PUBLIC UTILITIES FORTNIGHTLY
Impact the Debate
SEPTEMBER 2018

Mark Widmar, Paula Gold-Williams
Desmarie Waterhouse, Roy Jones
Vets in Energy, Ben Kostick
Thomas Coleman, Paul Zummo

A Day (Two Really) at the Florida PSC

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PUBLIC UTILITIES FORTNIGHTLY

Impact the Debate

The Hyde Park Speakers' Corner on Utility Regulation and Policy

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Cover photography: At the Florida Public Service Commission meeting in Tallahassee, from left to right, Commissioners Gary Clark and Julie Brown, Chair Art Graham, and Commissioners Donald Polmann and Andrew Giles Fay.

Veterans' Energy

Looking Forward to This Year's Veterans in Energy Forum

BY LORI BURKHART

My dad would have been a fine member of Veterans in Energy, had it existed while he was alive. He served twenty years in the Army, and then started a new career expediting the construction of nuclear power plants in the 1970s and 1980s for Gilbert Associates, later bought by Parsons Corporation.

It's because of my father's dedication and work ethic that I embrace the mission of Veterans in Energy and celebrate its ongoing mission. Veterans in Energy is a national employee resource group that provides transition, retention and professional development for military veterans working to support the U.S. energy infrastructure.

Veterans in Energy describes itself as a professional society for veterans working in the energy sector. But it's so much more than that. Veterans in Energy provides opportunities for outreach, networking and mentoring to support the needs of the growing population of veterans who have chosen energy careers.

And it's on to something, as the numbers speak for themselves. According to the latest Center for Energy Workforce Development survey, veterans comprise eleven percent of the workforce in investor-owned energy companies and make up twenty-two percent of the nuclear workforce.

Lori Burkhart is Managing Editor of *Public Utilities Fortnightly.*

That's important, and becoming more so, because predictions are that employers in the energy sector soon will experience a shortage of skilled workers due to an aging workforce and retiring baby boomers. Recent industry surveys indicate that approximately twenty-five percent of electric utility, natural gas utility and nuclear-generation employees will be ready to retire in the next five years.

Realizing the conduit of talent flowing steadily from the U.S. military, kudos go to the energy companies and trade associations that created a platform in 2011 to plug into that available employee group called, Troops to Energy Jobs. The Edison Electric Institute launched the Troops to Energy Jobs initiative, which is managed by the Center for Energy Workforce Development and helps service members transition to civilian careers at more than fifty energy companies in the United States.

> **Veterans comprise 11% of the workforce in investor-owned energy companies and make up 22% of the nuclear workforce.**

And then realizing that getting a job wasn't enough, but that helping veterans to thrive in their careers was also needed, led industry leaders to create Veterans in Energy. It has the backing of a diverse group of energy industry members.

Veterans in Energy is headed up by Hal Pittman, board president. He's a retired U.S. Navy one-star admiral and external director of communications at Arizona Public Service.

He is joined by Sean Connors, board vice president. He's a retired Navy »

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commander and plant general manager at Watts Bar nuclear plant at Tennessee Valley Authority.

Other industry people helping to lead Veterans in Energy are: Jim Spiers, vice president of business and technology strategies at NRECA; Ray Brooks, manager at the customer care center of Arizona Public Service; Cassandra Wheeler, plant manager at Georgia Power; Art Hudman, a department manager at Con Edison; Jon Smith, a vice president and general manager at Honeywell Gas Americas, and Steve Vaughn, a senior project manager at the Nuclear Energy Institute.

Veterans are perfectly suited to transition to the energy industry, according to Jon Smith, a retired Navy officer. He points to technical skills, a passion for results, and a desire to serve, as among the core traits that veterans bring with them when they move to civilian work.

Dominion Energy helped develop and start the Troops to Energy Jobs program. Since its launch in 2011, one in five of the company's hires has been a military veteran. Dominion also has a seat at the Veterans in Energy board.

Southern Company also is a strong backer of Veterans in Energy. It has three veteran employee resource groups, says Cassandra Carter Wheeler, regional director for Georgia Power, a subsidiary of Southern Company. An Air Force veteran, Wheeler says Veterans in Energy is a great way for their veterans to interact with others across the country to learn and implement best practices.

> **Veterans in Energy is holding its 2018 Forum on October 4 and 5 at NRECA headquarters.**

Veterans in Energy is holding its 2018 Forum on October 4 and 5 in Arlington, Virginia. It will be hosted by the National Rural Electric Cooperative Association at NRECA headquarters.

There will be a keynote speaker, a CEO panel, and chief nuclear officer and employee networking group panels, as well as examinations of flexible coal generation, renewables, battery storage and more. Over three hundred energy sector veterans are expected to attend.

Continued support of this organization benefits utility and energy companies as they strengthen their abilities to find, hire and retain veterans. Send some of your veterans to the 2018 Forum. Everyone wins. PUF

Lori Burkhart

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130th NARUC Annual Meeting and Education Conference

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Join the National Association of Regulatory Utility Commissioners in November to learn what mattered most in 2018 in the energy, telecommunications, gas, and water sectors—and preview what's to come in 2019! Regulators, industry representatives, consumer advocates, and others will all be on hand to talk policy, innovation, trends, and analysis.

NARUC President John 'Jack' Betkoski III will preside over the installation of new officers at the Annual Meeting and Education Conference. Don't miss your opportunity to join the foremost authorities in energy and utility regulation. Registration ends **October 26.**

President John 'Jack' Betkoski III

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A Day (Two Actually) at the Florida PSC

Chair Art Graham, Commissioners Julie Brown, Gary Clark, Andrew Fay and Donald Polmann; Executive Director Braulio Baez; Deputy Executive Directors Mark Futrell and Apryl Lynn; General Counsel Keith Hetrick; Deputy General Counsel Mary Anne Helton; and Division and Office Directors Cayce Hinton, Laura King, Andrew Maurey, Cindy Muir and Greg Shafer, with Steve Mitnick

PUF Editor-in-Chief Steve Mitnick hit the road again, this time to Tallahassee, home of the Florida Public Service Commission. Over two days, he interviewed Chair Art Graham, Commissioners Julie Brown, Gary Clark, Andrew Fay and Donald Polmann, Executive Director Braulio Baez, Deputy Executive Directors Mark Futrell and Apryl Lynn, General Counsel Keith Hetrick, Deputy General Counsel Mary Anne Helton, and Division and Office Directors Cayce Hinton, Laura King, Andrew Maurey, Cindy Muir and Greg Shafer. Fifteen unique conversations, on how they go about serving the public interest of Floridians through utility regulation.

Chair Art Graham

PUF's Steve Mitnick: What's a typical day like for the Chair of the Florida Public Service Commission?

Chair Graham: My typical day starts off in the gym. I've got to get myself in the right frame of mind. Get my head together and get ready for the day. Then, I go through my news clips.

I read through the news clips and see what issues are getting attention. Sometimes that sets the priorities for what happens that day.

After that, like every Commissioner, I start digging into docket files. I start reading staff recommendations for cases that will come before the Commission in the next meeting, or the testimony of cases that are coming up, and look for any orders coming out from cases we've decided to make sure the order reflects our intent.

Reading is by far the biggest part of the job. The public sees us in the Commission's meetings, but that's a tiny part of a Commissioner's work. Day after day, we have to absorb an awful lot of information to be ready to make the decisions in those meetings.

And, of course, as the chief administrative officer of the PSC, I get a constant stream of administrative things. Even though our staff handles most of the process, there's always so much going on that even the sliver that comes to me can fill a lot of a day. I referee scheduling issues among the parties, assign Commissioners as prehearing officers for dockets, approve Commission expenditures, oversee external relations, and plenty more.

PUF: How did your career lead you to this role?

Chair Graham: I'm an engineer by trade. I worked in paper mills. I was living in Jacksonville Beach, Florida and got to a situation where some friends of mine were very politically active in the little beach town of twenty-three thousand people.

They dragged me to my first city council meeting. I was never involved in public affairs. I never cared about politics. I went to the first meeting and was sitting there scratching my head thinking, number one, who is this bunch of people making the decisions?

I didn't agree with the decisions they were making. That motivates you. Later I was talking to my representative on the city council when he stood up and said: son, let me make something perfectly clear to you. I'm the elected official. I make the decisions. If you ever become the elected official, then you get to make the decisions. That really motivated me – six months later I took his job.

Elected office was never my career, it was just something I did. Eventually it led me here, though, and the PSC definitely took over my career.

Maybe public service was a calling. It felt natural. It gives a different perspective because you usually don't see an engineer in politics.

An optimist says the glass is half full. A pessimist says it's half empty. An engineer says the glass is just twice as big as it needs to be.

– Chair Graham

PUF: Does your training as an engineer help in this role?

