, reliability, or customer service reasons that they need action from the commission.

We have a clear focus and mission, which is interstate and wholesale energy of all types, but that covers quite a bit.

PUF's Pat McMurray: What do you anticipate once you have a quorum? What's number one on your list?

Commissioner LaFleur: Well, there are a couple bodies of work that we've been preparing since I've been Acting Chairman. The first is there are many draft orders that are drafted for the commission to take up.

We will have to come up with an organization and prioritization of those, triage them if you will, because we can't expect somebody to come in and do several hundred orders on the first day. So, we are working through that to try to make sure we have a good grasp on what's been backed up, what's time sensitive and so forth.

Second, we have quite a large number of rulemakings of different sorts. Everything from proposed changes in market rules, like our price formation proposals, to a notice of inquiry on how to deal with master limited partnerships in oil and gas pipeline rates. We also have a notice of inquiry on the terms of hydro licenses, and some pending reliability standards, and many other things like that. In those cases, we're trying to ensure we've done the homework and can shape what the policy options are for the new FERC 2.0 when they get here. That's another whole body of work besides the actual draft orders.

PUF's Pat McMurray: FERC is always mentioned as one of the top places to work in the federal government and for some reason this agency always gets that kind of commendation. Why is that?

Commissioner LaFleur: This is my first government job, so I have nothing to compare it to. But first, I think it's because FERC has a clearly defined mission. We know what our job is. We know what we're about. I think that we're a very good size.

We're large enough to have a superb body of employees, but small enough that people know each other. The people doing the work know the leadership. There are some huge departments in Washington that have much bigger management issues, I'm sure, than FERC. So, I think we're very focused.

Second, we are an independent agency. We're bipartisan. We've always worked well together. We're not overtly political, and I think there's a long history of collegiality and camaraderie among the commissioners.

Third, we have excellent employees. I worked with FERC on the outside in my past life, so I knew it to be an excellent agency, but I saw it much closer up when I got to see the people here.

When I was in private industry, we heard a lot about the aging of the workforce. I know the average age in the business unit that I oversaw was forty-seven. We had an aging workforce of a lot of baby boomers.

We have a real mix here. We have a lot of employees who have been around for decades and know all the background of everything, and have amazing perspective. But we're one of the top agencies in Washington for people under thirty, in terms of the percentage. We have a great mix of employees.

And finally, I think we have a family-friendly culture. We have good policies, and that's something that is always mentioned in our surveys. That's not because we don't expect people to work very hard, but hopefully we allow some flexibility.

PUF's Pat McMurray: Is there such a thing as a typical day at FERC?

Commissioner LaFleur: Yes. We're back to typical, when we have a quorum. When I hire people in my office, I think about two thirds of the job is in some way related to the orders that we consider, the issues that we vote on.

Typical would be working with staff to frame issues and discuss how to deal with matters that come before us, reading and working on orders, and writing separate statements. That takes a good bit of our time.

Another thing that takes time is that we have a lot of meetings – almost every day we have some combination of internal meetings with staff and other commissioners and external meetings. We have people trekking in from all parts of the energy world – regulated companies, state officials, environmental groups – people who have an interest in issues before us. We do a lot of outside meetings.

Third, I do a fair amount of public speaking and travel. I try to get to different regions of the country when I can, and that's the last big part of the job, really. I think every day is a blend of those: some meetings, time with my team in between working on orders or things that are pending.

PUF's Pat McMurray: What have you done that's the most fun at FERC?

Commissioner LaFleur: What I have enjoyed the most is all the people I've gotten to know. I really thought when I was in New England that I knew a lot of people. I was so concerned about having backups of backups of my Rolodex. (I know people don't know what a Rolodex is anymore, I guess you would call it a contact list.)

But I know so many more people now, and I feel like I could just kind of parachute into any state capital city and know someone there, whom I'd actually worked with, which is wonderful.

So, as to fun experiences, when I did the Energy Bar Association funny dinner, I did Lady Giga, which is like Lady Gaga except named after a gigawatt. I dressed up like Lady Gaga and did an energy themed entertainment event. That was definitely fun. That was different. Another thing that was very cool is I threw out a first pitch in Kansas City at a Royals game and it was the year they won the World Series.

There have been some unusual events, but I love meeting with people, and there's a lot of that on this job.

PUF's Pat McMurray: FERC is known to be bipartisan. Is the Commission a model in some ways for a way in which to build a relationship with the other side?

Commissioner LaFleur: I do think we have worked in a bipartisan fashion. We certainly don't always agree on everything, either across the aisle or even just commissioner by commissioner of the same party.

And I think the fact that we have relatively few dissents reflects the ability of the staff to find the middle, the compromise, the sense of where the commission is.

One of the things that helps is that we're expressly bipartisan, so we are a bit unusual right now with just two Democrats. Normally you have only one commissioner changing each year, so there's typically a lot of continuity. We process orders over a long time, and people come and go, but there's a continuity in the work that we're doing.

I also think that we decide cases by the facts and the law, and not by ideology. So, if you are deciding by the record, that makes it easier to discuss the issues because you're discussing facts grounded in a shared understanding of the case.

FERC Commissioner
Colette Honorable

PUF's Pat McMurray: You're here at a very historic time for FERC, when there are only two commissioners. The full complement is five commissioners. Three commissioners would constitute a quorum, which legally you need to transact business. What's it been like working without a quorum?

Commissioner Honorable: It's an interesting time. Some have thought that maybe we are twiddling our thumbs and that certainly isn't the case. It's been very busy, but it's been a different sort of busy.

By way of context, if you think about the number of orders that FERC issues in a year, even with a full complement of commissioners, the commissioners themselves only issued a third of those orders.

Even under preexisting delegated authority, our staff, which is very capable and experienced, issued about two-thirds of those orders. So, before we lost the quorum, we issued an order delegating authority to staff in limited circumstances.

It gives them additional authority to hear uncontested settlement agreements and make decisions about those. Also, to make decisions on certain uncontested waiver requests. It extends the time in certain circumstances such as with certain mergers or acquisitions for the commission to act.

We felt we could authorize them to suspend tariffs and set matters for hearing, and to basically maintain the status quo in most circumstances. But we also wanted to vest them with authority where we felt we could under the law, to hear certain matters that were uncontested.

PUF's Pat McMurray: Is the key word uncontested?

Commissioner Honorable: That's an important part of it because we recognize that the buck stops with us, the commissioners. We certainly didn't want to put our staff in the position of hearing matters that were contested or that we didn't believe we had the authority to delegate to them.

Before we lost the quorum, we issued an order delegating authority to staff in limited circumstances.

So, I believe that folks in the sector would find that we were very careful with the issuance of this order delegating authority, and it was very limited.

PUF's Pat McMurray: What comes up to your level and chairman LaFleur's level? Is it only the contested issues?

Commissioner Honorable: No, it's not only contested issues. Those matters are still being prepared and orders are still being drafted for our review.

We still receive the orders – we just can't issue them. So, we have quite a backlog to consider. We receive matters of all sorts regarding mergers and acquisitions, issues associated with the operations of markets, enforcement issues, and certain reliability matters. We also receive a number of contested matters.

I should also mention that so much of the work that our administrative law judges carry out under the direction of our Chief Administrative Law Judge Carmen Cintron is still continuing.

They are able to have hearings and complete a full record, issue orders and the like. We have a number of ways in which our work here is still continuing.

Our enforcement bureau is still very active and working diligently on ensuring that markets are free from manipulation. Our work in the Office of Electric Reliability is continuing.

Our work with regard to oversight of energy infrastructure security is also continuing.

I could go on and on. But there are a number of issues that we can't hear, and the commissioners can't decide until we get a quorum.

I think the one that gets the most attention in the public domain is our work regarding special projects.

We hear applications for projects such as hydropower facilities, interstate gas pipelines, and liquified natural gas terminals, but we cannot issue those orders until we get a quorum.

PUF's Pat McMurray: Do you hold open meetings?

Commissioner Honorable: No, we do not. In order to conduct deliberations regarding official commission business, a quorum is required and since we don't have one we're not able to have open meetings.

I'm really proud of our staff. So much of this work in the interim has fallen on their laps, so to speak. We've had a hydropower workshop in the last few weeks. Our staff has prepared an agenda for a two-day technical conference, focusing on the operation of wholesale energy and capacity markets and the intersection with the development of state energy policy.

I can assure you that it will be power packed. I want to compliment our team which put together an incredible agenda. We were able to offer input, but it will be led by our senior staff.

As you know, there are a number of very challenging issues associated with this growing tension, with the operation of markets and the work that states will continue to undertake in shaping their own respective energy futures. So I'm looking forward to the meeting.

[NOTE: This technical conference was held on May 2 and 3, 2017.]

PUF's Pat McMurray: FERC is one of the best places to work in the federal government, according to a poll I saw recently.

Commissioner Honorable: We have an incredible team of almost fifteen hundred employees here at FERC. They are our colleagues. And we are very proud of having won awards consistently for several years in a row now.

We have been ranked in the top five for the best places to work. I believe we're number four for mid-size federal agencies, and we are again in the top five for the best places to work for millennials.

That's really important in this work because it's very technical. So you need people who have the ability to stick with a project over a period of time, because these issues are very challenging.

But I have to speak for a moment about the strong collegiality of the commissioners and their team members who work here. It's very important to me, and I know that it is for my colleagues, that we work well together.

We don't always agree, but it's important that we remain agreeable even when we aren't all on the same page. We work very hard, and I want to compliment Chairman LaFleur and also my former colleagues, who really demonstrated that it's so important that we work well together.

The simple fact is so much of our work has nothing to do with politics. Yes, we arrive here through what some may call political means. We are appointed by a president who is of a particular party and confirmed by the Senate.

But most of our work we can do without referencing a political affiliation or an ideological perspective. We can work on infrastructure investment that has neither a Democratic or Republican slant, nor independent for that matter. I think we can all gather around that and focus on what's important to ensure that we have the necessary infrastructure.

We can also make sure that fuel shows up when it's needed and that energy is moving the way that it needs to when it's needed.

Our work regarding reliability and resilience of the grid, certainly knows no political affiliation. We all want the grid to be strong and secure. We are all focused on affordability.

The difficult thing is the fact that we are all leaders and we do tend to come here with some experience in the sector. So, we may have a certain idea or two about how that should be done. Or how that end goal could be accomplished.

That's where the hard part comes in, so it's important that we protect this precious and valuable asset that we have in our ability to work together.

PUF's Pat McMurray: Are there some big decisions or big issues that stand out as landmarks for you?

Commissioner Honorable: There are probably several. One is our work with regard to transmission as it's evolving. It's very significant as it relates to infrastructure development. I'm really proud of that work.

Our work with regard to market oversight is significant. We've been working on a price formation effort that has really driven our approach to looking at operator action, for instance, and ensuring that markets are not only operating as intended, but that we are providing market participants with certainty and transparency and building confidence in markets.

(Cont. on page 68)

Energy People:

Rudy Wynter

We talked with Rudy Wynter,
President and COO, FERC Regulated Businesses
and New Energy Solutions, National Grid

By Steve Mitnick, with Rudy Wynter

Rudy Wynter oversees electric transmission and generation, liquefied natural gas storage, and gas transmission pipeline investments at National Grid. With over 25 years of experience in the utility sector, Wynter has held positions in customer operations, strategic planning, engineering, and operations.

PUF's Steve Mitnick: Rudy, what do you do in your job?

Rudy Wynter: At National Grid, we meet the energy needs of about 20 million people across the Northeast every day, 24/7. We power virtually every aspect of their lives at home, at work, and everywhere in between. It's an awesome responsibility and one we take very seriously.

I oversee the parts of our U.S. business that are regulated by the Federal Energy Regulatory Commission, including our electric transmission system and a fleet of generators that supply power to customers of the Long Island Power Authority.

I also oversee a group we call New Energy Solutions. It's focused on developing and launching innovative solutions and technologies on our energy networks to deliver value to our customers and communities.

It will help get us to a sustainable energy future.

It's a fascinating time to be in the energy industry. Everything is changing: how we make and move energy, even how we use energy. At the same time, customer needs are changing just as dramatically. Customers want more and more choice and control; many want decarbonized energy; some want to generate their own power; others want more data and information about their energy use. We need to understand what our customers will want down the road, what the future energy landscape will look like, and then build solutions to navigate that transition and help create that future.

Our customers will be our guiding light every step of the way.

PUF's Steve Mitnick: Some people say the utilities are off on the side watching these developments, and that those new companies are going to drive this transition. Where does National Grid stand?

Rudy Wynter: We're right at the heart of that transition and we need to lead it. We're developing new ways of working, revolutionizing our business model, embracing new technologies and promoting new partnerships. We are doing pilot projects that will help us understand what our customers want and what technologies are available or can be designed to meet their needs.

To provide value for the customer, we're finding that more and more often we need to partner with new technology and service players.

PUF's Steve Mitnick: What are your top initiatives?

Rudy Wynter: We've got some key priorities for our distribution and transmission networks, but our number-one guiding principle is that the customer comes first.

We firmly believe that if customers have the right information, the right tools, and the right incentives, they will make better energy decisions. That's one of the concepts we're testing in our pilots.

We're finding more and more, we need to partner with new technology and service players.

We also know we must innovate like never before across the whole grid. The generation mix is shifting to cleaner power sources and distributed forms of energy, so we must make sure that the grid evolves to keep pace with these changes.

We're managing the variability that's inherent in these new forms of energy so the grid can continue to deliver power safely and reliably. At the same time, we're evaluating how we can leverage these new distributed resources to provide other services, such as voltage support, to our grid.

In addition, we're talking to policymakers, regulators, and other stakeholders about potential changes to the current regulatory model, to keep pace with the sweeping changes afoot in the industry. It's important that there are new compensation models that support the investing, testing, and experimenting of these new technologies, as well as the evolving role of the traditional utility.

PUF's Steve Mitnick: If the regulatory model isn't made more optimal, what will the negative effects be?

Rudy Wynter: I think if we really want to achieve the scale of change we want on the grid, the regulatory model must be part of the equation. We really need a combination of technology, a more flexible and smart grid, an updated utility business model and a regulatory framework that accommodates these changes. None of these things alone is the silver bullet to create the energy future we think customers want.

PUF's Steve Mitnick: What are you doing out there to advance your goals?

Rudy Wynter: On the transmission side, we're using UAVs and robotics to enhance our existing inspection and maintenance capabilities. We have about 9,000 miles of transmission, some of which is in remote and rugged areas. These new tools will help us get better access to and data from lines that are challenging to reach by land or even by helicopter.

We're also adding sensors and monitors so we can create a more dynamic grid. It will be better equipped to handle new renewable and distributed generation by giving us real-time information.

That means we can make proactive decisions that will increase reliability.

And we're beginning to deploy substation automation and online monitoring to help us do predictive analyses that are difficult to do quickly today. Those will give us better situational awareness and a holistic view to make better-informed decisions. This all translates to customer benefits in the form of enhanced reliability, resiliency and cost savings.

On the distribution side, we have our Smart Energy Solutions pilot in Worcester, Massachusetts, which includes about eleven thousand customers. The pilot customers received a smart meter and options to see and understand how they use energy.

They also were given the option to receive alerts for time-of-use rates in advance of "peak days," periods of extremely hot or cold weather when demand spikes. On peak days, we encourage customers to conserve energy. It's an opportunity for them to save money and use energy differently.

This pilot is about figuring out what it takes to get customers to change their behavior around how they use and manage energy.

PUF's Steve Mitnick: Do you have any information yet on how people will respond?

Rudy Wynter: The response to the pilot has been very positive. Customers could opt out of the program, and to date our retention rate is about ninety-eight percent. Our surveys also show that customer satisfaction is very positive. Perhaps best of all is that these customers saved about $1.8 million on their electric bills in the first two years of the program. We're currently rolling out a similar pilot in Clifton Park in upstate New York.

There's still much opportunity in this area, including the data services that are being provided by many start-up companies. They are working with the utilities to find out what it takes to really motivate consumers to use energy differently.

PUF's Steve Mitnick: I suppose you could get an app, but maybe it's too hard to do that at this point.

Rudy Wynter: It's an interesting thought and you raise an important point. We're used to just thinking about residential, commercial, and industrial users. Now we've got to think about segments and sub-segments of those customer groups that behave differently and want different solutions from their utility. Some customers just want their energy delivered at a fair price and want to leave everything else to us. In the pilots, however, we're seeing that there is a segment of customers that want to actively engage in managing their energy usage if it's simple for them.

It's important that there are new compensation models that support these new technologies.

PUF's Steve Mitnick: What's the reaction from regulators?

Rudy Wynter: They know our focus remains on delivering safe and reliable service; that's paramount.

They are reaching out to work with us to develop innovative ideas and approaches to optimize the safety, security, resiliency, and reliability of our energy networks. Especially how we can innovate to help customers save money.

We've been very successful in getting those in-market pilots funded because we develop them collaboratively with the regulator, including setting mutual expectations of what we want to learn over the life of the program.

PUF's Steve Mitnick: It sounds like you've become a tech company instead of a utility. Is that a good business to be in?

Rudy Wynter: It's a great business to be in and we believe technology will continue to play a major role for utilities going forward.

PUF's Steve Mitnick: Why is partnering so important?

Rudy Wynter: It goes back to the customer. Most customers want a one-stop shop for all their energy needs. In some cases, it will make sense for us to add new capabilities to our core business to meet customer needs; in others, it's more efficient and makes more sense to partner with a company that specializes in a particular technology so we can meet the needs of a subset of our customers.

The unregulated side of the company is also partnering with emerging technology and distributed energy companies. They can gain insights into how they work with customers and the technologies themselves. For example, National Grid's Business Development group has a joint venture with Sunrun, one of the largest residential solar companies in the United States.