Chair Graham: I just think it gives a different perspective. There's a joke I find funny because it really captures it: An optimist says the glass is half full. A pessimist says it's half empty. An engineer says the glass is just twice as big as it needs to be.

Being an engineer makes me think in very practical terms about what's really necessary to meet a need. When I hear someone wanting to replace all the coal-fueled electric plants, I kind of rebel at wasting half or a third of their useful life. Ratepayers already paid for that capacity. They shouldn't have to pay for it again.

A plant is going to age out of the system on its own, and it's hard to tell an engineer to spend ratepayer money on something that's going to take care of itself. You have to be more practical than that.

PUF: Did you feel like you had some mentors along the way or key turning points?

What about the value of having generating assets that can run even if there's a major disruption to natural gas transmission systems?

– Chair Graham

Chair Graham: You always have mentors along the way. I think my boss when I was working for Georgia Pacific was key, because when you're in production, there's a sense of urgency.

When the machine went down, he didn't care where I was. He didn't care if I was on vacation. It was costing them a ton of money every hour. That sense of urgency really stuck with me.

It seems a lot of times in government, people don't have it. Maybe they don't think about the consequences – the investments that aren't being made, the solutions that aren't being put into place. We can't just pontificate on things, we need to make a decision.

That extends to the way I chair Commission meetings and hearings, too. Is this discussion adding value, or is it a digression? If the Chairman doesn't impose some discipline to keep things moving forward, he isn't doing his job.

PUF: How do you work with everybody within the Commission?

Chair Graham: I've got my core group of people that I reach out to all the time. Then if there's something more I need, they will arrange it, or I'll reach out directly.

It's in my nature that I enjoy talking to the people who are dealing with the reality on the ground. Sure, I have to always be in touch with top management and external constituencies, but there's value in getting out of the bubble, being directly connected to the realities your organization is dealing with, and, frankly, injecting perspective into parts of the organization that may have an insular outlook.

PUF: Do you have some things you want to accomplish within this role?

Chair Graham: I'd like to see us more committed to fuel diversity for electric generation. The Florida PSC is very cost conscious, and rightfully so, but in recent years cost considerations have led us to keep moving all our eggs to one basket. It's to the point we should be asking ourselves, what about the value of having generating assets that can run even if there's a major disruption to natural gas transmission systems?

I'd also like us to do better at explaining to the public what we do. When we grant a rate increase, it's not because we feel like it, it's because the utility has a right to it. The Supreme Court long ago determined that if government is going to set a utility's rates, we have to set them at a level that gives the utility an opportunity to recover all its prudent costs, plus make a return on its investment. But if you're not some kind of regulatory nerd, you don't know that.

PUF: How do you feel about the future for the utilities?

Chair Graham: I'm very optimistic.

The electric industry is facing a lot of change, of course, and that's kind of intimidating. But these are companies that have innovated and continually improved, and they will adapt, and I believe thrive.

We just have to take care not to neglect existing kinds of operations and infrastructure – the future is something we need to talk about, but proven operations are what customers count on today. We have to be pragmatic.

Water utilities will face their own challenges. Water quality standards and supplies are both tightening, so those utilities will have to take advantage of technological development, and also find capital to meet new infrastructure requirements. That certainly can be done, although water service may not be as cheap as it is today.

Mostly our natural gas companies are enhancing the customer experience, but the fundamental business model isn't changing much. On the residential side, it's not used much for heating, and the people who like gas appliances probably will continue

to. I don't see much change for industrial users, either, except there will be more of them. Industrial demand will drive a lot of the expansion of gas utilities.

We don't regulate telecom utilities, but the wild evolutionary ride they've been on for twenty years makes me assume they can handle whatever's coming.

PUF: Do you feel like one of your missions is to make Florida a better place so there would be more economic development?

Chair Graham: Without a doubt. Aside from our quasi-judicial role, we're exercising quite a bit of policy-making responsibility. I'm always conscious that we're part of the state's over-arching strategy, and job creation is the state's top objective. It's important that we're doing our part.

Our governor's focus has always been to bring businesses here. He says there's no reason why every single CEO wouldn't want to bring his headquarters here to Florida.

– Chair Graham

Our governor's focus has always been to bring businesses here. He says there's no reason why every single CEO wouldn't want to bring his headquarters here to Florida. We've got great weather. We've got great roads.

Some FPSC Staff and other Floridians listen in at a Commission Internal Affairs meeting.

Businesses are going to want to come down here because we're a low-cost state, and Florida appeals to their employees, too. Florida is a fantastic spot. You go maybe a hundred miles from any point in Florida and you're going to hit sand and beach somewhere. What's not to love here?

So we can diversify and bring more businesses in. It doesn't have to all be high-tech businesses. It doesn't have to be an Amazon headquarters. We want all kinds of jobs.

We have a huge military presence in the state of Florida and a lot of those people want to stay here after their military service. They're people with a work ethic, who will get up every single morning, be at work on time, do the job, and provide for a family.

Our part of making Florida a better place is, of course, to assure reliable utilities at a low cost, and that certainly brings economic development. A lot of this comes down to common sense. If you have decent rates and your customers are happy, that's attractive.

We also support economic development in some very direct ways. Our utilities have economic development tariffs that are immediately available to an industrial prospect. We also approve special contracts for gas or electric as long as they more than cover the incremental cost of serving the new customer. ❍

Commissioner Julie Brown

PUF: What's your typical day like?

Commissioner Brown: This is a big state. We are the third largest in population size and are geographically expansive. No day is ever the same.

As Commissioners, we all hail from various parts of the state and have diverse backgrounds. We all have different "typical" days. Whether it's educating elementary school students about water conservation, serving as pre-hearing officer over a docket in a quasi-judicial capacity, or representing our state on national committees involving critical energy issues, there are a lot of different roles that we serve.

For example, today we sat down and spent several hours going over how to help improve the resiliency of the electric grid. We also discussed post-hurricane restoration and the assortment of issues that can affect the restoration process.

We made findings and recommendations that were a by-product of an extensive forensic review of our utilities' performance following Hurricane Irma. A lot of time and energy is spent on items like this, which are so important to our entire state.

PUF: What role did you play?

Commissioner Brown: When I was chairman in 2016 and 2017, we had four hurricanes hit our state. Although we had not been affected by a major storm since the 2004-2005 season, I felt it was important to have a face-to-face roundtable discussion with our investor-owned utilities in 2016, prior to the start of hurricane season, which begins on June 1.

We discussed a myriad of topics and learned about the different measures the IOUs were implementing, irrespective of their hardening efforts. The roundtable discussion, which was well received, gave the Commissioners the opportunity to hear directly from the executives about how their companies will communicate with their customers during a storm, or major event, and how they plan on improving from lessons learned.

We started the roundtable discussions in April of 2016, and Hurricane Hermine came in August of 2016. We were in the middle of a two-week technical hearing, that I was presiding over, and the Governor had declared a state of emergency. Hurricane Hermine was on a path to Tallahassee, and we were fortunate to have concluded and gotten everyone to safety in time.

After Hurricane Hermine, we had Hurricane Matthew, which was expected to cause significant damage as it was a massive and deadly storm. However, our state was fortunate that it stayed primarily offshore near our coastline.

Then, we had a rather destructive 2017 hurricane season, with Hurricane Irma first hitting the Keys as a Category 4 hurricane in September 2017, and ultimately impacted our entire state. A month later, Hurricane Nate impacted the Florida Panhandle.

As Chairman, I had an opportunity to sit in on statewide calls at our Emergency Operations Center and go into the field to experience restoration efforts up close. I quickly realized that in this modern day and despite all the public service announcements about planning before hurricane season, customers want immediate restoration regardless of the magnitude of the storm. While our utilities strive to get power restored in a timely fashion and have intricate plans in place, there are always key lessons to be learned following a season like 2017.

In this modern day, despite all the public service announcements about planning before hurricane season, customers want immediate restoration regardless of the magnitude of the storm.

– Commissioner Brown

As an agency, we have been fortunate to have productive discussions with all stakeholders that have bolstered best practices being implemented. We know from the data that restoration times are down significantly from the 2004-2005 hurricane seasons.

We also know that hardened poles have weathered the storms better than non-hardened poles. I am certain we will learn more over the next coming years, with investments in emerging technology, about ways to contribute to an even stronger, more resilient electric grid.

PUF: You must know that the whole country has been watching what's been happening in Florida, with the hardening, the investment, even some undergrounding?

Commissioner Brown: I know they talk about Florida. We have been at the forefront of discussions on hardening efforts and grid resiliency. Our PSC has improved the mechanisms we have in place to have more dialog with the key stakeholders to ultimately produce better, cost-effective results.

The productive discussion that we had today during our meeting, with the rapport among Commissioners, is a culmination of a lot of these efforts. We all have great pride in our states, but I believe that Florida's expertise on grid resiliency is because we have so many leaders who are dedicated to innovation and continuous improvement in this arena.

We are a hurricane-prone state that needs to explore important issues such as tree trimming, customer communication measures

Florida's expertise on grid resiliency is because we have so many leaders who are dedicated to innovation and continuous improvement in this arena.

– Commissioner Brown

and undergrounding in areas where it makes sense.

The hurricane docket that was opened following Hurricane Irma took in a great deal of information and public input. We also had a two-day workshop with the different stakeholders addressing storm preparedness and restoration activities.

A lot of the comments we received clamored for undergrounding. And although the forensic data from Irma reflects that underground facilities performed better than overhead, that is not always the case. There are a variety of issues that can affect restoration times for underground lines, and sometimes the cost may not outweigh the benefit. We're getting the data from pilot projects to see if it makes sense in certain areas to do underground conversions in susceptible areas.

All it really takes is one storm to realize that your state needs to be prepared for the absolute worst.

PUF: You have such huge energy and passion about this. Where does it come from?

Commissioner Brown: What inspires me? Family first. My husband and children know how much I value public service and are extremely supportive. We all make a lot of sacrifices.

This job is not a desk job. Florida is a very large geographical state. We have offices in Tampa and Miami, so we have employees all over the state. One thing I'd like to underscore is that geographical diversity on the Commission is critical in Florida, and we've been fortunate to have had an array of representation that I believe helps provide a more thorough representation of the public's interest.

We have service hearings and technical hearings – depending on the circumstances – throughout the state to take public comment, which give us an opportunity to hear from citizens across the varied regions of Florida.

It is important to stay involved in our state and around the country. I am usually more than willing to serve on committees and boards that keep me abreast of the meaningful issues that help regulators stay educated.

We have a job and a duty to be apprised of the matters and trends that are occurring around the country, so that we're better informed. Although my areas of interest have continued to evolve over the years as a Commissioner, I have an increasing appetite for technology across the different industries we regulate.

This job is most fascinating in that you get to combine law with public policy. It's very rewarding. We've seen a variety of cases over the years, and I know the work we do is important to every individual who is affected. So, I endeavor to ensure the same attention to detail is given equally to the smallest cases as well as the more substantial ones.

PUF: How do you deal with the pressures of your job?

Commissioner Brown: Being a seasoned regulator, I take a different approach. I don't base any of my decisions on any of the pressures. We all know what's right from wrong, and we base our decisions on sound policy, the law and the facts that you have. Serving as an attorney, I have the background that allows me to focus on that.

PUF: How did you become a Commissioner?

Commissioner Brown: There's an appointment process and it's quite cumbersome. It's almost like applying to be a judge with a nominating council, and then having to go through the Governor along with a senate confirmation. I had been a practicing attorney

for several years in Tampa and had been serving as an in-house attorney, doing a bit of regulatory work in Tallahassee when there was an opening.

I found that getting appointed and confirmed to a four-year term is a pretty arduous process. But it is worth it – again and again. Serving the public in this capacity is truly an experience like no other, yet we all know that it's not forever. Regulators don't serve for the rest of their working lives.

We also are in the lower quartile of electric rates. We're doing things to help encourage businesses to come to Florida.

– Commissioner Brown

So, each of us has to make the most of it. I knew that going in, which is why I've tried to be as involved and get to know other state Commissioners, get to see what trends are going on in the industry, and educate myself on emerging technologies. I'm so grateful to be serving our state as a Commissioner, which has been the highlight of my career.

PUF: What are your aspirations?

Commissioner Brown: First of all, our industry, right now, is on top of so many key issues. There are challenges, but I'm optimistic because I've seen Florida utilities addressing so many issues, like battery storage and electric-vehicles technology, in a prudent manner.

We hosted a workshop on these emerging technologies, where we discussed challenging issues and marketplace trends. Customers want that and are driving a lot of the new innovations that are occurring in our state. And utilities are adapting.

I'm optimistic because when I started on the Commission we had almost eighteen million people in the state of Florida. Now, we have twenty-one million and we've bumped up to number three in population. People are coming to Florida because we have low unemployment. We have a beautiful environment and a lot of tourist attractions. We also are in the lower quartile of electric rates.

We're doing things to help encourage businesses to come to Florida. We have economic development riders that we've approved and have taken steps that truly stimulate and encourage other businesses to come to Florida because of our attractive environment.

PUF: There's an important component of keeping the economy strong and improving it from the Commission. Do you see a link?

Commissioner Brown: Yes. But keeping rates affordable is critical to businesses and people across the state.

Our utilities are embracing technological trends that customers want. We have seen a deployment of major utility-scale solar, and we're going to see more of it over the next few years. We've even seen fully participated solar volunteer programs for solar farms, like a solar nursery.

It's very popular in our state, and our utilities are embracing these types of programs and offering a variety of options.

We've seen amazing strides in energy-efficiency programs, and there are so many different types of programs that are being offered and utilized. I will say that affordability is one of the main drivers to our state's economic viability.

PUF: Did you have any special mentors in your life?

Commissioner Brown: There have been a lot of mentors over the years as a lawyer and Commissioner. Other state Commissioners around the country have helped mentor and shape my role as a Commissioner, especially in our region.

I have a deep appreciation for my fellow Commissioners and the roles that they serve in their respective states (whether elected or appointed) and hope that I can also reciprocate the wisdom that has been bestowed upon me over the years. ❍

Commissioner Gary Clark

PUF: What does a Commissioner do?

Commissioner Clark: The Commission basically acts as a surrogate for competition. We are the force of competition that is applied to a monopoly business to make sure that consumers are getting fair value for their dollar.

On a daily basis, I spend most of my time reading and researching. The amount of information that is presented to the Commission is very large. There is testimony and data from utilities, intervenors and staff that must all be reviewed and studied prior to our hearings and agenda conferences.

It's about understanding the case that is being presented, looking at it from all perspectives and then trying to find the right balance of consumer needs and utility needs. In my mind I am always asking, what is the logical solution to the problem being considered.

PUF: What do you look for?

Commissioner Clark: You're really looking for the truth, and sometimes it's a real search. You have two sides of an argument, two perspectives, two opinions, and getting it boiled down to the essential elements relative to the problem is critical.

Consumers have a right to fair pricing, reliability and safety while utilities have a right to a reasonable return on investment.

For instance, in Florida, making decisions on how much investment in hardening is enough and how much is excessive can be very subjective. Having as many key facts as possible and an understanding of the real world applications is important to me.

PUF: Is what you do fun or interesting?

Commissioner Clark: It's exciting. I love this. Having an opportunity to play a role in our state's energy policy, and an opportunity to make a positive and lasting impact on the state of Florida is very exciting!

I also think it's very important and must be taken seriously. If you step back and take a look at the critical role that energy, water and communications play in the every day lives of Floridians and Florida commerce you have to place a high value on what we do. Making certain that those essential services are available with future capacity, affordable for consumers, reliable for a tech based economy and resilient in the face of severe weather is what drives me every day.

PUF: How do you tell people what you do?

Commissioner Clark: I usually try to break it down to the lowest common denominator. I simply tell them that it's my job to make sure that their power stays on and that it's priced fairly.

In Florida, making decisions on how much investment in hardening is enough and how much is excessive can be very subjective.

– Commissioner Clark

That is also when I get the funny looks. Most people don't have a clue how the Commission operates or what we do. If you begin with the statement, we regulate utilities, you get an even more puzzled look. Usually the conversation comes back around to making sure that consumers are protected from potentially unfair charges by a utility that otherwise operates as a monopoly.

PUF: How did you become a Commissioner?

Commissioner Clark: I started my career working for a non-regulated electric coop. I started when I was nineteen years old as a work study student, working for a semester and going to school for a semester. I began as a residential energy auditor. So I sort of started on the consumer side of the business, sitting at peoples' kitchen tables discussing energy cost and efficiency.

As my career progressed, I also became a certified energy manager. I handled most of the coops' internal operations except accounting. I was responsible for retail operations, cashiers, outage management, customer service, meter reading, automated metering, communications, and load management to name a few. We had almost thirty thousand consumers, which is large for a coop. I ended my service after twenty-seven years at the coop as a vice president.

My plan was to go home and enjoy an early retirement and help my wife manage our family restaurant business. She said no. Apparently, she was doing fine without me.

So I fished and mowed grass for a couple months until Jon Steverson, a good friend who was Secretary of the Department of Environmental Protection, called me up and asked me to come to work for him as Deputy Secretary of Land and Recreation. I said no three times. Working for the Department was never something I thought I would even consider.

He finally convinced me to give it a chance. I spent three years managing Florida's State Park System and the Division of State Lands.