The partnership includes a pilot in downstate New York to determine if co-marketing rooftop solar with the existing utility leads to greater uptake, and whether the cost to acquire customers comes down. We're also going to work with Sunrun to evaluate the feasibility of aggregating distributed resources to provide grid services.

PUF's Steve Mitnick: Is National Grid well suited for all this cutting-edge tech stuff?

Rudy Wynter: Absolutely. We know better than most that the grid must be modernized to keep meeting the needs of our customers, and while we don't have all the answers, we do know we'll continue to work with regulators and the market to find innovative ways to deliver cost-effective solutions. We've embraced the fact that technology's going to play a big role in this undertaking.

We also realize that we're better when we work and focus together as a team at National Grid, so we're broadening the team working on these issues to bring in additional expertise.

We can secure the grid, help our customers manage the transition to the energy future, and balance the increasingly diverse generation mix.

At the end of the day we believe this transition is an economic growth engine that will continue creating jobs in this country. Investment will be required to replace aging infrastructure in the U.S., and to build new infrastructure as we see more and more new forms of generation being developed and sited.

There also will be new opportunities for new types of capital investments on the outskirts of the grid. We are looking to develop cost-effective, reliable means to bring the infrastructure to those markets. Think energy storage and other distributed resources.

Who is better suited to meet those demands than a large energy company like National Grid? We have a vast

(Cont. on page 69)

Energy People:

Peter Terium and Klaus Grellmann

We talked with Peter Terium, CEO of innogy SE and Klaus Grellmann, Managing Director at innogy Consulting

By Steve Mitnick with Peter Terium and Klaus Grellmann

Peter Terium has been Chief Executive Officer and Chairman of the Management Board at innogy SE since April 2016. Previously, he served as Chief Executive Officer at RWE AG. He also served as the Chairman of its Executive Board. Dr. Klaus Grellman is Managing Director, innogy Consulting. He served as Senior Manager for Strategic Planning at RWE AG. Previously, he was a Senior Manager at PricewaterhouseCoopers.

PUF's Steve Mitnick: Peter, many of us know that RWE is a major European utility that you ran as CEO for several years. Now you are CEO of the new RWE subsidiary, innogy SE. Did it really take you less than a year from the decision to found innogy to the IPO?

Peter Terium: To be honest, sometimes I need to pinch myself. Exactly three hundred and two days after the Supervisory Board's December 2015 decision to restructure the RWE Group, I rang the traditional bell on the floor of the Frankfurt Stock Exchange at the first trading day for innogy shares.

That was a great moment for all of our employees, for my colleagues on the Executive Board, and for me personally. Our IPO was the second-largest in the world last year, and the largest in Germany since 2000.

Imagine: a year ago, today's innogy did not exist. Now innogy is Germany's leading energy company, with revenue of around forty-eight billion dollars, more than forty thousand employees, and activities in sixteen countries across Europe.

And we have our innovation teams in hot spots all around the world – in Berlin, London, Tel Aviv and of course in Silicon Valley.

PUF's Steve Mitnick: Only few on this side of the Atlantic are aware of the transformation that gave birth to innogy. Can you walk us through the process that resulted in a new, multi-billion-dollar global utility?

Peter Terium: Globally, the energy industry is currently experiencing a wide-ranging transformation. Take Germany as an example: within just a couple of years, volatile renewable energy became the new normal, power grids needed to be extended and wholesale prices for power fell by more than half.

This is quite a disruption for a well-established industry! And of course, the change continues. In particular, we have identified three megatrends which are resetting the metrics for the energy system: decarbonization, decentralization and digitalization.

In this dynamic environment, energy companies can only succeed if they reinvent themselves completely. With innogy´s three business segments – Grid & Infrastructure, Retail and Renewables, we address the requirements of a modern, decarbonized, decentralized and digital energy world.

Innogy is not just going to sit back during the transformation of the energy system. We want to be the playmakers – the leaders. For this reason, we have set out a future-oriented approach for our organization – a blueprint for the energy company of the future. A blueprint for every traditional utility to use to transform.

PUF's Steve Mitnick: Klaus, what was your role in the transformation as an internal advisor to RWE/innogy?

Klaus Grellmann: When you observe that an entire industry is being disrupted, "wait and see" is not an option. Instead, we stepped up our game to actively shape this transformation.

In Germany within just a couple of years, volatile renewable energy became the new normal.

We helped implement change tools and lean structures to make sure the company was ready for the biggest transition of its history. And of course, we also sent our best people to implement the actual IPO process.

We ensured operational readiness of all the entities, managed the clearing process and helped turn this huge endeavor into a great success. So we did our share to help innogy achieve an instant market capitalization of twenty billion dollars.

PUF's Steve Mitnick: How will innogy expand beyond the EU, and into North America?

Peter Terium: We are not in waiting mode in the U.S. – we are relatively advanced. And I am not only talking about solar and wind power, innovation or consulting activities.

eMobility is a very important business for us. We see clear indicators for exponential growth in that business of future mobility – in Europe and in the U.S. as well. We want to become the leading eMobility solution provider in the U.S. and in Europe.

Klaus Grellmann: Eventually, our activities here are a consequence of our belief in our brand. Yes, we want to increase sustainability. And therefore, whether it is eMobility or our consulting business, we want to have an impact and give the development of the U.S. utility sector an even more sustainable spin.

PUF's Steve Mitnick: innogy has gained a deep understanding of renewables and load management on its home turf in Europe. Do you see the utility bringing that expertise to the U.S. markets?

Peter Terium: Germany is one of the first industrialized

countries that decided to change its entire energy system, from fossil and nuclear energy to renewables. That is an enormous challenge, believe me. We have gained a great deal of experience during this transition period which we are in.

And we would like to share this knowledge and experience with partners in the U.S. Of course, we do not believe that it is possible to simply export the European way to the U.S. That would not necessarily fit with the peculiarities of the U.S. market. Instead, we share experiences and practical knowledge. We are always in it for a mutual exchange and learning.

Klaus Grellmann: This is part of innogy's strength. We can combine a comprehensive range of topics across the entire energy value chain to offer integrated consulting services and solutions to our clients.

We can elaborate on the mindsets, tools and solutions which enable us and our clients to master the challenges we encounter. At the same time, we learn from the best practices that are successful in Europe and the U.S.

PUF's Steve Mitnick: Klaus, given your experience of advising innogy, what is your biggest learning on a personal level?

Klaus Grellmann: You will be surprised, but in the end even in a commodity business like energy it is all about the customer! Alongside regulatory, market and technology changes, I have learned to closely watch customer behavior. I want to be able to get current customer preferences right and have a good forward view about future behavior.

And, of course our unique offering is in combining this experience together with our deep industry expertise. It's a combination few other utility strategy consultants offer. We have done it before, and we have done it successfully. A metric of twenty billion dollars in the utility sector is one that few people could argue with.

PUF's Steve Mitnick: From your point of view, what might be the most important challenges for innogy in the next couple of years?

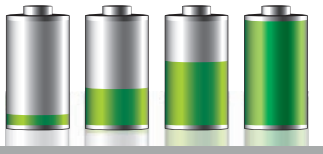
Peter Terium: Of course I am very happy with last year. We founded our company and we introduced our new innogy brand very successfully. But it is time now to close that chapter.

When you observe that an entire industry is being disrupted, "wait and see" is not an option.

Complacency and competitiveness do not go together. And competitiveness will count more than ever in the years to come. The goal is for innogy to build on its good starting position in the competition between energy providers and other new players in our market.

A key driving force for us as a company is asking ourselves: what do I need to start doing now to be prepared for future energy trends? We constantly challenge our business model and embrace both transformation and innovation to stay on top of the game in a competitive and profitable way. We promised a lot. Now we must deliver. PUF

NORTH AMERICA'S ULTIMATE HOT
SPOT FOR ENERGY STORAGE SOLUTIONS



CHARGING THE FUTURE: SOLAR-PLUS-STORAGE.

120 ENERGY STORAGE EXHIBITORS | 18,000+ VISITORS | 80+ NATIONS

JULY 11–13, 2017
SAN FRANCISCO, USA

ees® NORTH AMERICA

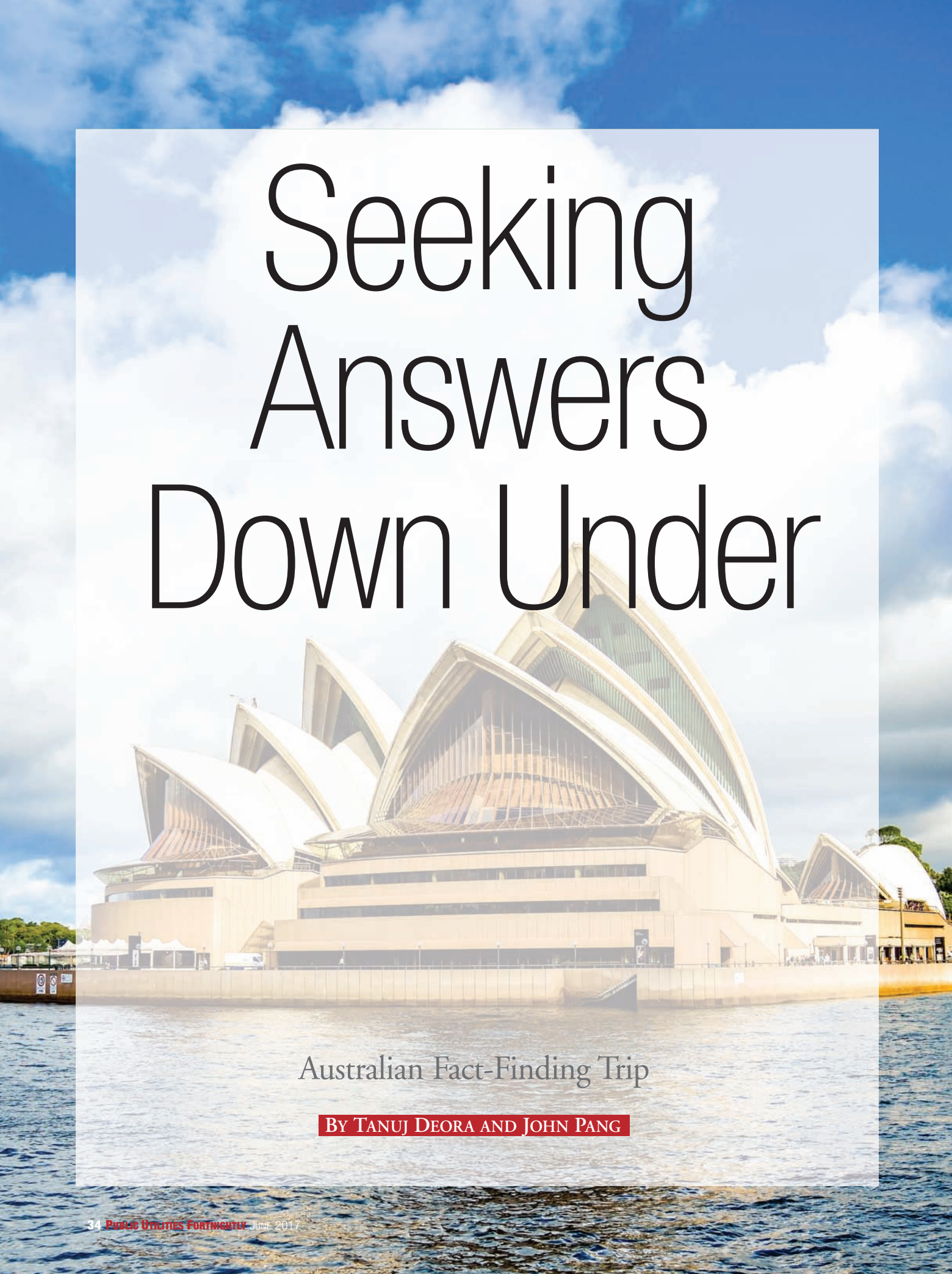
MEET THE LEADING ENERGY STORAGE COMPANIES – SAMPLE OF ENERGY STORAGE EXHIBITORS 2016

ADARA POWER
Altech Corp.
AQUION ENERGY
AXITEC high quality german solar brand
Batteries International
BATTERY SYSTEMS The Single Source Solution
BirkSun
BizLink
BMZ THE INNOVATION GROUP
C&D TECHNOLOGIES Power Solutions
CPS Chint Power Systems
CLEAN ENERGY STORAGE INC.
concept US
CURB
DARFON A BenQ Group Company
DCSystems
DELTA
DYNAPOWER COMPANY
DNV·GL
EATON Powering Business Worldwide
EEMB
ees INTERNATIONAL THE ELECTRICAL ENERGY STORAGE MAGAZINE
electriQ POWER
electrovaya
ENERGY STORAGE JOURNAL
ENERGY TOOLBASE™
EnerSys Power-Full Solutions
ENSTO
EnSync ENERGY SYSTEMS
Fraunhofer ISE
FULLRIVER BATTERY
Geli
Gexpro
GILDEMEISTER energy solutions
greencharge NETWORKS
Greensmith
greentechmedia
GS
Hello Tech
HRS HIROSE ELECTRIC CO., LTD.
HUAWEI
HUMLESS
IBEW LOCAL 11 NECA LOS ANGELES
IDEAL POWER
IPS
ISABELLENHÜTTE Innovation by Tradition
Jema innovative energy
JLM ENERGY
KingSolarman
LEOCH
MHB BATTERY
Middle Atlantic
MK POWERED
Multi-Contact MC STAUBLI GROUP
NAATBatt INTERNATIONAL
NABCEP Raising Standards. Promoting Confidence.
NEP NORTHERN ELECTRIC
NHR NH Research, Inc.
NPP
NUVATION ENGINEERING
NY BEST+
octillion power systems
OutBack POWER
PG&E
Parker
Pika ENERGY
POWERHOUSE
PowinEnergy
PRINCETON POWER SYSTEMS
REIS ROBOTICS
Rolls BATTERY
S&C
SHINDENGEN AMERICA, INC.
simpliphi
sonnen
Steca Elektronik
STONE EDGE FARM
SUNXTENDER
TABUCHI ELECTRIC
TENERGY
The SOLAR FOUNDATION
Trojan BATTERY COMPANY Clean energy for life.
UET
valence
VARTA Storage
ViZn ENERGY
WeRecycle Batteries.com

Organizers
SOLAR PROMOTION
FREIBURG Management Marketing International

co-located with
inter solar connecting solar business NORTH AMERICA

www.ees-northamerica.com



Seeking Answers Down Under

Australian Fact-Finding Trip

By Tanuj Deora and John Pang

Getting off the plane in Brisbane, the heat hits you like walking into a wall. It's a hundred degrees – in November.

We are in Australia as part of a group of about twenty-five U.S. energy industry executives from large and small utilities and innovative cleantech firms. We have travelled halfway around the world for a weeklong, intensive look at Australia's booming solar market and the energy market transition it has spawned.

Australia not only has more sheep than people, it has more solar panels than air conditioners. That fact and Brisbane's triple-digit heat are the first clues that our perspectives are about to be disrupted; not only about appropriate autumn weather, but also about what happens when levels of residential solar on utility distribution systems literally go through the roof.

See Figure 1 – Transmission and distribution networks in the National Electricity Market

In the coming days, we will learn that Australia's distribution, or network, utilities have been extremely successful in integrating rooftop solar onto their systems. For many utilities, a twenty-five percent solar penetration rate is now business as usual. In some cases, customers may be eligible for close to plug-and-play solar interconnection, while also enjoying traditional reliability.

But utilities have also missed opportunities to shape policy on key grid modernization initiatives, such as the rollout of smart or advanced meters. A recent regulatory decision has opened meter installation and ownership to third-party retail providers, foreshadowing a further disruption of utility business models.

"With American utilities' intense focus on reliability and safety, keeping the lights on, we often lose sight of the innovation going on in other markets, such as Australia," said Julia Hamm, President and CEO of the Smart Electric Power Alliance, one of the trip leaders.

"Seeing different approaches to the same problems we are facing in the U.S. with the integration of solar and other distributed energy resources really breaks down silos."

Sponsored by SEPA and industry consultant ScottMadden, the executive fact-finding mission included some of the obligatory Aussie experiences. Our first night, the group enjoyed a real Australian barbecue, with Aboriginal dancers and didgeridoo players. We also spent an afternoon at a koala sanctuary, where each of us got a chance to have our pictures taken holding one of the cuddly looking critters. (Key takeaway: holding koalas just automatically makes you feel happy.)

Australia not only has more sheep than people, but more solar panels than air conditioners.

But the core of the trip was a series of meetings in Brisbane and Melbourne with our Australian counterparts. There were utility executives, researchers, policy experts and tech innovators. With them, we could dig into the differences and similarities of our respective energy markets. The group quickly adapted to Australian tech talk, slang and accents, and the sessions were lively and challenging, with a two-way flow of experiences shared and lessons learned.

That said, the Australians were somewhat bemused by our interest in their operations. They seemed to have assumed that the U.S. had already figured out solutions to all the problems of solar integration and grid modernization.

They are vastly impressed with our advanced metering infrastructure, evolving utility business models, and distribution system planning tools. That's perhaps part of the reason why Audrey Zibelman, former chair of the New York Public Service Commission, was recently hired as chief executive of the Australian Energy Market Operator.

Certainly, many of the technologies Australians are deploying on their grid come from U.S.-based companies or global companies with American engineers. But our Australian hosts sometimes didn't seem to appreciate that they are innovating in very profound ways themselves.