It was a blast. That was the most exciting job I ever had. It was such an honor to work with some of the most committed and caring professionals in the state of Florida and to get to

experience Florida's incredible state parks system first hand. I am grateful to former Secretary Steverson for the opportunity he gave me.

It was actually hard to leave that department, but when this seat came open after Commissioner Patronis was appointed as the state CFO, I knew this was something that I wanted. The opportunity to apply for an open seat doesn't come along very often. So, I started calling some people I knew who might know the process and pretty soon I was standing in front of the nominating council asking for an opportunity to serve.

I was honored to have been recommended by the council to the governor and one of the highest honors of my career was being appointed by Governor Rick Scott to fill this seat.

Florida continues to be a leader by taking the right steps, cautiously, pragmatically, to balance consumer needs and costs with high growth, energy demand, fuel diversity.

– Commissioner Clark

PUF: As Commissioner are you optimistic about Florida's energy future? What are you concerned about?

Commissioner Clark: I'm very optimistic about our energy future. I think that our utilities for the most part are industry leaders and innovators.

Our rates are below the national average. Our investments in infrastructure hardening and resiliency paid off during the last major storm we faced. Our electrical capacity is strong. Our investments in renewable energy are growing faster than projected.

Our gas industry is meeting strong consumer demands with expanded infrastructure investments. Our water utilities are quickly adopting new technologies and expanding their systems to meet Florida's high growth demands. Overall Florida continues to be a leader by taking the right steps, cautiously and pragmatically, to balance consumer needs and costs with high growth, energy demand and fuel diversity.

My biggest concern for our state and our energy future is our vulnerability to weather. If we see another large number of storms in a year, they will undoubtedly cause us some serious problems. It's something you can't predict and no matter how good our systems are built, you can't reasonably build a system that is one hundred percent outage proof.

So we are always going to have some vulnerability when it comes to the weather. What we can do is plan and prepare, and I can't think of any other state that does it better or has more experience than Florida.

Another concern that I have is with the diversity of our fuel supply for electric generation. Over the past ten years we have become heavily reliant on natural gas for our generation needs. This move has been very positive for consumers in the short term due to the low price of natural gas.

But we import our natural gas. As a peninsula state we have some vulnerability when it comes to supply and potential disruption. Most of our gas is transported through four major pipelines. As more of our generation is dependent on gas we have more potential for disruption.

We also have some exposure to potential price increases as supply and demand is met from our existing transportation network that serves the entire nation. Natural gas pricing is not regulated on the wholesale markets and Florida, like many states, is exposed to price volatility in the markets

The Commission is in a tough spot when it comes to making future decisions on new generating capacity, balancing the desire for low prices in the short term versus reliability in the event of supply disruptions. This is further complicated by growing demand for alternative energy, the need for storage solutions, potential carbon costs and a higher installed cost for traditional generation.

While nuclear generation was long considered a strong long-term solution, it has faced crippling blows in terms of construction costs and perceived public safety concerns and some utilities have taken planned units off the table entirely.

We must act responsibly and prudently with a strong look toward the future if we want Florida's energy future to be as strong, reliable and cost effective as our past.

PUF: How do you want to have an impact?

Commissioner Clark: That's something I have thought about a lot. Number one, I am an advocate for conservation and energy efficiency. I spent my entire career working with customers and helping them to reduce and manage their energy consumption. I want to focus on programs that reduce demand, lower capacity needs and reduce energy consumption at the consumer level.

I also want to influence the future of customer service on a bigger scale. By advocating for demand side management programs, stronger communications with customers, flexible consumer payment programs and more pricing signals, we will put consumers in a position to make good decisions about how they spend their energy dollars and really set our state up for success in the future.

I'm also an advocate for technology. I think that we are going to solve a lot of our future energy issues with enhanced and increased technology. But if I had to boil it all down to one thing, I want to be remembered as a Commissioner that was fair, honest, straight-forward and made every decision looking at the long-term impact on Florida as a whole. ❍

Commissioner Andrew Giles Fay

PUF: Can you tell us how you became a Commissioner at the Florida PSC?

Commissioner Fay: I am not sure how the journey began, but I really think that the support of my family and friends is the reason I am here today. I also think my academics, experience, and work ethic led me to this opportunity. I was well aware that, historically, younger applicants are not appointed to the Florida Public Service Commission, but I wasn't worried about that hurdle. I believed I was the best person for the job and that is why I submitted my application.

My first job out of law school was serving as an Assistant Attorney General. It was one of those rare opportunities that allowed me to work on issues that impact the entire state of Florida. You have to be responsible and responsive to what all of Florida needs, not just certain areas.

The Governor and Cabinet, which includes the Attorney General, serve as Florida's Siting Board where they review the development and expansion of power plants in Florida. Working on Florida's Siting Board Act was actually my first taste of utility regulation as Assistant Attorney General. I was extremely fascinated by the issues and felt that they were a good mix of legal and policy. When working on these types of issues, you have to find a balance of interests.

When I started talking to my friends and colleagues about how the Siting Board Act worked, I quickly realized it wasn't as exciting to them as it was for me. There was no more denial in the fact that, if you like this stuff, you're a little different. I'm accepting of that, I enjoy it, and I wear that nerd badge proudly.

In Florida, the appointment process starts by submitting an application which states why you believe your expertise meets the statutory requirements of the position.

Then, the Public Service Commission Nominating Council, which is a bipartisan group selected by the Speaker of the House and the Senate President, reviews your financial disclosures and everything else you submit, along with your background, to determine if you are, by definition, a qualified candidate.

PUF: Is it somewhat political?

Commissioner Fay: I can't speak to previous appointments, but during my appointment I felt that the Council sent the best candidates forward regardless of any political affiliation. I was very honored to have my name submitted to the Governor with three other extremely qualified candidates that represented a wide array of views.

PUF: How did it go for you?

Commissioner Fay: It went very well. I guess in hindsight, I exceeded expectations. I thoroughly enjoyed it because it's hard to articulate in a document why you feel you're qualified and why you're passionate about something. Part of my success through the appointment process was that, once again, my nerdiness would show, and the Council could see that I was genuinely excited about the subject matter.

I think it is extremely beneficial to have that personal interview process that you go through. I received some very good questions from the Council which gave me an opportunity to discuss my qualifications.

Once again, this entire process is in the public. I guess it is not all that different than the first round of American Idol, except if I had to sing, I am pretty confident that I would not have moved on.

I guess the appointment process is not all that different than the first round of American Idol, except if I had to sing, I am pretty confident that I would not have moved on.

– Commissioner Fay

PUF: Then the group is narrowed down, and the Governor has a choice?

Commissioner Fay: Correct. Chapter 350 of Florida Statutes states that the Legislature can send three or more individuals to the Governor to make a decision. In my situation, there were four of us that were sent forward. The Governor personally interviewed all of us.

PUF: You went to Governor Scott? How was that?

Commissioner Fay: That was fantastic. I was able to show the Governor how excited I was about this opportunity and talk about my background. There is no stone left unturned in this process. The Governor and his staff even asked me about some specifics from my transcripts in college. They made it apparent that they are extremely thorough in their review of the applicants. There's nothing you haven't done that isn't looked at or reviewed before you get to this final stage of the process.

After the Governor selected me, I went through Senate confirmation hearings. There were three committee meetings: a utility committee, an ethics and elections committee, and a rules committee before the full Senate body votes on your approval. It was a very long process, but I think that it ensures that only individuals who are truly committed to working in public service will advance forward.

PUF: Did your age come up in any of this?

Floridians expect their electricity to work, and we are constantly making decisions that impact them, so that's what makes me so passionate about the work.

– Commissioner Fay

Commissioner Fay: It did only to the extent that I felt it was important to demonstrate why my experience made me qualified for the position. It's honestly hard to say if anyone thought it was relevant. Historically, you haven't had commissioners serve at this point in their careers, and I'm sure there are lots of different reasons for that. I do believe that those different perspectives are critical for a state as diverse as Florida. That's one of the main strengths of this Commission.

As complicated as the selection process is, the Legislature and Governor should be commended for selecting a diverse group of Commissioners that represent a wide array of interests across our state. I believe that I bring a different perspective, but everyone in this Commission, all five of us, have different perspectives and different strengths, and that serves as a strong representation for Florida.

PUF: What's fun in what you do?

Commissioner Fay: I know it sounds cliché, but it's all fun for me. These initial few months since I've started have been a constant learning process. I probably haven't read this much since my first year of law school. There is always something new to learn, and that is one of my favorite parts of the job.

I like the complexities of the issues. I also like how the subject matter and the issues lend themselves to different aspects of my background and strengths. As a lawyer, the legal components are where I always go first. It's always what draws me to an evaluation of what we're doing. In the utility world, decisions can be more complex than just a legal analysis. They can have broader policy implications, and potentially create precedent for decisions made down the road.

More than any other agency I can think of, the decisions we make here have a direct impact on millions of people. We're a state of twenty-one million people and, as one of five Commissioners, I have to always be mindful of the significance of my role. Floridians expect their electricity to work, and we are constantly making decisions that impact them, so that's what makes me so passionate about the work.

That's why I'm so excited to work on these issues because, beyond that learning curve, you know that the more thorough you are, the more time you research issues, the better information you will have to make those decisions.

I want to know it all. I want to have every piece of information available to make the best decision that I can. It's time-consuming and, at times, it's very challenging, but I think it's what we were appointed to do.

PUF: How do you prioritize?

Commissioner Fay: In Florida, our Commission cannot communicate outside of a public meeting. We can work on issues internally and learn as much as we can, but it's not until those public meetings that you get to discuss those issues with your fellow commissioners.

That allows for a lot of openness and discussion at our agenda meetings for each Commissioner to weigh in on their position before we vote. It also allows for questions to be asked of witnesses and staff before making a final decision. Engaging in our public hearings is one of my favorite parts about serving as a Commissioner.

PUF: Are there rules there?

Commissioner Fay: Yes. Florida has one of the most open operations of government in the country. That means from a preparation standpoint, commission staff does its work and publishes its recommendations, and as a Commissioner, we see those recommendations at the same time as everybody else.

It allows us as a Commission to freely review everything in our own world to understand the issues and then publicly discuss it with the other Commissioners. When you look at a Commission meeting, the public has the ability anywhere in the state to go online and see that meeting live. They not only have the ability to do that, but our Commission allows customers to go online and look at all the documents and resources that are filed with the clerk's office.

PUF: Do you feel like you can have an impact?

Commissioner Fay: I do. We hear generically about technology being a large component of the utility industry. Aside from being a nerd and reading the statute books, I'm also a techie. I love technology and I am fascinated how sometimes it makes our lives easier, and sometimes it doesn't.

I'm also intrigued by the advancements of new ideas and believe there are opportunities to look at advancements in technology in a way that is appropriate for large-scale applications. I think Florida is very different from the rest of the country and, as a Commissioner, I should be constantly evaluating if something is good for Florida.

Technology advancements can be extremely challenging as to how they will be implemented appropriately, but I think they might, in the long run, create some additional satisfaction for the user. We have seen some great advancements in our state in response to storm and hurricane related damage.

For example, some of the utility companies have started using drones to evaluate storm damage to power lines. That idea is not only helping to ensure better safety for their crews, it's creating these amazing efficiencies for them to be able to see exactly what went down, and the best way to fix it quickly. Just think of how important something like that is when you are in an area like the edge of the Florida Everglades.

I truly believe openness to innovation and advancement allows for constant improvements in these areas. I know some of those ideas will never pan out and they're not all going to be perfect solutions. You might have pilot projects rolled out and decide to never go any further, but it's Florida's willingness to try those things, that I believe is beneficial to our state as a whole. It's proven that we are already benefiting from some of those decisions that have been made.

PUF: How's solar for Florida?

Commissioner Fay: Solar continues to be a topic of discussion in Florida, and we're seeing some significant growth in the use of solar which, for a lot of the customer base, is fantastic. Some Floridians are really happy to see that. I believe those changes are largely in response to customer demand.

PUF: Do you have to explain what you do to your family?

Commissioner Fay: Absolutely. Most of my family and friends don't understand the job or what the Commission does. That is one thing I hope to improve during my time here.

When I tell people I am a Public Service Commissioner, they typically give me a blank stare. Sometimes their stare gets even worse when I explain that I regulate utility companies. A bunch of my friends and family presumed that I was going to be working with non-profits because of the job title.

PUF: Maybe society has become complacent in expecting their utility services to always be there for them?

Commissioner Fay: I think we are all guilty of that. At my home, I am more worried about my smart light switches working than I am about the generation and transmission of the power to my home.

With the storms in our state, Floridians have high expectations there will be electricity even during bad weather.

– Commissioner Fay

It's amazing to think that we have that expectation, but that's where we are today. I think we've seen with the storms in our state that Floridians have high expectations there will be electricity even during bad weather. That expectation is something that this Commission is looking at very closely because of the impact storms can have on reliability.

PUF: Do you think the expectations will continue to rise?

Commissioner Fay: If history tells us anything, I do. As we look nationally, we are a state that is growing at a very fast rate, so you think of both the challenges and the benefits. There will be opportunities for a more efficient use of resources, potentially scaling things to cut cost.

There are all kinds of opportunities but, at the same time, we've got close to a thousand new people a day that are coming to Florida and need power.

I'm a born and raised Floridian. I love our state. Florida is an amazing place to live, and I don't see that changing any time soon. We'll continue to grow.

We're going to have to continue to think about what's working and what's not and look at ways to fulfill those demands. I am extremely optimistic. I believe we're headed in the right direction. I truly believe Florida is going to be prepared to satisfy the demand that is going to come with population growth, and I think we're improving in all areas including better structures to protect against storms. ❍

Commissioner Don Polmann

PUF: What is your background and what led you to this role?

Commissioner Polmann: I have a background in environmental engineering by education. I have lived in Florida since childhood, and the importance of water as a natural resource has always been in the forefront. My greatest interest was on water and natural resources, environmental quality protection, and so forth. I went on to pursue a master's degree.

I was very involved in water supply and reclaimed water, even back in the early 1980s. My focus was the hydrologic aspects of water supply and wastewater management. It was not so much on the infrastructure side as municipal utilities, per se, but rather the supply side, water resource development, and environmental-quality issues.

I didn't feel that I knew everything I needed to know, so I went back to graduate school, and pursued a doctorate in hydrology and water quality to learn how to be more effective with advanced techniques.

It was that whole environment of resource management, water-quality maintenance, and so many new regulations. That became my focus in the 1990s.

PUF: How did that experience prepare you for your role at the Florida PSC?

Commissioner Polmann: At that point, having finished my doctorate and gone back to consulting, I was working on projects and didn't have the opportunity for the big picture.

I entered public service in the mid-nineties at the Regional Water Supply Authority that became Tampa Bay Water, as Director of Science and Engineering. Over nearly two decades, my team helped develop new sustainable water supplies as an integrated regional system of groundwater, surface and desalinated water serving six local governments and 2.4 million residents.

With that accomplishment, I went back to consulting for a couple years and thought being in public service is really where I belong. I very much enjoyed the time I spent serving a large community and accomplishing something that had such great meaning to everyone. To be able to provide a service that makes a difference is what means the most to me. So, I went through the process of applying for this job, and I'm so glad I did.

PUF: How did your experience in the water industry prepare you for this role?

Commissioner Polmann: It's different but it's the same. Our regulatory realm includes electric, gas, water and wastewater.

At the end of a utility system you have customers, and they require that service. Whatever it is that's being delivered, they require it every day, all day, all year. They have an expectation that they're going to receive service without interruption. So, they look to their utility provider to do their job.

I didn't feel I knew everything I needed to know, so I went back to graduate school, pursued a doctorate in hydrology and water quality to learn to be more effective with advanced techniques.

– Commissioner Polmann

Now, if you look back at the other end, in every case, there is a source. Whatever it is that the customer ultimately receives, the utility starts with, let's call it raw material.

In the electric sector, the utility generates electricity, they must transport it, and they must distribute it, and then deliver it to each customer locally. There's a whole network.

There's capital. The utility also has operation and maintenance.

The utility has decision-makers at some level. The utility has regulations and needs permits. In every regard at the Regional Water Supply Authority that I worked at, it's the same.

There's a budget, capital, operations and maintenance. There are decision-makers, regulations, and analogies in every case, be it a natural-gas system, electric, or water system.

You take your practical aspect of how all that comes together and then you have to learn the particulars. I have some facility in my experience that I transfer over here. I have people that help me every step of the way.

I wouldn't say I'm an expert, but I'm learning. I have my chief advisor who's been here at the Public Service Commission almost eight years. When I came in, she was very adept and brought staff in from each department here at the Commission to basically go through a tutorial process.

PUF: Did your background help you prepare in a unique way where you bring something distinctive to the table when you all are making decisions?

Commissioner Polmann: Absolutely. All Commissioners bring something. They bring their experience of working from a particular perspective. They bring a specific expertise. In my case, I'm the Commissioner right now who brings the water and wastewater expertise.

I also bring that agency experience of having worked with thirty different elected officials sitting on a board who are decision makers. There's an entire process experience of what the staff does, what's behind that and all the effort that goes into bringing a case forward. I have some of that. It's a practical part of it.

PUF: What makes it fun for you?

Commissioner Polmann: This is definitely the best job I've ever had. It truly is due to the people here. You can see that almost immediately by recognizing the longevity, the tenure, the commitment of people who have been here not just for a few years, but many years.