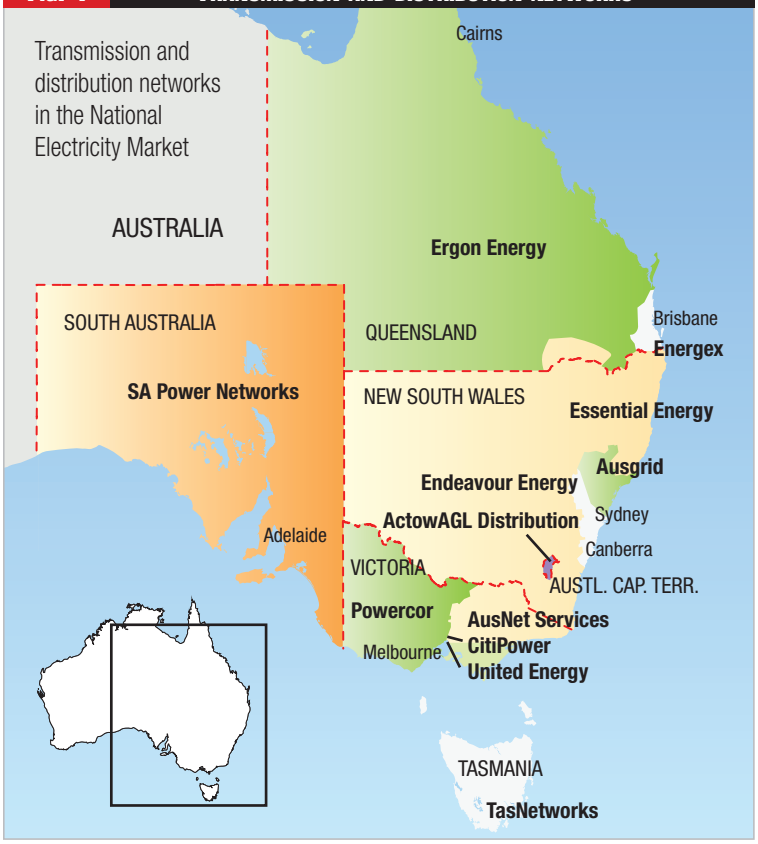
Brad Punu, Manager of Strategic Partnerships at the Energy Incubator in Honolulu, was blown away to discover one Australian utility that was funding its own in-house high-tech startups.

"In the U.S., innovators may work at utilities for a while, but to develop new technology, they have to leave," he said. "This was a startup that started on the inside – a living, breathing example."

Tanuj Deora is Executive Vice President & Chief Strategy Officer at the Smart Electric Power Alliance. He joined SEPA in January 2015 to lead SEPA's research, advisory, communications, and programs teams. His previous experience includes leading the Colorado Energy Office, developing wind energy projects in New England and the Rockies, and consulting in the McKinsey electric power practice.

John Pang is a Partner in ScottMadden's Energy and Clean Tech Practices. John has consulted with utilities around the world. His focus is on clean sources of energy, sustainable utility best practices, strategic planning and cost management.

FIG. 1 TRANSMISSION AND DISTRIBUTION NETWORKS



Integrating Renewables Low-Tech

The Australian consumers' voracious appetite for solar required the country's distribution utilities to quickly integrate large amounts of distributed variable generation. While some U.S. utilities have responded to even modest levels of solar with concerns about impacts on system reliability, the distribution utilities in Australia found the grid could handle higher penetrations of renewables than they had initially thought possible.

Previous SEPA fact-finding missions found similar results in Germany and Hawaii, two additional regions with high penetrations of renewables. What sets Australia apart is the utilities' creative use of low-tech solutions to facilitate the integration of distributed renewables.

For example, Energex, a distribution utility in Queensland, has turned to hot water load control as a low-cost option to integrate solar PV. Using distribution management software, the utility shifts hot water heating demand from early morning and late evening to mid-day. This load-shifting strategy, involving hundreds of thousands of water heaters, functions as what the Australians call a "solar sponge."

See Figure 2 - Solar Sponge Illustrated

That is, the water heaters preheat water at mid-day, to absorb excess solar generation. That improves network efficiency and power quality.

"It changed my outlook for DERs," said Seth Frader-Thompson, CEO of EnergySage. "I spend a lot of time thinking about them, to see what certain tipping points might look like. Water heaters have been a demand response resource for a long time. Now they can be incredibly valuable distributed resources. That shows how close we might be to dramatic technological shifts in parts of the U.S."

David Grant, Senior Vice President of Sales and Marketing for Tendril, was also taken with the solar sponge idea, seeing opportunities for electric vehicles and the need for what he called "incredibly sophisticated software to manage all this."

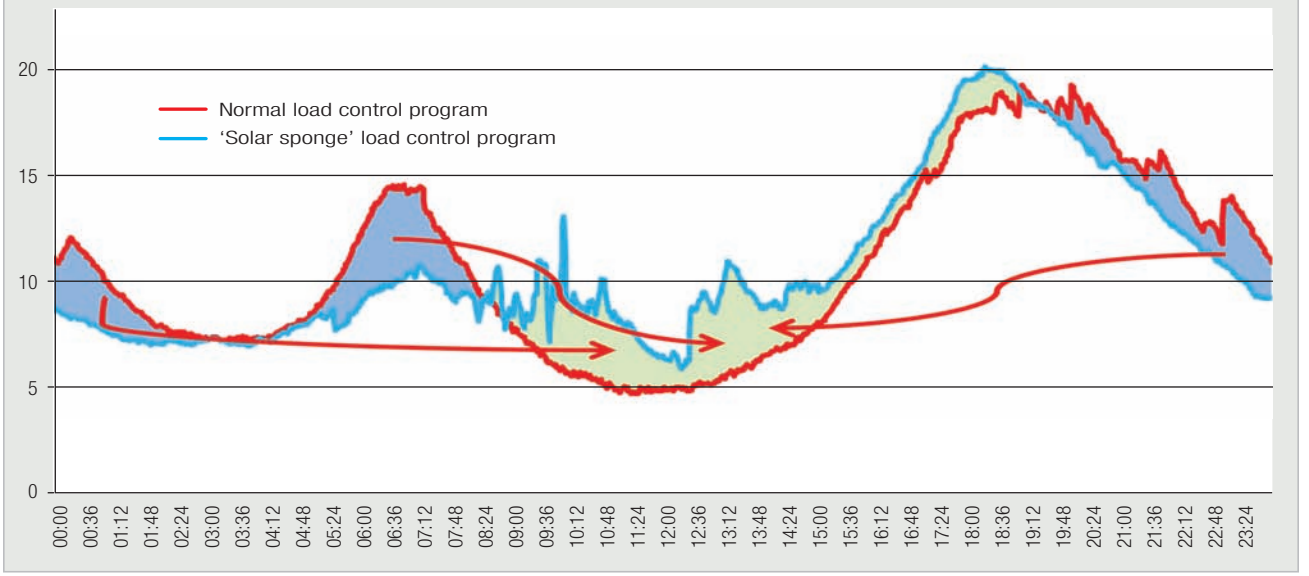
"We look at it as balancing rooftop solar with electric vehicles with hot water heaters," he said. "But you need to do that on a grid basis, as DERs get out there, to have the analytics and the algorithms. It's all coming."

In addition to such solutions, distribution utilities are also revising operating standards to accommodate high penetration of distributed generation. For example, the increase in solar has occasionally pushed operations outside traditional voltage standards.

Despite these anomalies, the utilities have not received any customer complaints. Voltage standards are being reviewed and are likely to be widened, to allow more flexible operating parameters.

The Australian utilities have focused on re-balancing the load, which has lessened the impact on the system. In all, the consensus view among the Australian utility executives we talked with was that the current state of available technology was not a barrier to high penetrations of solar.

Fig. 2 **Solar Sponge Illustrated**



A twenty-five percent solar penetration would require little action, they said, and even up to fifty percent penetration could be handled with traditional technology.

Despite the success of these strategies, the impact of renewables on grid operations remains a topic of debate in Australia. Questions were quickly raised about renewable generation following an extensive blackout in South Australia in September 2016.

The Australian Energy Market Operator has determined the loss of power was due to damage to electrical transmission lines and other infrastructure during a violent storm.

Metering Market Disruption

Somewhat paradoxically, the distribution utilities' can-do approach to integrating distributed solar has not carried over to the regulatory sphere. Specifically, the rollout of advanced metering in Australia has sparked reforms that could soon trigger a radical disruption to the distribution utility business model.

As in the U.S., Australian utilities have historically owned, installed and processed usage data from meters. But in an effort to encourage smart meter deployment, the Australian Energy Market Commission finalized a rule in November 2015 that allows competition in metering and related services.

When the rule goes into effect in December of this year, distribution utilities will have to compete with third parties to retain metering services for their customers.

The metering provisions are part of a larger package, called the "Power of Choice" reforms. They are designed to make Australia's energy networks more efficient and offer customers more choice and control of energy services.

The changes are broadly focused on metering, network pricing, and distributed generation. Corresponding changes in the U.S. market include the introduction of time-of-use rates and the development of industry wide technical standards for distributed technologies.

When the metering regulations were first mentioned, "there was this gasp," recalled Punu. "Until that moment, people in the room had not considered meters that were not controlled by utilities. You could tell there was a pressure point there."

Punu and other U.S. utility executives on the trip questioned their Australian counterparts closely on how the distribution utilities lost out on the metering services issue. Basically, faced with smart, aggressive lobbying by third parties, the Australian utilities took a passive approach to communicating with their customers and regulators.

They did not convincingly lay out the value of the advanced metering services they would provide that would, in turn, justify

Australian Energy Market: A Closer Look

Solar Makes Sense to Consumers

Australia is a ready-made solar market, with mind-boggling natural resources – both in terms of sun and wide open, mostly flat land. The country also combines dense urban centers with high power demand, and remote outback communities where off-grid solar is already taking root. But even taking these factors into account, the speed and extent of the country's solar explosion has been dramatic.

Ten years ago, Australia had slightly more than thirty-five hundred residential and commercial photovoltaic solar systems, most of them small scale, up to a hundred kilowatts. Four years later, in 2011, the country installed more than 360,700 small-scale PV systems in a single year.

By the end of 2015, more than four gigawatts of small-scale solar had been installed across Australia.

See Figure 3 – Annual Installed Small Solar Capacity (MW)

Over ninety percent of that capacity exists on the NEM transmission system, where penetration rates can be staggering. In the state of South Australia for example, twenty-five percent of households have installed solar PV. In some neighborhoods, penetration levels can hit sixty-five percent, according to figures from the Australian Energy Council.

This booming distributed solar market is no anomalous black swan in the energy landscape. It is the result of a convergence of three strong drivers that are by no means unique to Australia: a rapid increase in retail electricity prices, the introduction of generous solar incentives, and a precipitous decline in the installation cost of solar.

Little utility-scale solar being developed here, despite Australia's sun and open spaces.

Retail rates: Australia's rapid increase in retail electricity rates can be traced back to a major increase in investments in the country's transmission and distribution networks from 2009-2011.

See Figure 4 – Retail Electricity Price Index for Australian Capital Cities (Inflation Adjusted)

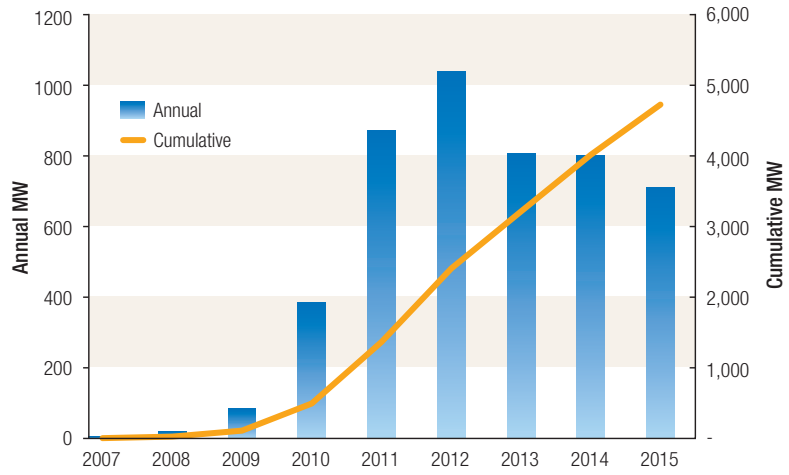
At that time, the industry was responding to the need to update the system and improve reliability, in the face of an expected upturn in peak demand. The global recession also exacerbated rate increases as the cost of capital rose, eventually peaking at ten percent in 2010.

The impact on electricity bills left many consumers stunned – residential electricity prices have increased sharply in recent years, with household electricity prices rising by around fifty percent nationally from 2010 to 2013.

The parallels for U.S. utilities are obvious. The attractive regulated investments and associated earnings growth notwithstanding,

Fig. 3 Annual Installed Small Solar Capacity (MW)

"Small solar" includes up to 100 kW; 2007 includes pre-2007 installations



Source: ScottMadden, Clean Energy Council

the major infrastructure investments required. Nor did they lay out the benefits for customers.

As a consequence, the distribution utilities will be expected to continue operating the distribution grid, but may not have access to real-time meter data if a customer selects a competitor for metering services.

The most memorable example of this shift came one night during dinner on the twenty-fifth floor of a Melbourne high-rise. The conversation among the Australian network operators, Australian energy retailers, and the delegation had moved to "meter contestability." That means the retailer can remove the network operator meter and put their own in.

During the dessert course, we asked the provocative question, "How does this make sense? What is the logic of the retailer having the meter?"

A representative of the energy retailer answered with a sly grin, "It is because the government relations folks at the retailer were better than the government relations at the network operators."

The crowd chuckled.

A delegate said, "But you are going to provide the operational

the steep increase in Australian electricity rates appeared to provide few tangible benefits for consumers.

A regulatory backlash followed, with a rate structure that made alternatives such as rooftop solar competitive. More recently, a decline in network investments and the removal of carbon pricing have tempered electricity prices, without affecting the solar market.

Incentives: The second key driver was the introduction of generous feed-in-tariffs (FITs) during the first years of this decade by state governments interested in reducing carbon emissions. Under these tariffs, utilities were required to buy solar owners' excess power, often at above-market rates. Initial FIT schemes were as high as forty-six cents in U.S. dollars per kilowatt hour, or sixty cents in Australian dollars.

Further, some states offered a gross FIT, providing compensation for all renewable generation rather than limiting compensation to excess electricity provided to the grid.

This approach to market-building has resulted in very little utility-scale solar being developed here, thus far, despite Australia's sun and open spaces. That situation could be changing with some development in large-scale projects now just starting.

FITs also contributed to Australia's higher electricity rates and have created long-term liabilities on the books of some distribution utilities due to the long-term length of their contracts.

The final factor in Australia's solar boom was the nosedive in installation costs.

Installation costs: The final factor in Australia's solar boom was the nosedive in installation costs. While the global decline in panel prices has been a central part of cost declines, the Australian market was also able cut soft costs, including installation, permitting and interconnection. Using standardized installation practices, solar crews in Australia can install two new residential rooftop PV systems per day.

Australian utilities have also simplified the interconnection process. One distribution utility even has a "connect anytime anywhere" policy for small solar systems.

Riding on this trifecta of trends, the cost of rooftop solar has become so low – three to five thousand dollars – Australian customers no longer view solar as a unique or extraordinary investment. More than one U.S. executive was floored by just how inexpensive solar has become here.

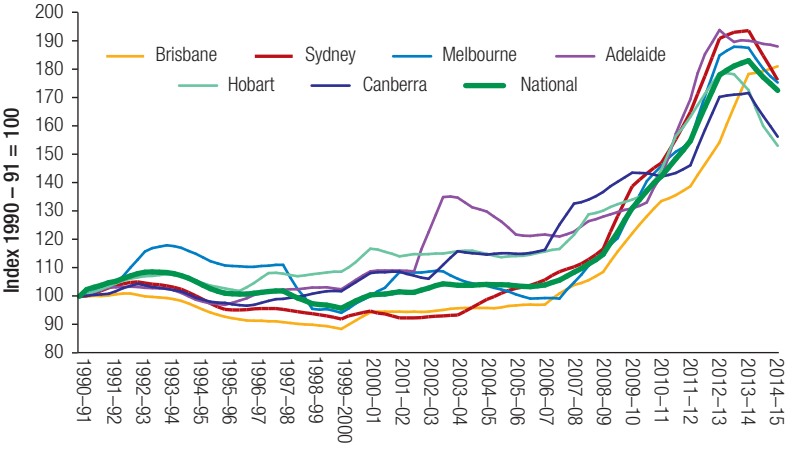
"I absolutely loved putting on the TV and seeing solar ads – 'Get your five-kilowatt system for five thousand dollars,'" Punu said.

"It's so cheap, it becomes a lifestyle decision, a discretionary purchase – like deciding whether you want the navigation system in a new car," said Seth Frader-Thompson, CEO of EnergySage.

"When you look at the U.S., where everyone is so obsessed with payback periods – the dollars and cents – that has an impact. When you have cheap solar, that allows you to make other decisions, for example, to get storage." ●

FIG. 4 RETAIL ELECTRICITY PRICE INDEX FOR AUSTRALIAN CAPITAL CITIES

Note: Consumer price index electricity and gas series, deflated by the consumer price index for all groups.



Source: ABS, Consumer price index, cat. no. 6401.0, various years

data to the network operator, right? How is the operator going to know there is an outage if they don't get a 'last gasp'?"

The network operator asserted, "Oh, they'll give that to us, for sure."

The retailer replied, "Why would we do that? All the data is our data."

The takeaway for David Grant from these "unintended consequences" was just how important it is for utilities to "get into the market and experiment and get hands on. You have to be in constant learning mode, piloting new technology, never underestimating the role of consumers and the unpredictable nature of consumer behavior," he said.

As with previous SEPA fact-finding missions, our immersion in Australia's very dynamic energy transition pushed us to see new possibilities and gain a deeper understanding of the challenges ahead.

The utility of the future and the energy system it operates in will not be a uniquely American creation. Transition can and should be a hybrid force, integrating the best knowledge and most effective strategies from the global marketplace.