There have been folks that have been here for twenty to thirty-five years. The commitment there is phenomenal, and they work as teams for that period of time. They enjoy a Commissioner who comes in and wants to know what they do and how they do it.

They're immediately responsive. They're open. They want to provide the information and they enjoy what they do. They enjoy helping the decision makers learn. It's very clear that they are here to serve the public, and they want to make sure that the Commission has all the information needed to make the decisions. We live by the notion that we are serving the public interest.

PUF: Do you feel like you're making a difference?

Commissioner Polmann: Absolutely. That's important to me. I wouldn't be here if I couldn't make a difference.

What's important to people from my perspective, is having sufficient, stable, reliable service at a reasonable, affordable cost. In this particular state, most utility services are provided by private companies.

We are involved throughout so much of the State that we make a difference. The decisions we make impact so many people.

The difference I make is being informed and asking questions that perhaps someone else doesn't think of. That's why it's important that we each bring our experience and our knowledge and that we work as a collegial body.

This is definitely the best job I've ever had. You can see almost immediately the longevity, tenure, commitment of people who have been here not just for a few years, but many years.

– Commissioner Polmann

If you watch our Commission, we work well together. Individual Commissioners have very ready and clear access to our staff. We work through our executive team, executive director and the deputy executives, but we can get any question answered that we need to. That is so important to us. It's a joy to be able to say, I need something more here, and I can get it.

We look at all the information. We ask all the questions we feel are appropriate and we make the best judgment that we're able to make in the public interest. It's a balance. These are private companies that we regulate, and they need to be able to make a profit in order to stay in business and operate. It's in no one's interest that these companies don't make a profit.

They are here to serve vital needs of the community; including the residents, the commercial interest and the industry of this state. We make the best decisions that we know how to maintain the balance.

We try to ensure that the customer paying the bill is paying an appropriate rate for reliable services and that the company operates in a way that assures that they will be here tomorrow. That's our assignment: to keep that balance, so that Florida continues to be a vibrant and enjoyable place to live. ❍

Braulio Baez, Executive Director; Mark Futrell, Deputy Executive Director, and Apryl Lynn, Deputy Executive Director

PUF: You are all directors. Tell us about your roles.

Apryl Lynn: I am the Deputy Executive Director of administration. That is the administrative arm of the Commission. It involves human resources, staff, budgeting, customer outreach and assistance, clerk's office and the auditors. We're basically the behind-the-scenes of the technical component. We keep everything floating.

PUF: So, between you and Mark, you split up the Commission. Who has the better part, you or Mark?

Mark Futrell: It depends on the day.

Apryl Lynn: Yes. I think we both have an important role. We're sometimes quiet, and if something isn't working, you'll hear about it. We want to make sure everything works as smoothly as it can, so that people can do their work. We're like a service arm. Our clients are both internal and external.

PUF: Mark, you have this other part. What does your part of the Commission do?

Mark Futrell: I'm the Deputy Executive Director of the technical staff. That includes the engineers, economists, accountants, and finance analysts who review requests of the utilities, and monitor their activities. We analyze that information and work in coordination with our legal staff in bringing items to the Commission for their consideration and vote.

I help ensure that all that work is going properly and on time, and then I help advise Braulio, so that he's aware of everything that's happening on our side of the shop. We work in coordination with Apryl and her team.

I think we have a good collegial relationship where we all work together. We're all here in service to the Commission, and then we work in coordination with our legal staff, because they're our partners in all of this.

PUF: Braulio, what is your role?

Braulio Baez: I try to take good counsel from all these people who do the real work. I try to articulate it to the Commissioners in a way that resonates with them, so they can feel they have all the information they need, whether it's good or bad, both, to be able to do their job, which is to make the difficult decisions. I count on all these people to fill my empty vessel, so that I can make sense of it in a way that provides a useful perspective for the Commissioners.

PUF: You're trying to bring all the staff together to work in a way that gives the Commissioners options and in a way that fits their needs?

Braulio Baez: I think that's fair. If pressed, I would describe my job as having two real functions. First is to empower the professionals of the agency, from Mark and Apryl on down, to do what they do, and what they are experts at. I'm not the expert at what they do, nor do I want to be. Empowering them to do their job is crucial to the operation.

On the other side, it's to empower the Commissioners to make their best decisions. Putting it in terms of having options, I think that's a fair statement.

PUF: How did you get to this point in your career?

Braulio Baez: I'm a recovering lawyer, and I also served as a Commissioner on the PSC for a little over five years. I also served as Chairman. I think the Commissioners appreciate the added perspective of having served on the Commission.

PUF: Apryl, what's your typical day like?

Apryl Lynn: They are all different. Some days we're putting out fires. We may have different administrative needs from day to day – hour to hour. As an example, if we're in budget season, that can be a very busy time when we're trying to make sure we are funding things appropriately and spending accurately. Then there are other functions that may be on a cycle.

There may be things we do in August every year, and there may be things we do every September. Then there are things that just hop in there that are different.

PUF: This Commission has become smaller over time. Is that a challenge to deal with?

Apryl Lynn: Yes. That's something that we deal with. Working with Braulio, the Commissioners, and Mark, there are some things that are legislatively driven. There may be an initiative to add more staff because of some legislative move or there may be an initiative to sometimes reduce staff. Unfortunately, sometimes we have to do that.

We work hard to make sure that those actions don't adversely affect staff and the work they do. That's something that's very important to us, so we try to be very strategic in satisfying our external customers, the legislators and parties, while ensuring things are still working as they should. Statutorily, there are things we must do.

There are a lot of moving pieces (between statutes, rules, etc.), so we have to check boxes to make sure that any and all actions are done appropriately

PUF: Is it a fun job to have?

Apryl Lynn: It's great. I love it.

PUF: Give us a couple of examples of the fun part.

Apryl Lynn: We're trying to make great strides to be more technologically savvy. So that's fun. The Commission is excited about that, as well as the staff. This is a place where people love to work. We have staff that have been here thirty years.

Transitioning, changing, and pulling that great institutional knowledge out of people to put into a system, is exciting. I think we're making positive moves in that direction. That's a fun and a great initiative the Commission is going through.

PUF: How do you gear up when you know a big event or big decision is coming soon?

Mark Futrell: Scheduling is a big thing. That initially is quite a big schedule. We have statutory constraints in certain matters where the Commission has to make a decision by a certain point. So, the scheduling is important.

A lot of our work is docket driven. There are a lot of recurring dockets that are predictable, and there are other things that are not predictable. We sometimes are in a reactive mode. So, we have to constantly stay flexible.

Then there's undocketed work that involves regular monitoring of the industries over which the Commission has authority and preparing reports to the Legislature and the Governor. We are constantly gathering information to try to give the Commission and stakeholders outside a view as to what's happening.

These are items like safety for electric utility distribution facilities and gas utility operations. There are a host of components we monitor to ensure service is being provided reliably. So, there's a lot of docketed and undocketed work that we're constantly trying to stay on top of and manage.

Then there are just the regular personnel-type actions. We ensure staff is developing, and that we're giving them the resources they need to improve. Retention is important, and we're trying to do everything we can to attract qualified staff, then try to develop them and give them the tools to contribute to the Commission.

PUF: How did you get to this point in your career?

Mark Futrell: I'm one of the long-standing people. I've been here for twenty-eight years now. I started as an entry-level analyst as an economist. For some reason they gave me a few more things to do over time, and circumstances led me to this opportunity. I'm really enjoying it.

PUF: Apryl, are you also a veteran here?

Apryl Lynn: No, but I'm getting there. I was a computer programmer for a few years after college. Then I stumbled into a job with another state agency in an administrative-type role.

Executive Director Braulio Baez attending a FPSC Internal Affairs meeting.

I try to articulate to the Commissioners in a way that resonates with them, so they feel they have all the information they need, to be able to do their job, which is to make the difficult decisions.

– Braulio Baez

So, I've been in administration my entire state career. I came here as a director a few years ago. Then I was promoted to this role a little while later.

PUF: Braulio, tell us about your work after you became a Commissioner.

Braulio Baez: I went back to private practice for five years, involved in regulatory and governmental law. This is my third tour with the Commission in different capacities. It is one of the greatest places to work and is full of the best people.

In the work atmosphere, although we deal with stressful issues and important issues, everyone has a good attitude. They make it a point to work well together. No organization is perfect, and we all understand that. I think generally this is a place that people like to stay, and the testament is that a person like Mark has been here for twenty-eight years, and someone like Apryl hopefully will be here for twenty-eight years.

(Cont. on page 64)

Grid Flexible Solar

Key to Unlocking Clean Energy Grid of the Future

By Mark Widmar, CEO, First Solar

Today's power grid is evolving. In recent years, a confluence of factors has fundamentally altered how electricity is generated, delivered, and consumed.