(Cont. on page 67)

Energy People:

Jane Lewis-Raymond

We talked with Jane Lewis-Raymond, Partner, Parker Poe LLP

By Steve Mitnick, with Jane Lewis-Raymond

Jane Lewis-Raymond is a partner in Parker Poe's Charlotte office, practicing with the firm's Public Company Growth & Compliance and Energy groups. She has over 25 years of legal experience, including a decade as general counsel and chief compliance officer of a publicly traded company, Piedmont Natural Gas.

PUF's Steve Mitnick: Where were you six months ago?

Jane Lewis-Raymond: Today is the six-month anniversary of the closing of Duke Energy's acquisition of Piedmont Natural Gas. My last title at Piedmont was Chief Legal Officer, so serving as the chief general counsel, I had the very distinct pleasure of structuring the acquisition of Piedmont by Duke.

I worked with incredibly talented outside counsel to help structure and negotiate the deal and the entire process that led up to the deal.

PUF's Steve Mitnick: Chief Legal Officer, Chief General Counsel of Piedmont Gas. That must not have been an easy job.

Jane Lewis-Raymond: It was a joy of a job because I never knew what was going to walk into my office on any given day. With a million natural gas customers in the states of North Carolina, South Carolina, and Tennessee, and as a publicly traded company with assets of around five billion dollars, my team and I were faced with the entire gamut of not only legal issues, but regulatory compliance issues as well. All of those needed legal oversight and management.

PUF's Steve Mitnick: When you're the general counsel of a big organization like that, and your executive says, "We're going to do an acquisition or a merger," how does that start off?

Jane Lewis-Raymond: Generally, what happens is the market has ended up in a state such that you know you're about to receive some incoming offers.

For example, immediately preceding the acquisition of Piedmont by Duke, Southern Company acquired AGL Resources. Immediately after that deal was announced, I began to get our legal house in order by doing a search for outside M&A counsel.

I wanted to make sure that our company and our board would be well represented if we ended up with some offers to buy Piedmont. Especially if they were so compelling that we knew that we had to take them to our board and consider a response that was in the best interest of our shareholders.

So the first thing I did was actually engage outside counsel. I looked at a couple of firms and went with the lawyer that I felt was going to give the best advice to my board. We needed advice that would give them great confidence that they were making the right decision in every step of the process.

PUF's Steve Mitnick: And this while you're doing everything else that a general counsel does for a big company.

Jane Lewis-Raymond: Yes, absolutely. If most days I wore four or five hats, during that process I was wearing six or seven.

It was a very surreal experience. You're still running the company and having to deal with day-to-day activities, manage risk and create budgets while you are also working on this major transaction.

Negotiating with your regulators, to be nice about it can really gain you a lot of credibility.

PUF's Steve Mitnick: With your six or seven hats, were you a good general counsel?

Jane Lewis-Raymond: If you can measure how good I was by how much fun I had, I was a really great general counsel. I was not sure I would be when I took the job, I must confess.

I had been in D.C. for a very long time. I left the American Gas Association when I was Vice President of Regulatory Affairs to take the role as general counsel at Piedmont. I had never imagined myself sitting in that corporate C-suite before.

But I did OK by all accounts because, first and foremost, I understand relationships matter in this business; I have always placed value on the relationships that I have with my colleagues. That matters for people inside the company, with people across the table that we would be negotiating with. And with our customers, certainly with our regulators, and with all our employees. Especially my team at Piedmont, they were terrific and we knew we had one another's backs in every way.

Second, I know the industry, I love the industry and I truly loved what I was doing. I was really happy to go to work every day. Even the bad days when you might be feeling like there was a little mini-crisis, they were still fun because you believed in what you were doing.

The third thing that makes you a good general counsel is having incredibly positive relationships with your executive management team. To know the expectations that your CEO places on you, as well as the CFO and your other fellow executives. And to know that you can trust them and feel comfortable in the way that the corporation is making decisions, allows everyone in the organization, including the general counsel, to elevate their game.

PUF's Steve Mitnick: What do you mean by relationships and why is that so important for regulated industries?

Jane Lewis-Raymond: When I say 'relationships', for example,

if you're dealing with your regulators, they might not always like what you're going to say.

But you're always going to be honest with them and not play games or hide the ball.

Direct communication, be it good or bad, is very important. In order to be able to do that, we need to understand that we are all human beings and we all get out of bed in the morning and put one leg on the floor after the other.

We all have other pressures and lives that exist outside of our work world. When we are in our role as general counsel or CEO or board member, that is all a part of who we are and that's a part of what everyone brings to their office.

To build relationships across the table with adversaries can make a better outcome, a better product for what you're trying to achieve. For example, if you're negotiating with your regulators, to be nice about it can really gain you a lot of credibility.

PUF's Steve Mitnick: Isn't it a little odd that when you're one of the lead people, you're basically working on getting rid of your job?

Jane Lewis-Raymond: There were a few days at about two-thirty in the morning when that thought did occur to me. When you're a general counsel of a company, you are charged with representing what is in the best interest of your shareholders, and that is what you must do.

As lawyers, that is what we do. We represent our clients to the best of our ability every day. You know that in the end, if you're doing your job well, you might be looking for new work at the end of the day. But you must have confidence that if you did the transaction well, the next thing will follow. You just put your head down and soldier through.

PUF's Steve Mitnick: Tell us what you're doing now in your new position.

Jane Lewis-Raymond: For the first time in many years I find myself back at a law firm. I decided to join Parker Poe because it is a super firm with the right set of values in a city I love. I joined them in March.

I am working on representation on corporate governance issues, compliance, and board issues such as cybersecurity response programs. I can use all my years of industry expertise representing companies, focusing on policy work, and working on state regulatory matters.

I look at my career in two halves. My first half being D.C.-based, representing natural gas distribution companies, and my second half being an in-house counsel, doing that as well as the corporate work. Now I find myself here at Parker Poe taking both halves of my career, marrying them together.

PUF's Steve Mitnick: Tell me how that works there.

Jane Lewis-Raymond: That is a very good question because there are a whole lot of lawyers in this world. I think my

differentiator is that I was in-house for so long.

I have that experience in the boardroom. I have that experience in the C-suite chair. I understand what it is that general counsels are looking for from their outside counsel.

I understand the pressures of those internal budgets and being able to make budgets. I understand there are some issues a client might bring me that they want a solution for, but they don't necessarily want a research article on it.

If you can measure how good I was by how much fun I had, I was a great general counsel.

I can present to in-house counsel in a way that will enable them to take the solution to their other executives on their management team. That's because I speak the business language as well.

I've been spending a lot of time just communicating with folks, sharing with them what Parker Poe is all about, the strength that the law firm brings, what a great energy practice we have here, what great lawyers we have. And letting them know the types of things I'm hoping to do with this next decade of my career or so.

PUF's Steve Mitnick: What are you going to be doing in three to five years?

Jane Lewis-Raymond: I would hope that I've got a busy base of clients. I hope that I am still a recognized industry expert.

And I hope that I can add value to corporate boards in the region. Even beyond the energy industry space, in terms of adding value to their compliance programs, helping them manage crises with their board, showing in-house counsel and their board how you can create compliance programs.

Those programs can really add value to any company and, frankly, add value to the bottom line. If I've done even just a little bit of that for a few companies five years from now, I think I'll feel good about that. PUF

David Bowie, Nikola Tesla and The Iron Giant

It takes Hogarth to pull down a massive off-switch to disconnect and save Iron Giant and protect grid assets.

"The Prestige" was a 2006 thriller about the cutthroat competition between magicians including the use of teleportation. The star-studded cast directed by Christopher Nolan included Hugh Jackman, Christian Bale, Michael Caine and Scarlett Johansson. And in the role of Nikola Tesla, who creates a teleportation device, David Bowie in his final picture.

In the film, the "war of currents" between Tesla and Thomas Edison, alternating versus direct current, is a parallel rivalry to that of the magicians. One scene has a dialogue in which one of the magicians is amazed that the distance of ten or fifteen miles separates electric generator and lights. During the war of currents, the efficiency of transmitting alternating current over distances was a critical advantage.

Though Tesla manages to do this in the film without transmission and distribution lines. Imagine the impact on siting if this was possible.

Tesla and Edison have been depicted in a number of films over the years. "The Secret of Nikola Tesla" was a 1980 biography made in Yugoslavia. Tesla was born in Serbia.

The great Orson Welles co-starred in that one, playing the financier J.P. Morgan who funded Tesla for a while. Welles was sixty-five when the film was shot. Why did Welles appear in a relatively obscure Yugoslav film? Probably didn't hurt that his Croatian girlfriend Oja Kodar had a part too.

A scene in the film that likely never took place involves a showdown between Tesla, Edison and Morgan. When Edison walks out, Morgan says, "My friend Edison is a stubborn man, Tesla. He's also the greatest inventor in the history of the world. But if you can prove him wrong (about alternating current), I won't say I'll be happy. But I'll tell you this. You and I are in business."

Morgan did merge Edison General Electric and Thomson-Houston Electric in 1892. The result, General Electric, or GE.

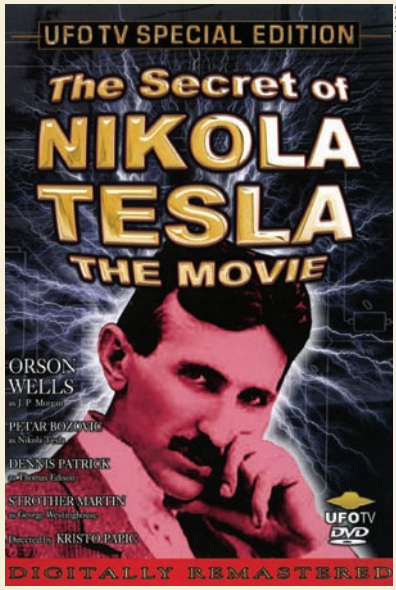
Two films released in 1940 were biographies of Edison. "Young Tom Edison" starred Mickey Rooney as Edison in his youth. "Edison, the Man" starred Spencer Tracy as Edison in his adulthood.

One memorable line has Edison saying, "I'm an inventor. I can't be told what to do. I've got to do the things I want to do… Nobody – not even I – knows how useful they're going to be or how profitable until I had a chance to work them out in my own way."

One of the most popular and acclaimed movies ever that focused on electricity was "The Iron Giant." The 1999 science fiction animation tells the story of a boy Hogarth who, during the Cold War, discovers a fifty-foot metallic alien and tries to protect the military from destroying him.

Vin Diesel was the voice for The Iron Giant who eats metal including grid infrastructure. In the great power station scene, Hogarth first discovers The Iron Giant eating his way through a realistically-drawn substation.

But we're energy nerds. We're unable to overlook troubling technical details.



UFO TV

The substation remains electrified far past when the catastrophic damage should have operated the circuit breakers. It takes Hogarth to pull down a massive off-switch to disconnect and save The Iron Giant from further electric shock. And protect other grid assets, incidentally. Only then is the surrounding area blacked-out.

The production involved everyone from Jennifer Aniston to Harry Connick, Jr. to Cloris Leachman. Even Pete Townshend of The Who. Naturally, Townshend wanted The Iron Giant to be a musical.

The film is set in Maine so the eaten infrastructure would now be assets of ISO-New England. But the film takes place well before Order 1000 and the 1992 Energy Policy Act too.

Though, the power station scene is a graphic depiction of the physical security threat to the grid that challenges us today. Albeit by an endearing fifty-foot metallic alien. PUF

Energy People:

Mike Caranfa

We talked with Mike Caranfa, Senior Vice President, Sales & Strategy of Smart Energy in Honeywell Home and Building Technologies

By Steve Mitnick, with Mike Caranfa

Mike Caranfa is a Senior Vice President, Sales & Strategy of Smart Energy, Honeywell Home and Building Technologies. He has served in a variety of sales roles and is currently responsible for leading sales efforts for the electricity and water businesses in the Americas. Caranfa is a retired Army infantry officer with 22 years of combined service in the Army and Army National Guard.

PUF's Steve Mitnick: What do you do at Honeywell?

Mike Caranfa: I lead our sales for Honeywell Smart Energy for electricity and water throughout the Americas.

That includes water meters, water measurement devices, and electric meters. The most exciting piece is around the smart grid technologies, communication, and data analytics. That's where we really get into the value of providing solutions for our customers. That package of products, solutions and services is my responsibility throughout the Americas. It's a lot of fun.

PUF's Steve Mitnick: Tell me some of the coolest innovations that you're putting into place at the utilities or on the grid.

Mike Caranfa: One of the things that's really front and center for us is an uptick in requests around energy storage. We've got some unique solution offerings around energy storage and storage capability at everything from the individual homeowner level up to utility-grade energy storage.

That's a technology that allows the utility to use renewable energy that isn't so predictable and make that a dispatchable energy resource. It's exciting news around distributed energy management and the overall battery storage technology. That's one piece.

We've got some other innovative technologies around thermostat capabilities. There's a tie-in with demand-response functionality with our new connected Lyric thermostats we've recently released.

Some of the real exciting stuff is a combination of the solutions that we bring together for utilities and smart grid, where we've got a meter that measures consumption and then communicates the data back to the utility, which stores that.

Then there are the data analytics capabilities, to analyze and create actionable intelligence out of data. That process of measuring, transporting, storing, analyzing data, then creating that actionable intelligence, has allowed us to bring some unique solutions to bear with some innovative and cutting-edge utilities. That's not just in the U.S. That's throughout the Americas and globally.

PUF's Steve Mitnick: Can you talk about some things that really make this work distinctive for your team?

Mike Caranfa: I believe we are the world's leading industrial Internet of Things company, when you consider the number of connected devices that Honeywell puts into the market. This is more than just the utility applications, which is why you hear us talk a lot lately about connected homes, connected buildings, and connected utilities.

We have a large level of industrial automation technology that we've put out into the marketplace that communicates, measures, stores, and can transport data back to a database of information. That information can then be used for actionable intelligence beyond just utility applications; it becomes very interesting to not only utilities but the larger industrial market.

I believe we are the world's leading industrial Internet of Things company.

PUF's Steve Mitnick: How do you see the pace of change for digital and automation?

Mike Caranfa: Historically, folks would look at utilities and think there's nothing innovative about a utility. They provide energy, and nobody thinks about them until the lights don't come on or the bill comes once a month.

That's not good enough for utilities anymore. Their regulators and their leaders within the utility space are driving this innovation to go faster. We recently spoke with a large U.S. utility that has an executive in charge of an innovation center. The reason they have an innovation center is because they're looking to do more cutting-edge technology applications around efficiency and for consumer engagement.

If, as a utility, you don't have the ability to present consumer data through a portal to your customers, you're behind the times. That becomes important to the utility, to not only gain but keep and enhance that customer interaction, that customer engagement.

How will utilities become relevant beyond just keeping the lights on? Most utilities these days are looking to do that.

In the United States, they're further advanced with that. In other emerging parts of the Americas, they're only now getting

into that space and trying to figure out innovative ways they can engage with the consumer.

Utilities are asking themselves, how does it benefit the consumer in general if I can communicate with them more frequently in a meaningful way? To help them to better manage their energy use but also make them more likely to pay the bill? That becomes important to utilities.

PUF's Steve Mitnick: Utilities in the U.S. vary by size, type of ownership, regionally, and in their politics. When you call or visit an executive at XYZ Power and Light, what do they ask?

Mike Caranfa: There are generally some common themes. They want to better engage their consumer. They want to keep energy costs low. That's always a focus of almost every executive we talk to.

They want to enhance their customer experience. Some of them are really focused on things like J.D. Power ratings and high marks from their consumers in general.

There's some utilities that are larger, with different styles of ownership and different regional impacts. Some are more focused on creating demand response programs that allow them to shave peaks to better manage power purchase agreements and keep their off-contract purchase lower.

Some are more focused on non-technical losses and abating them, where there are problems with non-payment. Some parts of the world have problems around non-payment at a greater rate than others do.

It's based on the ownership, the location, and the country. There are some variations in what their focus is, but in general, they all want to better serve the consumer with affordable energy, better engage with the consumer, and continue to provide reliable power.

PUF's Steve Mitnick: How did you get to this point in your career?

Mike Caranfa: I started with Elster ten years ago, managing a sales region. Then I gained added responsibility over the years, taking over a small sales team in 2009 and taking over a larger sales organization in 2011, then slowly growing up through the ranks within Elster. That was up until December 2015 when Honeywell bought the company.

As part of the Honeywell organization, I've continued to assume more and more responsibility.

PUF's Steve Mitnick: What's a typical day like?

Mike Caranfa: I'll give you an example of a day this week. I started out the day in a meeting with one of our future possible distributors, trying to make sure that we can better serve our customer base and get our products and solutions out to the market.

From there, I went into a customer meeting where I was talking with them directly about some changes in their approach to using our technology in the market.

We're going to have to review our technology roadmaps with the customer to ensure it aligns with their future technology desires. We'll then provide commitments to the customer so they can continue to plan for and effectively deploy our current and future technology solutions.

Beyond that, we have another prospect that we're trying to win some business with. I spent part of my day with my team that is preparing for some meetings that they've got coming up in a couple of days. They're going to present our entire suite of technology solutions to that customer from a Honeywell perspective and see if we can earn their business.

Part of my day is spent making sure everybody within the business has the support and resources they need to continue to do their jobs in each of the regions.

Then from there, I might end up spending some time talking with our solution architect team. They are really the voice of the customer back inside the walls of Honeywell. We want to make sure that we're focused on the right roadmap solutions and products for the next set of customers that we'd like to work with.

If you don't have the ability to present consumer data to your customers, you're behind the times.

I can tell you everything I do is focused on the customer. It's a busy job.

PUF's Steve Mitnick: Looking to the future, where is your business going to be three to five years from now?

Mike Caranfa: Three to five years from now, I think that we will continue to serve the utility market with a different suite of products that are very software-focused. The hardware becomes a reliable, back-of-mind product that is in the field, but the communication and the analytics are the key.

We have so many values that we can bring to a utility. We can provide an entire suite, measuring consumption at the meter, communicating that data back to a head end that massages it into a storage software package. The head end then can analyze that data and use it to monitor and manage the distribution grid. The utility can then better manage the distribution and consumption of energy. They can also integrate renewable and distributed energy resources, as well as demand response and energy storage applications. A utility that implements this combined solution is much closer to being a connected utility.

It goes beyond just the storage of data and the analysis of it. There's a service component. We can help utilities better create and use actionable intelligence out of that data.

We have moved into a software-centric, service-centric model from what historically was a hardware-centric model. PUF

Utility GC Roundtable at Energy Bar Association's Annual Meeting

The Energy Bar Association's Annual Meeting opened with a roundtable panel of utility general counsels. The panel included, from left to right, Emily Fisher, vice president for law and corporate secretary of the Edison Electric Institute; Tamara Linde, executive vice president and general counsel, Public Service Enterprise Group; Jane Lewis-Raymond, former chief legal, compliance and external relations officer, Piedmont Natural Gas; and Mrg Simon, director for legal, Missouri River Energy Services. See the interview in this issue of Jane Lewis-Raymond, now a partner with Parker Poe.

And we couldn't resist this pic of some of the great people that made the EBA Annual Meeting run as smoothly as a lawyer's brief.

EPRI Podcast

Advanced Coal and Fossil CCS

Options for the Future

AIMEE MILLS WITH JEFF PHILLIPS AND ABHOYJIT BHOWN

Is coal dead? No, but it's facing an uphill battle in the U.S., according to EPRI's Jeff Phillips, senior program manager for advanced fossil generation. And so began a thought-provoking conversation about where we are today, and the innovation needed to make fossil fuels relevant in the future.

Phillips pointed out it will be difficult to justify building new coal-fired power plants in the United States, where natural gas prices have fallen seventy-five percent since 2008. However, coal is still an abundant resource around the globe.

For this reason, and because of the continuing concern over carbon dioxide emissions from all fossil fuels, Phillips and his colleagues are looking ahead at advanced technologies that could support fossil fuels at home and abroad.

"The best possible option is to come up with new technology that will allow us to unlock the energy in fossil fuels without putting enormous amounts of carbon dioxide into the atmosphere," he said.

A significant amount of EPRI's advanced fossil generation research is focused on carbon capture and storage, and the effort to make it a viable, cost-effective option for fossil power plants.

"If you look at very deep decarbonization, then that becomes an extremely critical component of the future for electricity generation," said Abhoyjit Bhown, technical executive for the carbon capture, utilization, and storage program at EPRI.

In a fossil-fired plant, Bhown explained, combustion of the fuel with air produces large amounts of energy, and that reaction produces carbon dioxide, which can be separated from other combustion gasses. But that separation process requires additional energy.

"Whenever you have a gas mixture, or any kind of chemical mixture, you have to put in energy if you want to do a separation. The question in the power industry is, where do you get that energy? That question can be significant."

According to Bhown, twenty percent of the energy coming out of a coal plant is needed to separate the carbon dioxide. For geological storage, the carbon dioxide is further compressed to a supercritical fluid, transported to a storage site, and injected into the ground. Compression adds an additional energy demand of seven to ten percent. The entire process requires twenty-five to thirty percent of the plant's output.

As the industry moves toward a more flexible mode of operation for fossil plants, Phillips sees potential for using a carbon capture and storage system as an inverted energy storage system when partnered with wind generation.

"We're looking at ways we can run the capture system really hard at night and soak up a lot of power that otherwise we couldn't put out on the grid because it's not needed, and then maybe not capture quite as hard during the day."

"A lot depends on the future of how the U.S. and the rest of world decide to deal with carbon, or carbon dioxide in particular," added Bhown. "In a carbon dioxide-constrained future, many modeling studies, including EPRI's, predict there will be a requirement for low carbon options for electricity generation. Among those will be carbon capture and storage both for coal and natural gas."

Innovation surrounding fossil generation remains crucial to moving the industry forward.

According to Phillips, research has already shown that carbon capture and storage is competitive with other low or zero-carbon-emitting generation options.

A 2016 EPRI study for the Australian government compared the cost of building various plants. The researchers compared coal plants with carbon capture and storage and natural gas combined-cycle plants with carbon capture and storage, as well as with solar photovoltaic, solar thermal, nuclear, and wind generation.

In all cases, with the exception of wind, the carbon capture and storage options were competitive with other forms of generation. Natural gas prices in Australia are fifty percent higher than in the U.S., so Phillips estimates the costs of power produced by natural gas combined-cycle units with carbon capture and storage domestically could potentially compete with wind.

Keeping innovation at the forefront of fossil generation remains crucial to moving the industry forward. EPRI is working on an initiative to look at other industries in which there is interest in funding research and development to reduce carbon dioxide emissions, to increase deployment of advanced technologies.

According to Bhown, a tremendous amount of work has been done through EPRI's Technology Innovation program and in collaboration with other organizations. This work looks at a variety of options for the future, even new chemistries.

"Sometimes these materials don't exist in nature," said Bhown. "We often don't know what they cost, but we do know if they could be deployed they could have much lower energy

(Cont. on page 68)

Interviewees: **Jeff Phillips** is EPRI Senior Program Manager for Advanced Fossil Generation. **Abhoyjit Bhown** is EPRI Technical Executive for Carbon Capture Utilization and Storage.

Leadership Lyceum Podcast

Shareholder Activism: Coming to a Utility Near You?

A Conversation with Chris Young, Managing Director and Head of the Contested Situations Group at Credit Suisse

By Tom Linquist

I spoke about shareholder activism with Chris Young, Managing Director and Head of the Contested Situations Group at Credit Suisse. Chris is a lawyer who moved into investment banking in the technology sector. He spent a little over six years at Institutional Shareholder Services. Chris joined Credit Suisse seven years ago and leads the Contested Situations Group.

Tom Linquist: Chris, you refer to activism as "contested situations." Perhaps it's helpful to define terms upfront. Shareholder activism, in some type of planned and directed form, conjures images of corporate raiders from the 80s – the stuff of *Predators' Ball* and *Barbarians at the Gate*.

The contemporary form of activism seems less hostile. Or perhaps the euphemism sounds a little less hostile if it's described as "contested situations." What is activism, and how has it evolved over time?

Chris Young: I think the current activists are the next generation of what we used to call "corporate raiders." I think the major difference is that back in the 80s, the raiders would make plays to take over a hundred percent of the target company.

I heard a well-known activist state that the genius behind activism is you can take a non-control position, a small stake, not pay a control premium, yet exercise some degree of control over the company. That's why they are willing to take on all the costs and added bandwidth to run campaigns. It's an expensive, time-consuming way to invest rather than to just pick a stock and sit back.

I think that's the biggest difference.

Tom Linquist: What do activists want and how has that changed over time?

Chris Young: I always talk about four buckets of activism. First, mergers and acquisitions. Sell the company or a subset of what would break up the company and get re-rated on different businesses, or sell your non-core businesses and focus on your core. That would be all mergers and acquisitions-related.

Second, balance sheet, is straightforward. Usually the argument is that you have too much cash on the balance sheet. You can return it in various ways, either through a dividend or a share repurchase.

The third area is governance. This is not usually the focal point or the driver for activism. Often there is a request for board representation. Or a request for some changes in compensation practices and other things.

For hedge funds, that's not usually the driver, but it's a means to an end if they can get on the board and have some say from the inside and implement balance sheet and mergers and acquisitions changes.

The current activists are the next generation of what we used call 'corporate raiders.'

The fourth bucket is what I call operational. To me, it's one of the more interesting developments because it's the hardest and therefore, the rarest kind of activism you see. It focuses on the income statement more than the balance sheet.

It's where the activist purports to have ideas on how to run the business better.

Historically, that's been a hard form of activism to deploy, because companies and advisors can say, "Hey, these guys are a bunch of traders, what do they know about running a power producer or a utility?" Or whatever the case may be.

Over time as the asset classes mature, at least in the U.S., the activists have been able to almost morph into a pseudo-private equity sort of structure where they have recruited operators, retired CEOs, COOs in the industry.

They used to have difficulty doing that because of the stigma attached to activism in the early days. But more recently, we have been surprised by what you would consider very conservative individuals who have strong personal brands to protect, who have been willing to say this. "I'm going to have a little fun and agreed to work with an activist on their fight here, and I'm going to add my expertise on operations on how to run a company."

Some will take over leadership of the company.

Tom Linquist: So, you have three areas: mergers and acquisitions, balance sheet and operations performance, where I can't envision influencing events without the governance change. How, in the absence of getting representation on the board, are they able to get control of the three other areas?

Thomas Linquist is founder of The Leadership Lyceum and Managing Partner of Lyceum Leadership Consulting. He focuses on senior level search assignments including CEO and board of director roles within the power, utility and infrastructure sectors. Tom has twenty-six years of industry and consulting experience, and more than ten years of experience at three of the top five global executive search firms. See the complete body of leadership podcasts, interviews, and articles at www.LeadershipLyceum.com. Tom can be reached at thomas.linquist@LeadershipLyceum.com.

Chris Young: That's a good point. That's why I usually say governance. That bucket is a means to the end and the end is the other three: mergers and acquisitions, balance sheet, and operational.

I would say that you have plenty of examples where the activist does not get on the board, just threatens to run a proxy fight and then the company decides not to fight. Maybe they've gauged investor sentiment and determined that they may lose that vote and therefore, they agree to do a buyback, for example.

Or they agree to sell a non-core business line without any of the governance changes. The activist is able to accomplish one of the other three goals without actually having to change the governance.

Now the threat of changing the governance typically has to be stated overtly. It's the elephant in the room that everybody knows is there. That is the weapon. It's the stick that the activist can use while you are negotiating what we call a settlement.

You either decide to fight because you determine that the activist is wrong, and it's in the best interest of the company and the shareholder to fight. Despite the expense and the bandwidth that you must devote to a fight.

Or in many cases, and the data shows this, there are settlements that you meet halfway and you agree to do part of what the activist is looking for and maybe refuse to do something else. Sometimes the settlements do include board seats. But a lot of times maybe those board seats are not the principals from the hedge fund.

Again, the quality of the board nominees that the activists can recruit has improved over the past decade-plus. Often, the principal of the hedge fund wants to be on the board, too, to have a shareholder watchdog in the board room.

But increasingly, many of them are happy just to have influence on maybe two seats and say, "These are two people that we would like to have on the board. I don't need to go on the board as Mr. Activist. I'm comfortable that if you agree to do this buyback and do one other thing and then put these two individuals, who are independent of me, on paper at least, then we are happy."

That would be a version of the governance change. It doesn't have to be the activist or a principal from the fund itself that goes on the board.

Tom Linquist: Yes, but you must move the chess pieces that are in place to have the powerful influence absent the governance.

Chris Young: Yes, you either have to have that or you have to threaten to force your way on the board and then the company has to determine, "Oh, that's a credible threat and therefore, let's find a way to not go through all of that brain damage."

Sometimes it's the right call for the company to refuse it. It's all going to depend though. Everyone has to remember the activist is an outside investor, meaning they are investing based on publicly-available information, unless they are doing something wrong. They can get it wrong. Some of them are very smart and just by using publicly available information, they can have good ideas.

Other times, they don't have the full picture, because they don't have the access to non-public information. Therefore, their prescription for creating shareholder value is erroneous and therefore, you need to educate them.

Tom Linquist: What drives the timing for an activist?

Chris Young: The activists decide when to go public. With rare exceptions, a company does not want to go public because they know that will change their share registry and then their employees are going to be distracted. The activists can just decide when it wants to go public.

What controls the final escalation typically is the board nominations deadline. We all talk about circling that date on the calendar. The activist has it circled. The company has it circled and they know typically after that date passes the company's leverage increases for another year.

You have examples where the activist does not get on the board, just threatens a proxy fight.

This means typically, unless there is a way to act outside the calendar.

One of our jobs along with outside counsel is to examine a company's charter and bylaws. Is there a right for shareholders to call a special meeting?

At what threshold is their right to act by written consent? At what threshold can they remove directors? Because activists have been willing to use those tools and tactics to act outside the annual meeting calendar.

Tom Linquist: Surprise attacks.

Chris Young: Surprise attacks or just not being bound to that nomination deadline, so it's not that same little date circled on the calendar. They can act three hundred sixty-five days a year.

Tom Linquist: With that single date, is there a "hunting season", is there an "activism season?

Chris Young: There's a hunting season and the pressure, yes, it builds up to that date, I think for both sides.

Tom Linquist: Let's discuss your vulnerability framework. What are those principal areas that you advise a CEO and a board to make sure they are watching?

Chris Young: I think a lot of it is common sense, of course. Shareholder return on a relative basis against the peers, the index. If you are underperforming from a shareholder returns perspective, you are going to have an unhappy shareholder base.

That shareholder base is going to be more open to an activist coming in and presenting what I mentioned before, that free option.

Tom Linquist: You mentioned that you have not seen a lot

of activism in the utility space. But you talked about one of the fundamental settings in which you find activism. It was when the industry was ripe for consolidation. There has been a long trend over the last twenty-five years in the utility industry.

Twenty-five years ago, there were in excess of one hundred independent utilities. Now there are less than fifty. Do you have any advice specific to a consolidating industry?

Chris Young: If you are in an industry that is perceived to be ripe for consolidation, then you are vulnerable to being pushed into consolidating.

It's one of the easiest strategies for an activist. It's a home run for them to take a position in a company, whatever sector it is in. But if you are talking utilities, they will take a position in a company they believe will be consolidated, the target company.

They will agitate to make that deal happen and capture the expected takeover premium over a pretty short period of time, often using leverage. When you do all the math, that's a tremendous sort of annual rate of return for that investment.

Tom Linquist: What can you do?

Chris Young: The best defense, again, against activism, it's a cliché because it's true – high performance, high multiple. To extent that you are one of the smaller firms in a sector and therefore, by definition, would be considered maybe a target rather than the acquirer.

If you are trading at a high multiple because you are performing on all cylinders and one of your peers is trading at a lower multiple, that peer is going to be more vulnerable than you are because you are more expensive.

It's easy to say, perform better, but that's really it. Among your peer group try not to be the laggard. It's like that old joke with the bear and the two guys, "I don't have to be faster than the bear. I just have to be faster than you." PUF

To hear the full interview, please link to the podcast at Leadership Lyceum: A CEO's Virtual Mentor, available at Apple iTunes. Search iTunes Podcasts, with the keyword Leadership Lyceum.

Reddy Kilowatt is a registered trademark of the Reddy Kilowatt Corporation, a subsidiary of Xcel Energy Inc.

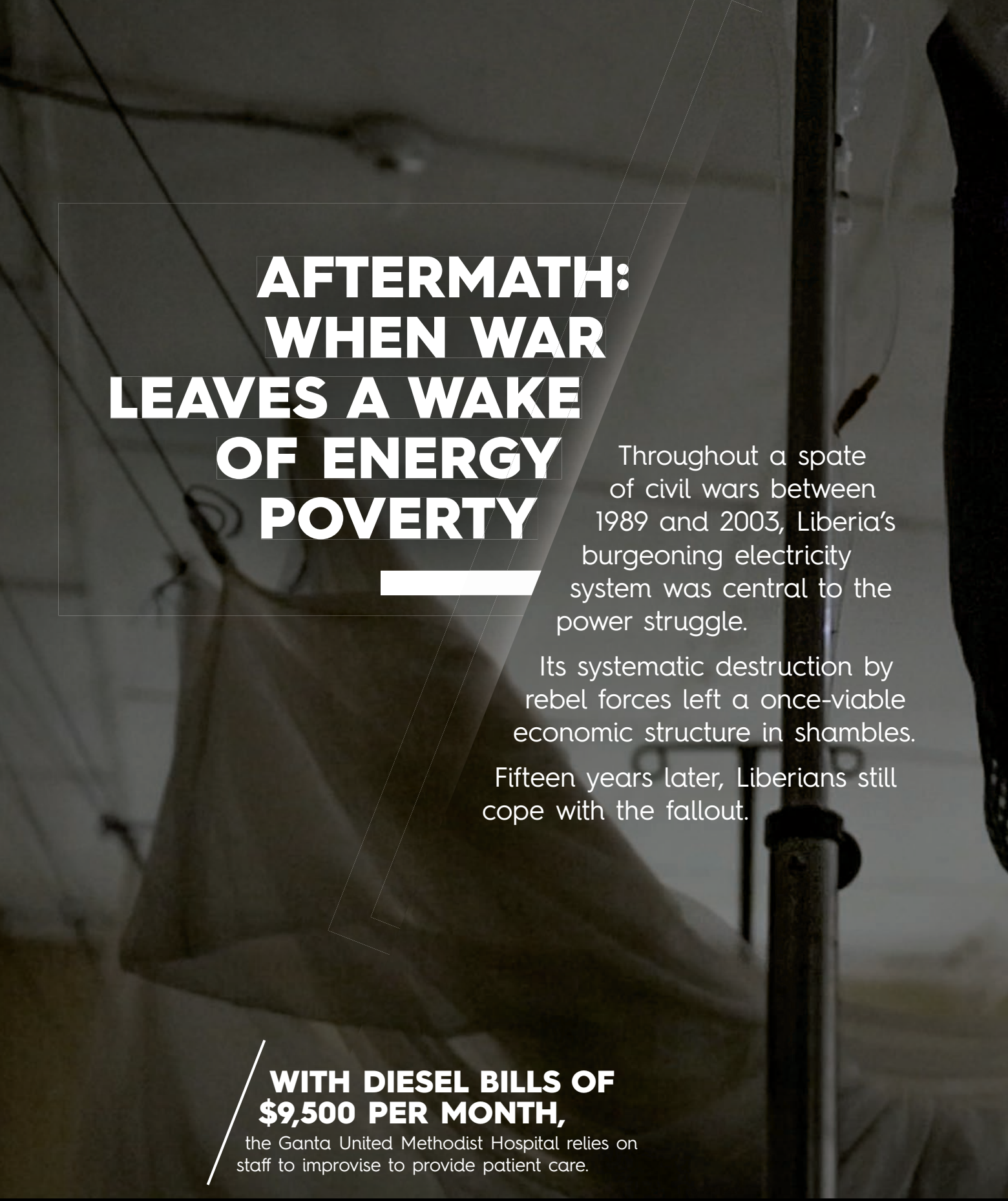
Last month, the Commerce Department released detailed data on Americans' consumer expenditures in March. The data is a key component of the first quarter's Gross Domestic Product.