Prices for utility-scale solar and other renewable resources have plummeted to the point where they are the least-cost new resource for many utilities around the globe. At the same time, the proliferation of new technologies – everything from behind-the-meter solar projects to smart devices to electric vehicles – allows end consumers to interact with the grid in exciting new ways.

These advances have come with consequences; namely, significant changes in the load shape typically served by dispatchable generation resources. Nowhere has the need for modernization of grid-management approaches been more evident than in connection with the infamous duck curve.

Driven by the high level of mid-day solar generation during low-load periods, the duck curve clearly highlights the need for more flexible generation to manage increasing penetration of variable energy resources. To date, much of this conversation focused on adding new, flexible, thermal-generation units to the resource mix.

Because of older, inflexible units that have extended must-run times, grid operators typically curtail utility-scale solar projects to ensure that conventional fossil-fueled units can remain online to meet system needs. This view misses the opportunity to leverage solar in a more flexible manner. Through real-time dispatch, utility-scale solar can add value to the system by meeting system needs – just like conventional generation.

In most markets, utility-scale solar is still at modest levels of penetration and curtailment is not a concern. For these markets, the core-value proposition for solar is to maximize the production of energy and renewable-energy credits, where applicable. We call this basic solar, and this approach to development and utilization works well in early-stage markets with little distributed-energy resources or utility-scale renewables penetration.

For other regions, like California, which have achieved moderate solar penetration, some curtailment occurs when load is low, especially during shoulder months. This curtailment is driven by operational needs rather than reliability concerns, and its impact on the economics of utility-scale solar is manageable.

In its most recent Levelized Cost of Energy report, Lazard quoted thin film utility-scale solar at between 35 to 38 dollars per megawatt-hour. All other things being equal, absorbing twenty-percent curtailment raises that range to 43.75 to 47.50 dollars per megawatt-hour.

The least-cost thermal-generation resource, according to Lazard, are gas combined cycles, ranging in levelized cost of energy from 42 to 78 dollars per megawatt-hour. So for new units being added to the grid, even moderately high levels of curtailment should still favor solar over conventional thermal generation.

In addition to economics, curtailment can be a vehicle to provide flexibility and reliability services to the grid. By reserving some planned headroom via under-scheduling or through planned curtailment, solar can provide a host of essential reliability services to the grid. Dispatching solar in this manner creates value through much-needed operational flexibility, helping operators meet the needs of an evolving grid.

We call this basic solar, and this approach to development and utilization works well in early-stage markets with little renewables penetration.

Utility-scale solar resources can offer smoother ramping in the morning and evening hours or provide frequency regulation, meeting the flexibility needs of grid operators and overcoming challenges from inflexible conventional generation and distributed energy resources. We call this grid-flexible solar, and we believe this approach is critical to achieving higher levels of solar penetration nationally.

This isn't just a theory. CAISO, NREL, and First Solar proved out these capabilities in a real-world demonstration by leveraging a solar project to provide NERC-identified reliability services including frequency regulation, voltage control, and flexible capacity.

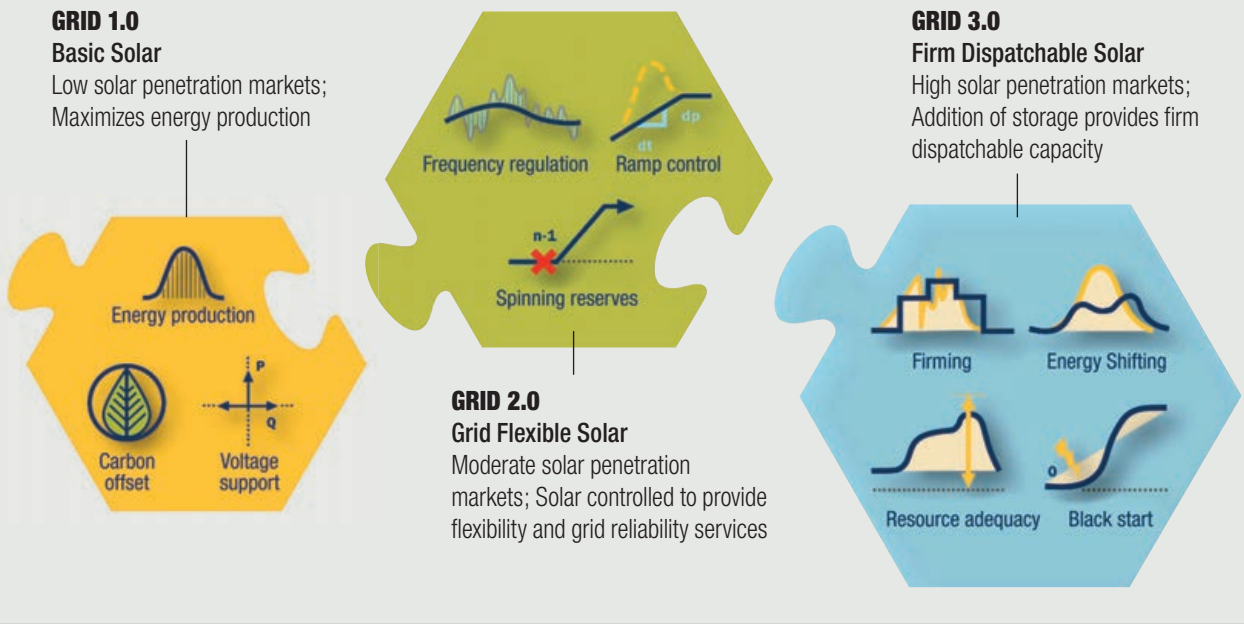
CAISO found that solar could provide frequency regulation at eighty-seven to ninety-three percent accuracy, compared to conventional units at forty to sixty-three percent.

Moreover, enabling solar to provide flexible services reduces curtailment overall, as it reduces the overall demand placed on thermal units. If planned for in the day ahead, rather than real-time, this reduces the need to rely upon minimum must-run units that idle on the system in case they are needed.

Rapidly evolving cost-effective storage provides an opportunity to further extend the capabilities of low-cost solar and enables even higher solar penetration. Adding storage to a photovoltaic plant provides the opportunity to reduce plant costs by sharing infrastructure and enabling other value streams that go beyond mitigating plant curtailment. It can align energy production with peak demand.

First Solar is actively working with utilities today to deploy

Fig. 1 **Progression to Grid 3.0**



solar-plus-storage solutions to meet their unique needs. Take, for example, the recently announced project between First Solar and Arizona Public Service. First Solar's solar-plus-storage solution successfully competed against conventional fossil-fired generation in an all-source request for proposals to meet the utility's needs for firm capacity during summer evenings.

By incorporating storage, we meet all the core attributes of conventional generation and complete the utility-scale solar product suite with firm dispatchable solar.

For fully evolved grids that have reached peak penetration of variable energy resources and distributed energy resources and that are transitioning toward highly-flexible solutions, the firm dispatchable product blends together all the flexible capability that solar can offer with the firm capacity and energy-shifting capabilities of storage. These enhanced services can fortify solar's place on the grid of the future.

At left, panelists Mike Jacobs of the Union of Concerned Scientists and Stacey Crowley of CAISO, and at right, Mahesh Morjaria and Eran Mahrer of First Solar, with panel moderator and PUF Editor-in-Chief Steve Mitnick in the center, at a First Solar-sponsored luncheon panel at the recent NARUC Summer Meeting.

All the functions mentioned above can stand on their own and are simply building blocks as utilities move forward in the grid's evolutionary process.

Each piece of the puzzle – from basic solar to grid-flexible solar and on to firm dispatchable solar enabled by storage – builds on the capabilities of the prior product and creates a complete set of enhanced services for the grid. This full suite of offerings delivers on the promise of solar

as a clean, new generation source. Grid operators looking to address flexibility needs and manage high penetrations of solar and other variable resources need look no further.

To fully realize the potential of grid-flexible solar, the solar industry must also evolve. Solar's core product has been based on generating the maximum amount of energy possible at any given time. Current contract structures often reflect that driver.

Moving toward a future where curtailment is an integral part of the most economic new generation solutions will require different thinking on how to structure procurement processes and subsequent power-purchase agreements. Emphasis will need to shift toward availability of capacity, flexibility, and the ability to provide essential grid services.

Mike Jacobs of the Union of Concerned Scientists and Stacey Crowley, VP, CAISO, on a First Solar-sponsored luncheon panel at the recent NARUC Summer Meeting.

Where applicable, renewable portfolio standards compliance that has been based solely on the number of renewable-energy credits delivered may have to evolve as well. One option would be to ensure utilities using variable energy resources to provide ancillary services are still able to maintain renewable portfolio standards compliance from those resources.