Number-crunching by your PUF team found that electric bills in the first quarter were just 1.25 percent of all consumer expenditures. One and a quarter percent! This percent has never been lower. By a lot. The previous record, 1.34 percent, was set in the first quarter of last year.

The electric bills percent has been below 1.40 percent in just six of the two hundred thirty-three quarters since the first quarter of 1959.

Remarkably, five of these six low electric bill quarters have taken place since the fourth quarter of 2015. And, as remarkably, all but one of the quarters since then have been below 1.40 percent.

Another way to see how low electric bills have become, is to use fractions. 1.25 percent is one-eightieth. So, in the first quarter, electric bills were one-eightieth of consumer expenditures.



AFTERMATH: WHEN WAR LEAVES A WAKE OF ENERGY POVERTY

Throughout a spate of civil wars between 1989 and 2003, Liberia's burgeoning electricity system was central to the power struggle.

Its systematic destruction by rebel forces left a once-viable economic structure in shambles.

Fifteen years later, Liberians still cope with the fallout.

WITH DIESEL BILLS OF $9,500 PER MONTH,

the Ganta United Methodist Hospital relies on staff to improvise to provide patient care.

Photo: H. Kastenskov / Liberia

ENACT

the ENERGY ACTION project

Photo: M. Smith / Liberia

MILES OF SLASHED RUBBER CASINGS, gutted of valuable copper and cable, bear witness to the extent to which Liberia's electricity system was destroyed.

"YOU LIVE IN THE DARKEST WORLD. You feel very isolated. You could be harmed at any time... because evil men like to travel in the dark."
Harry F. Bombo, 35, Kakata Rural Teachers Training Institute.

"For us, it was the massive destruction of the very fabric of the entire society,"

Joseph Mayah, Liberia Electricity Corporation.

Joseph Mayah recalls the night rebel forces first attacked the Bushrod Island Power Plant on the outskirts of Monrovia, a city of one million, about twenty-five per cent of the Liberian population. "You hire security guards to protect your assets, but when bullets fly, you have to accept that they will run for their lives."

The domino effect followed quickly, spreading to both demand and supply sides of the electricity system. The city's water and sewage systems ground to a halt; hospitals and schools were forced to close. People were left with two choices: hide in the dark or flee an increasingly dangerous city. With generation capacity knocked out, water pressure eventually burst the Mt. Coffee hydro dam.

In late 2015, EnAct travelled to Liberia to shoot **Darkness**, a documentary film exploring how the aftermath of forced energy poverty affects young people today (www.filmsforaction.org/watch/darkness). Immediately striking was how much human potential the country had lost.

Harry F. Bombo, then enrolled at the Kakata Rural Teacher's Training Institute, was a prime example. Aged 15 at the start of the wars, he was finally able to finish high school at 25. After a degree in business administration failed to lead to work, he enrolled in KRTTI with the aim of bringing strong administrative skills to education. His entrepreneurial spirit is evident. He manages the battery purchases and use of a sole LED light for twelve young men who share a dorm that is not connected to the Institute's diesel-powered generators.

Now 35, Harry is keenly aware that under different circumstances, he would be in mid-career—and seriously concerned about the looming talent gap. "Liberia's experts are

Photo: P. Dicampo / Liberia

aging and will retire before long. Those of us who should be stepping into their roles are ten years behind in education and lacking experience. How can the country recover?"

At the Ganta Methodist United Hospital, the second-largest in the country, energy is a constant worry for Assistant Administrator Patrick Mantor, who returned to Liberia after training and gaining experience in the United States. The high cost of diesel fuel means generators are rationed to ten hours per day, six days per week. The monthly bill of $9,500 means the hospital is constantly at risk of having to close its doors.

Throughout the night, we watch doctors and nurses administer drugs, change dressings and even deliver babies by the light of their cell phones.

In the morning, Patrick draws my attention to the parking lot behind the emergency ward.

"That is the biggest tragedy," he says, pointing to a 4X4 mounted on cement blocks. "Because we pay so much for electricity, we can't afford to fix the ambulance we used to bring in women from remote villages who are experiencing distress during labor. As a result, after years of decline, we are seeing infant and mother mortality rates climb again."

Photo: M. Smith / Liberia

WITHOUT RELIABLE ELECTRICITY,
the Ganta Hospital struggles to carry out diagnostic testing and safely store medications that need to be refrigerated.

Efforts are underway to rebuild the Liberian electricity system, but as Joseph Mayah points out, at today's costs in a stagnant economy, it means relying on massive amounts of aid, foreign investment and expatriate expertise. At present, the new grid serves about four per cent of the population.

Liberia is a long way from being out of the dark.

FOR MORE INFORMATION ON ENACT

Visit our websites:
www.en-act.org / www.coldathome.today

Or contact our Executive Director:
marilyn.smith@en-act.org

ENACT
the ENERGY ACTION project

Building Energy Workforce of the Future

Next Generation.

By Sue Kelly

Throughout my career, I've tried to share my passion for energy issues with family and friends, not always successfully! When I was seven months pregnant, as a mid-career energy lawyer, I tried a month-long natural gas pipeline rate case. This was back when it was all the rage to play classical music, preferably Mozart, to your child in utero. Instead, my child got a full month of cross-examination about rates of return and minimum bills.

Once she emerged, my daughter heard lots more about rate cases and navigating FERC practice and procedures. So, you might have thought my daughter was poised for a career in energy. But the moment of truth came when her middle school had Career Day. I offered to go and talk about my job. Annie refused because my job was "too boring." That was soul-crushing, but I survived.

Today, Annie has a successful career in broadcast journalism – with a STEM connection. She co-hosts and co-produces the brand-new podcast "Undiscovered" for NPR's Science Friday, telling the stories of the "left turns and false starts that make science happen." And I am still trying to convince younger people how cool an energy career can be!

In fact, the energy industry has much to do to attract young people to our rapidly changing workforce. The good news, says the Center for Energy Workforce Development, is that the number of eighteen to thirty-two year olds in the energy workforce is trending upward. Targeted career awareness and recruitment efforts are attracting the next generation to energy careers.

However, as the center points out in its 2016 State of the Energy Workforce report, our industry is not just dealing with an aging workforce. Age is just one factor. Other trends like infrastructure modernization, regulatory policy changes, cleaner energy mix, new build, and cyber and physical security threats are shaping our workforce needs.

In many organizations, retired employees are not just being replaced one-for-one. "In fact, their jobs may be retired with them while the work is completely reengineered," says the center. These changes are redefining our approach to workforce planning and development.

Attracting the Workforce We Need to Power Our Future

Public power utilities are focusing on four key areas – engaging students, understanding millennials, investing in succession planning, and nurturing diversity. And the American Public Power Association, along with other energy organizations, is partnering with the Center for Energy Workforce Development to transfer best practices and lessons learned to our members.

Engaging students: From middle school to community colleges, public power utilities are often in local schools to talk to students about careers in energy, get them to think about smart energy use, and invite them to experience what it's like to work at a utility.

Our association's research and development program, Demonstration of Energy and Efficiency Developments, offers student scholarships and funds member utilities to hire interns to work on special projects. Often, these interns go on to have long-term careers in public power or other energy sectors.

When Girish Balachandran was

Since April 2014, **Sue Kelly** has been president and CEO of the American Public Power Association – the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. Earlier, she was the senior vice president, policy analysis and general counsel. Under Kelly's leadership, the association has advocated on wholesale electric market issues, worked to strengthen cybersecurity awareness and resources for utilities and raised the profile of public power in Washington, D.C.

studying at UCLA in 1989, he didn't have the money for next semester's tuition. He saw a flyer posted in the engineering department for just such a scholarship. The project dealt with load control and energy efficiency concepts.

It was perfect timing and his application was accepted. Today, Balachandran is the general manager of Riverside Public Utilities in Riverside, California, and serves on the Association's board. The scholarship introduced him to a successful career.

"In a five- to six-year period, I was given an opportunity to be an analyst and work on contract negotiations with many utilities and then be involved in regulatory proceedings that were happening statewide," he said. "Many of my friends who finished graduate school and went on to do MBAs – the stuff I was doing at work was what they were learning about in business school. Contract negotiation, regulatory proceedings. At a muni, you get to deal with all these things. So it was very satisfying to work in public power."

The Center for Energy Workforce Development has a National Energy Education Network. It comprises more than a hundred fifty universities, community colleges, technical schools, high schools and career centers that train students for technical careers in energy. Educators there must foster partnerships with the Center industry members, provide education required by the industry member and report results through agreed upon metrics.

As Ann Randazzo, executive director of the Center points out, "If we know the population is struggling to get a certificate or degree that our industry requires, it's automatically 'our' problem. We need to take a strategic and coordinated approach as an industry to change the outcome. Fortunately, we see many examples across the country where the center's members are doing just that."

At Career Day, I offered to talk about my job. My daughter refused because my job was "too boring."

Millennials, passionate about social causes, are ideally suited to nonprofit community utilities.

Understanding millennials: It's been said many times already, but we can't say it too often. Millennials – generations Y and Z – entering the workforce are very different from Baby Boomers and Generation X. These new entrants are sophisticated, tech-savvy, flexible and eager to explore. And this "selfie" generation will constitute more than fifty percent of the energy workforce by 2020.

Public power utilities are working to evaluate and revise long-standing employment practices to keep up with the cultural norms and needs of the changing workforce. For example, Easton Utilities in Maryland allows telework for jobs that don't need face time, offers flexible work weeks for those whose work can only be done in person, conducts onsite fitness training programs and even has a garden that employees can work in.

Many millennials are passionate about social causes and hence ideally suited to work in not-for-profit, community-owned utilities. Public power is leveraging this passion by engaging younger employees in its public service mission and empowering them to find new ways to give back to the community in which they grew up.

Every sector of the energy industry needs to understand millennials and find out what it can offer to suit their wide spectrum of interests and skills. We also must recognize that this generation is seeking new experiences and opportunities rather than permanence.

Millennials are not likely to stay in the same jobs for ten or even five years. So we need to prepare to get the best out of them while we have them – and hope they like us so much they decide to stay!

Investing in succession planning: While we look at the incoming workforce, we cannot forget the seasoned workers in energy who still have a lot to give before they retire. While new technologies and new players are rapidly entering the energy space, the fundamental values that enable the delivery of safe, reliable, and affordable electricity for all are unchanging and must be passed on from one generation to another.

At Nashville Electric Service in Tennessee, addressing the gap in knowledge transfer has been a priority for over a decade now. All managers and supervisors go through systematic training so they can move up exposed to the same knowledge.

President and CEO Decosta Jenkins introduced the focus on succession planning. He says, "The best way to do that is to put in place programs which are documented and structured. And then those procedures are more easily passed along – as opposed to knowledge transfer from one generation to another by word of mouth or on the job training. And now we see increased efficiency, higher levels of safety and higher levels of employee satisfaction. People seem to like to know what's expected of them."

Santee Cooper, a large public power utility in South Carolina,

(Cont. on page 67)

Low-Cost Wind Brings New Opportunities

Midwest Utilities Replace Coal with Wind Power

Q&A WITH MOODY'S JAIRO CHUNG

Amid the uncertainty surrounding the new presidential administration's environmental policies, wind power prices in the Great Plains region are now averaging around twenty dollars per megawatt-hour. According to a new report from Moody's Investors Service, many utilities are capitalizing on this cheap wind, using it to grow rate base or replace inefficient coal-fired assets.

What's Caused Average Wind Prices to Drop So Low?

Wind turbine technology continues to advance, improving the performance and longevity of the assets. At the same time, competition among manufacturers has lowered the price of materials and installation costs. The ability to forecast wind generation patterns has also improved substantially over time, which significantly reduces risks associated with investment.

On the other side, demand for clean energy has certainly helped drive supply. As of this year, twenty-nine U.S. states have some version of a renewable portfolio standard, which requires utilities to sell a specified percentage of renewable energy.

Consumers today are generally more conscious of where their electricity comes from. New market entrants, including corporations and community choice aggregators, are buying directly from renewable generators.

What Happens When the Production Tax Credit Fully Expires in 2020?

If the PTC were to expire today, wind power purchase agreements would average around forty dollars per megawatt-hour. However, we expect that continued cost reductions will keep wind competitive with other power sources even in the absence of the PTC.

In the next decade, we expect a reduction in tax rates and/or equipment costs that will lower the cost of wind PPAs to thirty to thirty-five dollars per megawatt-hour.

> Significant investments in wind energy are driven by economics more than policy.

The general expectations for continued competitiveness of wind energy are also reflected in plans for several large transmission lines to move wind from the Great Plains states to the rest of the country, including the Grain Belt Express, Plains & Eastern Clean Line and Rock Island Clean Line.

How are Utility Companies Responding?

Historically, investor-owned utilities have added renewable generation to meet RPS mandates by signing long-term PPAs and locking in a fixed price over several years. Now, though, favorable pricing of wind generation also allows utilities in Great Plains states to invest directly in wind generation assets to expand their rate bases and move away from inefficient coal-fired generation.

There is some debate about "buy versus build," but ultimately the split between utility rate base and PPAs seems to be a largely negotiated outcome, dictated both by the benefits of utility ownership and a policy desire to support wind developers.

Even in states without RPS mandates, we're seeing utilities make significant investments in wind energy, which speaks to how the sector is being driven by economics more than policy. For example, Westar Energy has been steadily adding wind to its generation portfolio.

After initially owning and operating a one hundred-fifty megawatt wind farm, Westar added wind PPAs totaling twelve hundred twenty-five megawatts, and an additional two hundred eight-one megawatts of owned wind between 2010 and 2016.

For states with strong RPS mandates such as Minnesota and Colorado, the economics of wind are permitting legislatures to explore even more aggressive long-term climate goals.

Public power utilities are beginning to move in the same direction. For example, Omaha Public Power District signed a four hundred-megawatt wind PPA to help replace capacity after it shut down its Fort Calhoun nuclear power plant in late 2016.

The cheap wind provides a "win-win-win" situation for utilities, regulators and customers, characterized by higher rate base and earnings, lower

utility rates from displacing coal with wind and a cleaner portfolio of power.

What Are the Broad Implications for Coal-Fired Generation?

The cost difference between wind and coal is driving coal generation up the dispatch curve and into early retirement. The decline of merchant coal power plants has been a well-documented trend over the last several years with so much cheap natural gas coming onto the market.

But we believe that low-cost wind resources could help drive even regulated coal-fired power plants into early retirement.

While the average long-term all-in PPA for wind power in the Great Plains region is around twenty dollars per megawatt-hour, most coal-fired power plants in the region have operating costs higher than thirty dollars per megawatt-hour.

We've identified approximately fifty-six gigawatts of coal-fired capacity generation with operating costs exceeding this price point, making them less competitive and at risk for early retirement. Coal plants that have costs lower than thirty dollars per megawatt-hour tend to be newer and more efficient or located closer to coal mines.

As coal-fired plants are retired and replaced prior toward the end of their useful lives, we believe regulators will allow capital cost recovery to mitigate stranded asset risk for utilities that operate vulnerable assets. Any additional coal-fired plant retirements would be phased in, and utilities will be able to mitigate the associated risks over time.

Even if the mandates from the Clean Power Plan are scrapped under the new presidential administration, we don't expect utilities to invest in new coal assets. That train has left the station, and low cost wind is vying to replace it. PUF

Jairo Chung is an associate vice president in Moody's Global Infrastructure Finance Group. She joined the Utilities team in August 2013. She is responsible for a portfolio consisting of investor-owned electric and gas utilities.

One is the Loneliest Number, Now PUF is Two

One is the loneliest number that you'll ever do.
Two can be as bad as one,
It's the loneliest number since the number one…

'Cause one is the loneliest number that you'll ever do.
One is the loneliest number, whoa-oh, worse than two.

One, written by Harry Nilsson, recorded by Three Dog Night, was the first of the group's many gold records. You'll also remember their hits Celebrate, Joy to the World, Mama Told Me Not to Come (by Randy Newman), Easy to Be Hard (from the musical Hair), Try a Little Tenderness (by Otis Redding) and Eli's Coming (by Laura Nyro).

One is indeed the loneliest number. We know that as well as anyone, publishing just one issue of Public Utilities Fortnightly per month for the last eleven years.

Two is not as lonely. Which is why, starting this month, we'll be publishing two issues per month. As Three Dog Night also sang, celebrate, celebrate, dance to the music.

You've been receiving Public Utilities Fortnightly on the first of the month. And then you've whiled away the hours, for a whole month, until the next issue came.

This month, you received Public Utilities Fortnightly on June first. And then, before you know it, you'll receive PUF 2.0 on June twelfth.

PUF 2.0 is our new hip mag tailored for the digital world. You'll catch our industry's thought-leaders impacting the debate, reading PUF 2.0 on your phone, pad or PC.

Your lonely days are soon to end, with Public Utilities Fortnightly and PUF 2.0 as your constant companions.




Future of EE is Now

Data Creates New Opportunities

By John Hargrove, Michael Mernick, Michael Volker, Sara Conzemius

In prior articles, we focused on the important impact that the energy efficiency industry has had on the current North American energy economy. In this essay, we share our thoughts on the ways this segment will be challenged to drive innovation as it continues to mature. We also discuss the evolving role demand side management will play in the energy industry and the utility of the future.

All Grown Up

Over the course of the past decade, investment in utility-funded energy efficiency programs has grown to nearly ten billion dollars per year. To deliver those programs to customers, utilities added staff to help market, implement, evaluate and manage their investments. As those investments grew, an industry was born.

This industry would grow to serve and support those energy efficiency programs and help utilities meet their regulatory goals and requirements. The demand for energy efficiency expertise brought opportunity. It created organizations that touted their local presence, national and international experience, boutique technical experience, marketing prowess, and ability to apply evaluation techniques to improve program performance. They also touted their ability to satisfy regulators' demands for cost-effective results. And everyone was very busy.

But as every industry matures, market consolidation occurs, and the number of options available to buyers often narrows. The growth and consolidation of the firms that provide these services can provide synergies and depth within an organization. But that can also eliminate the unique differentiators that drive innovation and exceptional service, something that in the past was a staple of the energy efficiency industry.

The benefits of local knowledge or specific technical domain expertise can become devalued through consolidation. The risk is the loss of creative thought leadership and healthy competition. Also, the executive leadership that built those individual organizations can be lost as individuals retire or begin to savor financial benefits from selling their organization.

Utilities are facing the same challenges as managers retire, consolidation occurs, or regulators push for a higher percentage of outsourcing. But acquisition and market consolidation happens

John Hargrove is President and CEO of the Association of Energy Services Professionals. **Mike Mernick** is a Senior Vice President and the Director of Market Development for ICF's Commercial Energy Division. He has led ICF's Energy Efficiency business since 2006. Mernick assisted his first utility DSM client in 1987, and has served as the senior manager for ICF's support to the U.S. EPA's ENERGY STAR® Residential, Product Labeling, and Commercial and Industrial Programs. **Michael Volker** serves as the current Chair of the AESP. He is the first representative of a co-op to lead the AESP. Volker serves as Rates and Treasury Manager at East River Electric Power Cooperative. **Sara Conzemius** is a Founding Advisor and Co-Owner of ILLUME. She has over fifteen years of experience leading the planning, development, and evaluation of residential, renewable, and commercial energy efficiency programs. Conzemius is the immediate past Chair of the Board of Directors for AESP.

> Customers have begun to demand a more informed relationship with their energy providers.

every day in other industries. Why should the energy efficiency world be any different? The pendulum of growth and consolidation swings here too.

While this market consolidation can create challenges, it is also a natural part of the business cycle and one that can drive future creativity and growth. We should expect to see new opportunities being identified, start-ups forming, and spin-offs developing that will spark innovation and create new innovative approaches. Just as in the time when this industry was created.

Implementers of energy efficiency programs will continue to develop more cost-effective ways to deliver programs. Savvy firms will capitalize on their talent, do more with less, and turn to technology and new approaches to accomplish their goals. The time is ripe for innovation and creativity to once again lead the way.

The Next Wave

Plentiful, inexpensive domestic gas is depressing avoided cost. The number of EE opportunities a utility can take to its most willing customers is being reduced. EE is being engineered into more products directly. Mandated codes are driving baselines up and unit savings down.

Some utility customers are wondering if they even need their utility anymore. Instead they are thinking about that sharp new electric car, the cool new solar roof for their home, and the energy storage unit they can buy that ties it all together, so they can go "off grid."

And while some describe this as the utility death spiral, the utility innovators and the entrepreneurs see an opportunity to offer customers solutions. Those solutions will rival the evolution we have witnessed from that old telephone landline to the highly sophisticated mobile device you may be using to read this article.

Smart meters have introduced large, easily available volumes of data that previously did not exist for utilities. The knowledge that data can provide to utilities allows them to deeply understand their customers. Utilities can easily see how they use energy in their homes and businesses and how willing (or not) customers are to engage with them.

> Demand side management will have a greater valuation going forward.

This comes at the perfect moment in time. Customers have begun to demand a more informed relationship with their energy providers and are seeking more independence and control of the technologies they bring into their homes and businesses. This creates infinite opportunity for forward thinking utilities.

And it creates those same opportunities for the industries that serve this growth. Energy efficiency and demand response organizations will likely thrive as a result of this extraordinary market transformation. The consulting industry that serves utilities will be looking for ways to determine best practices, secure additional industry knowledge, and provide improved training to their already taxed workforce. With all this opportunity, career changes and seasoned professionals transitioning from one side of the industry to the other are a given.

2017 does bring uncertainty to the industry, as the direction of the current political winds is still unknown. Individuals who have not historically favored efficient and clean energy solutions that also provide safe and reliable energy are filling key Trump administration energy positions.

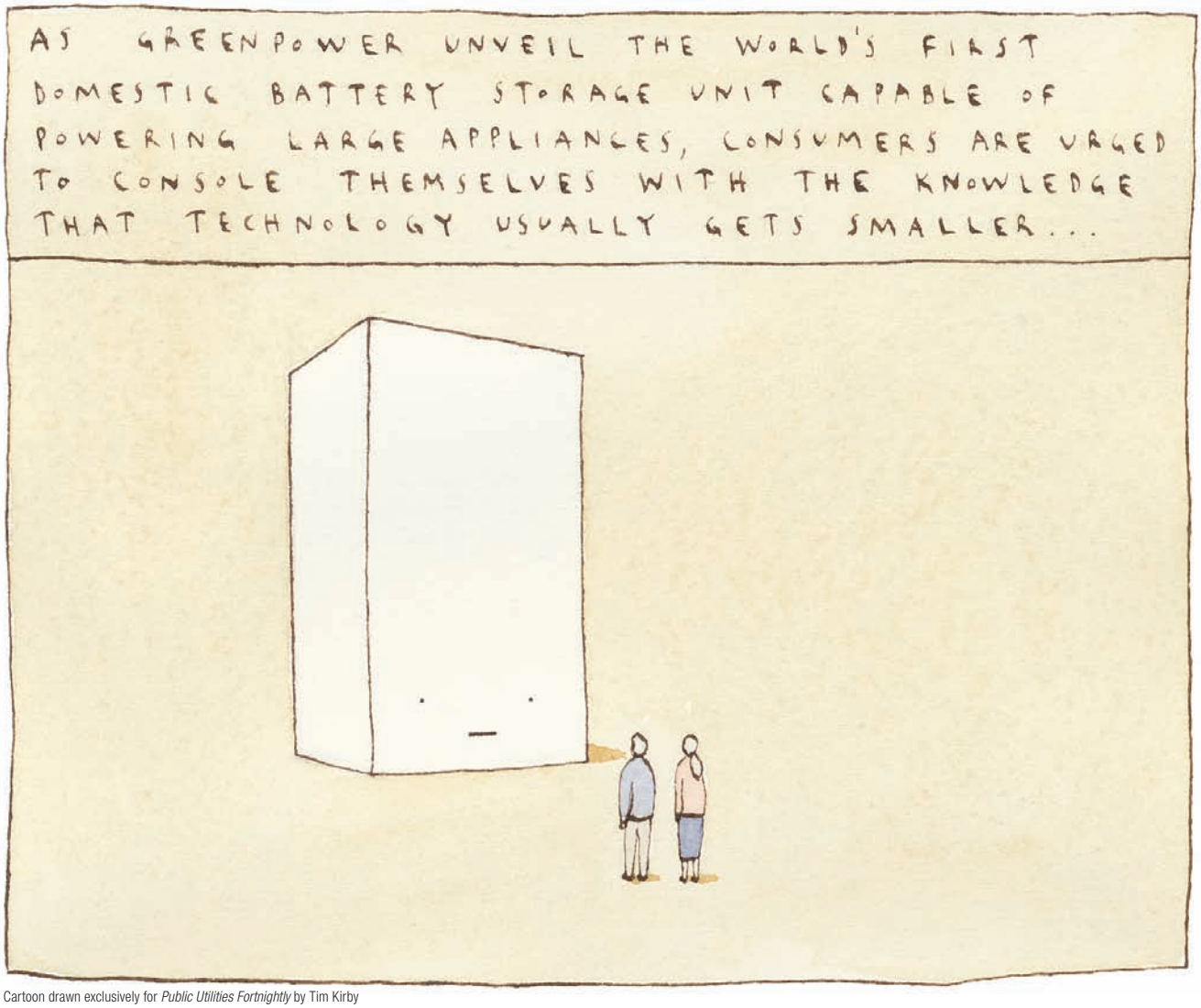
At the same time, the administration has taken a strong position on energy independence and national security. While it is too early to tell how the administration's influence will impact and potentially reshape energy markets, opportunity exists. Perhaps recent growth in the green economy will serve as a model to help fuel and support new infrastructure investments?

There are examples of models that work that we can turn to as an example. For the past twenty-five years, overwhelming support from bipartisan business and political leaders for the highly successful, voluntary ENERGY STAR® public/private partnership has realized greater results than its founders could have imagined.

With the participation of over eighteen thousand private and public sector organizations, ENERGY STAR helped to produce over twenty-four billion dollars in energy and cost savings in 2012 alone! Today, ENERGY STAR is not only recognized as the symbol for energy efficiency, but is an embedded and integral component of the energy economy.

State governments have become increasingly important in the energy equation, wielding great strength in their regulatory controls and their ability to shape and even create new markets. Much of the growth in energy efficiency and demand response is directly attributable to state mandates and utility investment requirements.

Demand side management has proven to be an effective resource-planning tool in most states. Utility customers are demanding a greater level of personal control over how and



Cartoon drawn exclusively for *Public Utilities Fortnightly* by Tim Kirby

where they use energy in their homes and businesses.

And utilities are placing an even greater emphasis on demand side management as a critical component of their customer engagement and retention strategies. Not only because it's a great way to connect with customers, but because if they don't, someone else will.

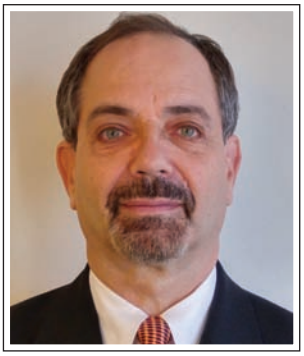
While no one can truly predict the future, we envision a utility grid that is very connected, in every sense of the word. We will see a convergence of demand side management programs, energy efficiency, demand response, and renewables that will offer utility customers much greater control and independence than they have today.

> Trying to be as energy efficient as possible will become second nature to all consumers.

We see the emergence of new companies to support an evolving and changing industry. We see technology having a dramatic and lasting effect on consumer behavior. We expect that demand side management programs will have a greater valuation in the utility planning equation going forward, as utilities and regulators consider how to balance macro grid-scale investments with targeted locational infrastructure improvements.

What we see, similar to the time when this industry was created, is a time of extraordinary change. One that will see more innovation, a greater use of technology, and a better understanding that the efficient use of energy is the most vibrant policy we can enact.

We believe this will be true in terms of public policy and personal behavior. Actively trying to become as energy efficient as possible will become second nature to all consumers of energy. The underlying goal will be productivity, rather than sacrifice. PUF



Nuclear Closures

Where is the Public Interest?

By David Boonin

Debates rage in state houses across the country about subsidizing the weakening nuclear power industry. Not for new nuclear plants, but rather subsidies to prevent the early retirement of existing nuclear power stations.

The nuclear industry claims that the low market price for electricity makes it uneconomical for them to continue to operate. The culprit? Low prices and electricity generated by abundant natural gas.

In one corner is the nuclear industry talking about its zero-emission production of electricity and in the other is the natural gas industry calling for free-market outcomes. This debate needs to be broader than "competitive markets" versus "clean energy." Even according to Adam Smith, public policy starts where markets fail.

The most basic electric utility integrated resource planning recognizes that least cost is not the correct metric. We should look at lowest reasonable cost, subject to certain constraints – like environmental stewardship.

David Boonin is president of TBG Consulting and has over forty years of experience as a public utility economist synchronizing the interests of utilities, regulators and other stakeholders in the electric, gas, water and transit industries. Boonin served as a principal for the National Regulatory Research Institute, member of the Philadelphia Gas Commission, chief economist at the Pennsylvania Public Commission, and corporate economist for United Illuminating.

More sophisticated integrated resource planning would insert risk management into the process and look at expected costs. Consider the probability that there will be some fee for carbon consumption or that natural gas prices will increase.

Even more sophisticated planning would manage uncertainty by looking for resource solutions that create always-acceptable costs, regardless of what plausible future occurred.

Back to the nuclear subsidy debate. Public policy must consider issues other than non-internalized carbon costs. For example, public policy for nuclear subsidies should consider whether subsidies of existing nuclear plants

The most basic electric utility planning recognizes that least cost is not the correct metric.

create a bridge to long-term acceptable resource solutions.

That policy should also consider whether using natural gas to generate electricity is a good long-term use of natural gas. Natural gas might be better used to fuel cars, heat pumps or water heaters – displacing oil or electricity.

There is value to fuel diversity that might mitigate risks associated with a spike in the demand for natural gas through LNG exports, or increased domestic load for NGVs. There might also be a decline in the future supply of natural gas due to restrictions on fracking.

Good policy should consider whether coal plants will continue to close. If they do, there will be an effect on total supply of electricity. Policymakers should consider whether subsidies need to take different forms in different wholesale markets. If there are subsidies, they could take many forms.

Renewable energy credits, net-metering and feed-in tariffs for renewable power are frequently used subsidies. Comparable subsidies above short-term market prices could be considered for nuclear power.

Policymakers could consider a fossil fuel entry fee and a fully offsetting consumer dividend as a way of internalizing the cost of emissions, which would indirectly subsidize all clean power sources.

There is also the issue of whether an owner of nuclear plants should be allowed to prematurely shut down without paying an exit fee to compensate customers for their support of the facility.

(Cont. on page 68)

AEIC Power Delivery Committee Meets

36 Execs from 28 Utilities

By Terry Waters,
Association of Edison Illuminating Companies

AEIC's Power Delivery Committee met in Fort Worth, Texas in March 2017, to discuss advances that were being deployed at host company Oncor and in the industry at large.

Thirty-six utility executives representing twenty-eight AEIC member utility companies, as well as associate member EPRI and the Executive Director of AEIC attended the three-day meeting. The first agenda item was safety, specifically as it applies to customers, utility employees and suppliers to the industry.

Collin Martin, Director of Transmission Engineering at Oncor, discussed the unique operating conditions within the Texas transmission market. Paul Folger, Regional Director of Distribution Operations at Oncor, explained the challenges associated with providing timely service delivery in the West Texas oil field service territory.

Hagen Haentsch, Director of Distribution Operations Center West at Oncor, discussed advanced distribution management systems and how Oncor is improving the automation of its grid in many areas of its service territory.

Terry Waters is Executive Director of the Association of Edison Illuminating Companies.

> The first agenda item was safety, as it applies to customers, utility employees, suppliers.

Malia Hodges, Director of the Project Management Office and Lamar Hill, Director of Advanced Metering at Oncor, discussed how Oncor's information technology professionals were working with departments to deploy information technology throughout the company.

> The second day began with discussion of the Storm Team Subcommittee's recent work.

Later, the committee visited Oncor's Technology Demonstration and Education Center. It was created to demonstrate to customers, stakeholders and government officials the operation of an advanced microgrid system with multiple energy sources such as solar, battery storage, propane-fueled generation and other energy sources.

The chairman of the AEIC Distributed Energy Resources Subcommittee, Jacob Tetlow, reported on the progress his group was making in the incorporation of new distributed generating resources into the existing electrical system.

The second day of the meeting began with a discussion of Power Delivery's Storm Team Subcommittee's recent work. This subcommittee plays a major role in developing best practices for storm restoration among the electric utilities in the United States.

The committee toured one of Oncor's large industrial customers, Lockheed Martin Aeronautics, and discussed the important ongoing relationship between Oncor and this critical defense contractor.

An important part of every Power Delivery Committee meeting includes time set aside for committee members to engage in an open forum, discussing ongoing operating issues and solutions being implemented at AEIC member companies. This open discussion and exchange is highly valued by AEIC committee members.

The AEIC Power Delivery Committee will meet again in the fall of 2017. PUF

Building Energy Workforce of the Future

(Cont. from p. 59)

has an impressive program called STEP – Shaping Tomorrow's Energy Professionals – that is designed to develop leadership qualities, transfer company and industry knowledge and help to groom replacements from within the company for employees who are likely to soon retire.

Much time and thought has been put into this curriculum and choice of employee participants from various parts of the company. I can say from personal experience, having presented twice to these groups, that there is a spirit of camaraderie among the participants. Given Santee Cooper's size, these folks might not have gotten to know each other very well but for this program.

Nurturing diversity: Diversity in the workforce is not easy to define. As Lisa Lewis, vice president of people and culture at CPS Energy in San Antonio says, "Being diverse means our workforce reflects the community in which we live and serve, through age, gender, ethnicity, race, education, etc. And it means valuing those differences when it comes to solving problems and getting work done."

> A workforce that reflects its diverse community ensures the utility is more in tune with customers.

A workforce that reflects the diversity of the community ensures that the utility is more in tune with customer needs and preferences.

Many companies also create employee resource groups, which bring together staff with similar backgrounds. "If you create a resource group for military veterans, for example, there's automatically a place where they feel comfortable asking questions or asking for help," says the Center's Ann Randazzo. "Having an organization you can go to where you feel welcome makes a huge difference."

The Omaha Public Power District has five employee resource groups – the Society of Engineers, Young Professionals Group, African American Network, Women's Network and Veterans Group – which help cultivate ideas from all types of employees.

Diversity of thoughts and ideas helps them drive good decision-making and better customer service.

Courtney Polk, chair of the Young Professionals Group, says, "We put together a team to create an innovation initiative, so employees have a voice in new ideas the district goes after. It's been exciting that we've gone from being just a social group to also figuring out how we can be a seat at the table and have a voice."

We in the energy industry need to have a strong voice when tomorrow's workforce makes career choices. We need to show our stuff, and get them energized about the vitally important work we do. Because without electricity, the quality of life for all of us, including the future workers we want to attract, would be radically different – and certainly worse. PUF

Seeking Answers Down Under

(Cont. from p. 39)

Takeaways

Our last day in Australia included an intensive closing session during which we tried to summarize a few key takeaways.

Simply put, high penetrations of solar are not a fundamental threat to grid reliability and security; integration of rooftop solar is a technical problem of the kind utilities are very good at solving, often with tools and programs already to hand.

Utilities, like other sectors of our economy, must focus on supporting innovation and becoming innovators themselves. The emerging grid of the future, by its very nature, will disrupt many givens of the U.S. electric system's hundred-year-old business model, and outcomes will not be predetermined.

Even in traditionally regulated markets, utilities must become more competitive. The term "customer-centric" has become an industry buzzword, easy to use but with no real quantifiable meaning. As utilities' historic regulatory compact comes under increasing pressure in markets around the world, taking our customers for granted is a risk we can ill afford. PUF

In January's *PUF*, Lawrence Jones, EEI's VP – International, said: "I have had the opportunity to sing in many choirs and groups, performed solos before large and small audiences in different countries, including singing a duet with my wife at our wedding. I also directed choirs. I believe that when you sing in or direct a choir, you develop a kind of listening skill that seeks to find harmony. I think having a conversation is like singing with another person. If you can't reach the point of harmony, then you're not communicating." June 12 is Lawrence's birthday. And when our new digital mag *PUF 2.0* debuts.

Just Two FERC Commissioners

(Cont. from p. 25)

The [May 2 and 3] tech conference is yet another part of that ongoing work that we're undertaking with regard to market oversight and operation. I'm also really proud of our work with regard to making room for renewables and advancing technologies.

Over the course of my tenure here, we've been very focused on ensuring that, in the transmission planning and cost allocation process, we are trying to improve the timeliness of how projects are moving through the queue. And, focusing on why we're having a lengthier time building the necessary transmission.

But I'm proud also of our work in making room for storage and especially proud of our Notice of Proposed Rulemaking as well as the eventual issuance of the energy storage policy statement.

That really focused on directing the removal of barriers for storage to participate in markets.

PUF's Pat McMurray: On a lighter note, are there humorous moments that you look back on?

Commissioner Honorable: I think my colleagues here on Team Honorable would share with you that we love to find humor in our day-to-day work because at times it can be technical.

I think humor is important not only in laughing at a situation, but also in laughing at yourself from time to time. And I've enjoyed getting to know my colleagues better – my commissioner colleagues, and the men and women who work here at FERC.

Norman Bay, who sadly has left the agency, when we would visit we just would laugh about things so loudly at times. I learned a lot about him and the sense of humor that he has.

Tony Clark and I sat next to each other in the hearing room and the commission meeting room. He's a dear friend. I recall that when he left, I gave him a mug with a picture of Hillary Clinton. And it said that we were stronger together. I talked about the fact that no matter who we voted for, we're stronger together and then gave him the mug.

But he took it and he placed it behind his name placard so no one could see it. And I told him, "No you've got to display that mug."

I've been blessed to be able to bring my best efforts to produce an excellent product.

PUF's Pat McMurray: When you leave do you have a dream, a place you'd like to go? Is there something you'd really like to do that you haven't been able to do yet in your career?

Commissioner Honorable: No. This has been a dream job. I love coming to work every day. I love this job. I've been blessed to be able to bring my best efforts to a place and work with men and women from all walks of life to produce an excellent product.

The work we do here at FERC is so important and it's been an honor to do it here. And I'm focused on today. I'm focused on this week. Throughout the week I'm looking at, what are my objectives and what do I want to accomplish.

Focusing on ensuring that even though we lack a quorum, much of our work will and must continue, and I'm doing what I can to support that work. I still enjoy strong support from both the Democratic and Republican Senate leadership, along with the environmental community and people in the electric and gas sector.

I'm a bit of a unicorn right now to have the decisions that I've issued here and worked so well with so many people in this sector. It really is a dream to carry out this work. PUF

Envisioning the Energy Future

(Cont. from p. 49)

consumption. That approach has led to some very innovative chemistries."

In the end, the priority is designing plants that can operate flexibly and at the same time meet all current and future environmental regulations while maintaining reliability, concluded Phillips.

"We're probably not there yet," he said. "But I see no technical impediments to say this would never happen." PUF

EPRI Unplugged is the podcast of the Electric Power Research Institute (EPRI), featuring twenty-minute conversations on a wide range of topics relevant to EPRI's research and development portfolio. You can subscribe and find episodes for download on iTunes.

Nuclear Closures

(Cont. from p. 65)

plants ran at a sixty percent capacity factor and consumers paid for the inefficiencies. Those were later reversed by competition and regulatory incentives.

It was also not so long ago that based upon variable costs alone, nuclear ran first and natural gas was used during summer peaks. Natural gas was almost never used as a source of electric generation in the winter, because of supply limitations.

In the nuclear subsidy debate, consider how much things can change and how hard it is to create clean energy resources. The debate is about subsidies, and by definition must look beyond short-term market clearing prices. PUF

Energy People: Rudy Wynter

(Cont. from p. 29)

transmission grid and a service area that includes urban and rural, remote and densely populated areas. We bring our expertise from the U.S. and the U.K. to solve those problems.

PUF's Steve Mitnick: It's a different job than it was fifteen to twenty years ago.

Rudy Wynter: Absolutely. It's different than it was ten or even five years ago. The pace of change we're seeing is unprecedented.

One thing that hasn't changed – and never will – is delivering safe, reliable service. What has changed and will continue to evolve is how we provide those services. Before, we'd just look at building new transmission or distribution infrastructure. Now, we might consider a solution that includes infrastructure in combination with battery storage, or a partnership with a distributed energy resource provider.

We also must stay ahead of the change curve so we can continue to make smart capital investments on behalf of our customers. Over the next five years we expect to invest about fifteen billion in capital in our U.S. business, which means we must have a "no regrets" investment approach during all the ongoing industry changes.

PUF's Steve Mitnick: Is it a fun job for you?

Rudy Wynter: It sure is! This is not a routine, paper-shuffling type of job.

For starters, all the change in the industry provides plenty of excitement. But there is so much more. If we want to be able to undertake pilot programs and invest in new technologies, we must ensure that we continue to spend capital wisely and that all of our projects are delivered on time and on budget.

On top of that, we must look for ways to get better every day, including developing innovative internal business processes. And finally, we need to evaluate and incorporate new technologies that help us get more out of our existing networks. These are all new challenges and massive opportunities that make this job fun.

PUF's Steve Mitnick: Are you trying to build a different mindset with your staff?

Rudy Wynter: Absolutely! At one point, we were producing several pilots for our regulators. At first, we were having our engineers and other employees work on them part-time alongside their day jobs. Then we realized that was not the most optimal way of working.

So, we carved out a team of about forty or fifty people to be part of the New Energy Solutions group to focus full time on these projects.

This group is helping us chart the future. They get a lot of support from across the enterprise, in part because people care about and believe in their projects, which include solar installations, microgrids, smart grids and residential smart energy technologies.

We've got about twenty megawatts of solar that we own up and running in Massachusetts, with an additional fifteen megawatts to be built, much of which will be accompanied by battery storage.

We've also got several battery storage projects in the planning stages in New England. In fact, we just issued an RFP for a ten-megawatt storage project. These are cool projects, and our employees want to be part of them.

PUF's Steve Mitnick: Where do you want to be three to five years from now?

Rudy Wynter: We need to spend the next two years really understanding what motivates customers to use energy differently and evaluating the full value of deploying technology on the grid.

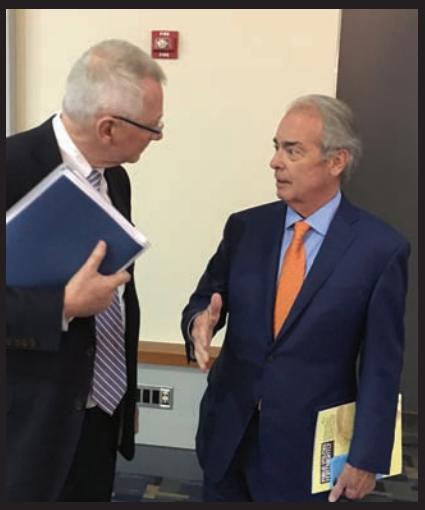
That three-year mark is when I think we'll be ready to start to scale up what we've been piloting so it becomes business as usual. Just another tool in our toolkit of solutions to deliver the services and benefits our customers want and deserve. PUF

Thomas Edison, the Wizard of Menlo Park, had 1,093 U.S. patents, including his first on June 1, 1869. It improved the voting machine for legislative bodies. Perhaps the U.S. Congress can get one.

In our industry, we talk about his patent of June 14, 1881 perhaps more than any other. No, not his patent of the light bulb. It was the electric meter that was patented by Edison in June of 1881, leading to a near infinite number of hours since of discussion, debate and dispute.

Alliance to Save Energy's EE Global Conference, May 8-9

The conference featured many of the stars in energy efficiency. In the lower right, for example, is the Alliance's president Kateri Callahan with Senator Jeanne Shaheen. In the upper right is former Duke Energy CEO Jim Rogers with World Resources Institute CEO Andrew Steer. At the middle right are Clay Nesler of Johnson Controls, at the table, and below, Andrea Vullo and Maryrose Sylvester of Current Powered by GE.



At the top, this panel included Ammi Amarnath of EPRI, Dan Turton of GM, Thomas Ashley of Greenlots, Roland Hwang of NRDC, Bruce Edelston of Southern Company. At the right, this panel included Melissa Lavinson of PG&E, Ronald Vogelwede of Whirlpool, Scott Kessler of LO3 Energy, Rick Tempchin of EEI, Alexander Sauer of Institute for Energy Efficiency in Production. In the bottom left, Gil Quiniones of NYPA, Her Highness Princess Lalla Joumala Aalaoui of Morocco, Clint Vince of Dentons, Kateri Callahan of the Alliance.

Jackalyne Pfannenstiel

The first woman to break the glass ceiling in many of her endeavors.

Jackalyne Pfannenstiel, the first woman to chair the California Energy Commission, and the first woman to be a corporate officer of Pacific Gas & Electric (vice president – strategic initiatives), died on April 26.

Michael Picker, president of the California Public Utilities Commission, wrote this memory of her:

"I knew Jackie from her work at the CPUC and with AEEE, but first really got to know her when she was Assistant Secretary of the Navy for Installations and Environment. She was first in so many ways: first strategic planner at PG&E, first female chair of the California Energy Commission, first female undersecretary."

Christopher Warner, chief counsel, Pacific Gas & Electric wrote:

"My wife Cathie and I knew Jackie through our work lives when she was a glass-ceiling breaking leader at PG&E and later at the Energy Commission and as Assistant Secretary of the Navy… We will miss her and will always honor her in our hearts."

Bob Howard, former vice president – corporate planning and logistics, Pacific Gas & Electric, wrote:

"Jackie was a manager who had an immeasurable impact on my career in 1980 when pricing and demand-side management were emerging paradigms in the utility industry. She was a patient leader that gave each employee plenty of space to explore the creative side of my interests in pricing research.

Coming from a regulatory background, she understood and counseled me on how to build relationships and to work collaboratively with the commissions, educational institutions and research organizations like the Electric Power Research Institute and EEI."

Brian Cherry, former vice president – regulatory affairs, Pacific Gas & Electric, wrote:

"Jackie's accomplishments were many and she was a woman who was recognized by many as a trailblazer by being the first woman to break the glass ceiling in many of her endeavors."

John Chamberlin, executive advisor, ScottMadden, wrote:

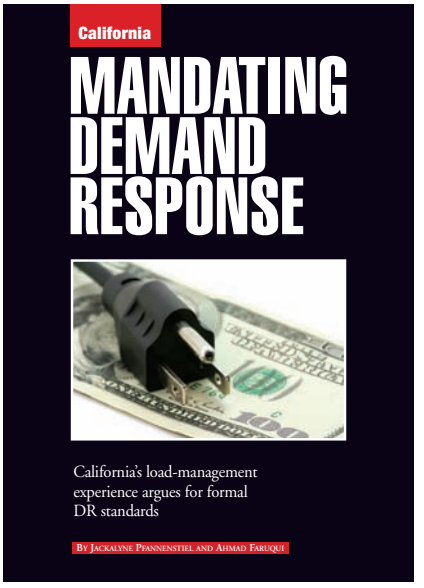
"I first met Jackie back in the early 1980's, when I was working on a number of the EPRI/EEI Rate Design Study "grey books," and Jackie was served on several of the project task forces as the representative of PG&E. Back in those days, things like marginal costs, time of use rates, and "load management" were very controversial topics, and many of the task force meetings were heated. Jackie had a way of offering criticism without seeming critical, of making suggestions without grandstanding, and was generally one of the more thoughtful and articulate people I had met – before or after that time."

Bill Prindle, vice president – energy efficiency, ICF International, wrote:

"I knew Jackie through one of her many public service roles on the board of the Alliance to Save Energy. I was immediately impressed by her passion for service, whether it was on the Energy Commission or with the Navy.

Her mind grasped the full range of policy issues, while at the same time valuing the many forms of human connection."

Jackie's article in the January 2008 issue of *Public Utilities Fortnightly*, co-authored with Ahmad Faruqui, of The Brattle Group, is pictured on this page. PUF




Joe Paparello


Pat McMurray


Steve Mitnick


Angela Hawkinson


Mike Eacott

PUBLIC UTILITIES FORTNIGHTLY

"In the Public Interest"

EXECUTIVE EDITOR
Bruce W. Radford
radford@fortnightly.com

EDITOR-IN-CHIEF
Steve Mitnick
mitnick@fortnightly.com

EDITOR-AT-LARGE
Pat McMurray
mcmurray@fortnightly.com

EDITOR
Angela Hawkinson
hawkinson@fortnightly.com

LEGAL EDITOR
Phillip S. Cross
pcross@fortnightly.com

PUBLISHER
Joseph D. Paparello
paparello@fortnightly.com

ART DIRECTOR
Michael Eacott
eacott@fortnightly.com

CIRCULATION
Teela Wormley
twormley@fortnightly.com

EXECUTIVE MANAGEMENT
Bruce Radford, President; Phillip S. Cross, Vice President;
Lewis Turner, Treasurer; James Norris, Secretary

POSTMASTER: Send address changes to Public Utilities Fortnightly, 11410 Isaac Newton Square, Ste. 220, Reston, VA 20190. Periodicals postage paid at Vienna, VA and additional mailing offices.

SUBSCRIPTIONS: $287 per year (12 issues) U.S. and possessions; Canada and all other countries, $317 (International Surface Airlift.) Single copy $24. Copies not delivered due to subscriber's failure to send change of address six weeks in advance cannot be replaced. Replacement copies must be claimed within 30 days of cover date for free replacement.

CHANGE OF ADDRESS: Notices should provide old mailing label as well as new address including Zip or Postal Code to: Public Utilities Fortnightly, 11410 Isaac Newton Square, Ste. 220, Reston, VA 20190 or call 1-800-368-5001. Please allow 4 to 6 weeks for changes.

www.fortnightly.com

Reprints: Call 703-847-7720.

Advertising Index

USEA Visits Emirates

Dipka (Dee) Bhambhani of the U.S. Energy Association, and occasionally a PUF essayist, visited the United Arab Emirates. She went to Al Reyadah, the UAE's first carbon capture and sequestration facility. It's a joint venture between Masdar and Abu Dhabi National Oil Company.

The CCS facility captures emissions from the adjacent Emirates Steel plant in Mussafah. The CO_2 is then transported and injected into nearby oil fields for enhanced oil recovery. PUF

Fatma Abulhoul AlFalasi, sustainability engineer for UAE Ministry of Energy; Dipka Bhambhani, communications director, USEA; and Hamad Abdulla Alsharmi, administrative management services, UAE Ministry of Energy

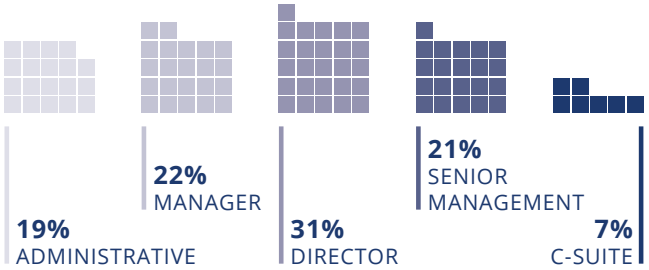
The community that's changing the electric power industry...

50+ UTILITIES

20+ STATE REGULATORY BODIES

REGULATORY BODIES

ATTENDEE **JOB LEVEL:**



GRID EVOLUTION SUMMIT

SEPA

A National Town Meeting

Smart Electric Power Alliance

July 25-27, 2017
WASHINGTON, DC

Register at GridSummit.org

#GridSummit

70+ SPEAKERS & THOUGHT LEADERS

... and the education that's driving smart electricity forward

50+ HOURS OF EDUCATION

38+ HOURS OF NETWORKING OPPORTUNITIES

THE MOST IMPORTANT ELECTRIC INDUSTRY TOPICS:

- Grid innovation
- Consumer engagement
- Information technology
- Rates and regulations
- Asset deployment
- Utility business models
- Retail & wholesale market design

EUROPE'S LEADING ENERGY CONSULTANTS ARE NOW IN THE US.

innogy Consulting

From energy strategy through implementation.
Find out how we can support you:

https://consulting-americas.innogy.com

innogy Consulting Americas
innogy Consulting Americas
@innogyConsult