These capabilities can be utilized through several approaches, but the solution should be tailored to the needs of each utility's service territory. To that end, we look forward to partnering with utilities and grid operators to find both the mix of solar capabilities that best meet their needs, and the right policies to support that mix.

Last, continued demonstration and deployment of these capabilities, with detailed case studies made widely available, will be critical in increasing both the awareness of, and confidence in, solar providing reliability services to the system.

As this vision for grid modernization becomes fully realized, it will become clear to the electricity industry that utility-scale solar is a flexible resource today and is quickly becoming the new mainstream generation resource of the future, capable of providing energy when, and how, it is needed. Follow our continued work on this front on the web at firstsolar.com/Grid-Evolution. PUF

Electric bills were 1.36 percent of Americans' consumption expenditures in the second quarter this year. In the sixty years of data, since 1959, second quarter electric bills have never been a lower percent of consumption expenditures.

The electric bills percent was 1.36 percent in both the second quarter this year and the second quarter last year. Only one other year since 1959 has had an electric bills percent less than 1.42 percent. And that was in the second quarter of 2016, when the electric bills percent was 1.39.

Clearly, we've never experienced such low electric bills compared to overall expenditures, as in the last three years. Indeed, the electric bills percent in the second quarter of 2015 was relatively low as well, at 1.44 percent.

The second quarter electric bills percent has been below 1.45 percent in just seven of the eighty years since 1959. Four of these seven years have been 2015, 2016, 2017 and 2018.

Vets in Energy

Power of Vets through Association

Rob Berntsen, Senior Vice President
and General Counsel – MidAmerican Energy,
and Kevin Baker, TVA,
with Steve Mitnick

Veterans in Energy was established through the work of the Utility Industry Workforce Initiative. This working group consisted of six utility industry associations – EEI, APPA, NRECA, NEI, AGA and the Center for Energy Workforce Development – four federal agencies – the Departments of Defense, Energy and Labor, and the Veterans Administration – and two labor groups – the International Brotherhood of Electrical Workers and Utility Workers Union of America. Together, they identified new initiatives the energy industry could undertake to support veterans working in energy jobs.

It builds on a prior initiative called Troops to Energy Jobs, another example of when the energy industry came together to support our nation's transitioning soldiers and military veterans. Troops to Energy Jobs was created in 2010 by the Center for Energy Workforce Development to make it easier for military veterans to find employment in the electric and natural gas utility industries, accelerate their training and employability, and provide a pathway to successful job placement and advancement.

Once employment is secured, Veterans in Energy provides the opportunity to expand these best practices by connecting military veteran employees to others around the country and by providing leadership opportunities at the state, region and national levels. It builds on the work of Troops to Energy Jobs by providing additional resources to already-employed veterans to ensure successful transitions, retention and professional growth.

Here you will hear from two veterans, Kevin Baker and Rob Berntsen. They describe how military service imbues men and women with discipline, technical skills, commitment, and leadership attributes, which translates into valuable skills for effective employment in the energy industry.

PUF's Steve Mitnick: Tell us what your typical day is like?

Rob Berntsen: I am general counsel for MidAmerican Energy. In our department we've got regulations, regulatory, compliance, government affairs and some energy efficiency. It's heavily geared around the regulatory environment, and on a day-to-day basis making sure that we're compliant with all those requirements and regulations.

PUF: How did your background lead you to this role?

Rob Berntsen: I'm from a place called Marion, Iowa, which is in the eastern part of the state. I've lived in Des Moines for the last four years but have moved all around the country for different jobs and education.

I joined the Reserves right after 9-11 and joined as a JAG officer. I was doing government relations and public service at that time and got called up. I was a reservist, too, so Operation Iraqi Freedom had a lot of reserves that were serving, and I was part of that.

We had one daughter at the time, so when I got called up, my wife and I decided it was best for them to move to her hometown to be close to her parents, who were in Evansville, Indiana. So, they lived there, and I went overseas and did the training, and served in Iraq for the year. Then I came back and we decided to stay in Evansville. When I returned, I began to work for a utility called Vectren.

It's a great company, with great people. But we still had our connections to Iowa. At some point a new governor was selected, and after several years at Vectren, the new governor of Iowa asked me to come back and serve on the Iowa Utilities Board.

Values like duty, loyalty, honor and integrity – values the military lives by – are cherished in the utility world.

My utility experience allowed me to hit the ground, probably not running, but walking really fast. So, I did that for several years, and then left to work at the Midcontinent Independent System Operator, Inc. (MISO).

At MISO I oversaw government relations for a number of years. About four years ago, my family came back to Iowa to be in this general counsel role at MidAmerican Energy. I've been doing energy law for twelve or more years now. In my various jobs I've had a great opportunity to see the industry from the utility, regulator and RTO perspectives.

PUF: How did your military experience help your energy career?

Rob Berntsen: The military and the U.S. Army in particular helped me out tremendously for a career in energy in a couple of ways. One was a set of values that the Army lives and operates by that I was trained in and learned. Values like duty, loyalty, honor and integrity – values the military lives by – are cherished in the utility world.

From a more practical perspective, when I was a lawyer in the U.S. Army, I specialized in administrative law, and I learned that specific skill in the military. In the utility world, and the regulatory space in particular, there is a tremendous amount of administrative law. That translated very effectively for me when I entered the energy world.

PUF: Did you face any challenges in transitioning from the military to a career in energy?

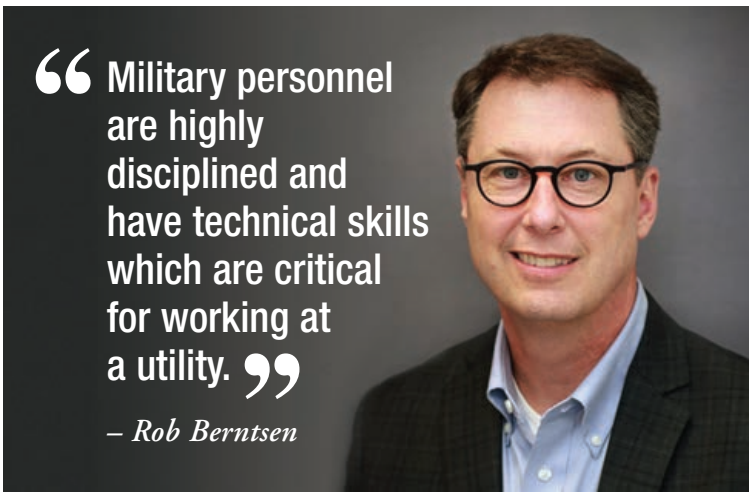
Rob Berntsen: Yes. A lot of veterans do have challenges when they come back. A lot of them leave jobs and they're legally entitled to go back to those jobs, so that works out well for a lot of veterans.

But over in a deployed environment, life can be chaotic and frantic, so the transition coming back to civilian life can be a tough one. The military and employers have many programs in place to help with that transition.

The fact that employers realize how valuable military service members can be in their businesses creates a good environment for veterans to come back to and find work. This is especially true in the utility world. It's a great match.

Military personnel are highly disciplined and have technical skills which are critical for working at a utility. But it's the passion, commitment and leadership attributes military personnel have that can't be taught. It's these attributes that translate very effectively into the utility space.

PUF: Have you seen some best practices that help attract and retain folks?



Rob Berntsen: Yes. There are partnerships with the state that have certain programs that veterans and companies can rely on to create synergies. In Iowa, MidAmerican Energy works with Iowa Workforce Development as part of the Skilled Iowa Initiative and Home Base Iowa, sponsored by the Governor and the state economic development department, to notify veterans returning from active duty of open positions. That is a best practice that's been great for us.

Also, at MidAmerican Energy we've developed a tremendous amount of renewables. We are building wind farms all across the state which creates a high demand for skilled workers in this profession. So, the utility itself has a lot of opportunities for veterans but there is also a high-demand renewable industry in the state that is building wind farms. Both of these create a lot of employment opportunities for veterans.

And, of course, Veterans in Energy is a "best practice" all on its own in its efforts to link veterans wanting to work in energy.

PUF: What advice would you give to a man or a woman that's in service, who may be coming home soon, as far as a career in energy?

Rob Berntsen: As you are getting close to the end of your deployment, work with your home state to identify programs that match veterans and utilities. Also, Veterans in Energy is an incredible resource that can help veterans find jobs in the utility industry.

It can also help veterans who want to work in energy transition into a utility job through training and job placement. The technical and leadership skills that veterans can bring to utilities makes these partnerships win-win opportunities for everyone.

Kevin Baker: I work at one of the fossil plants for TVA in Western Kentucky at Shawnee. I'm on the maintenance side of it.

PUF: What do you do every day?

Kevin Baker: I've been here for twelve years and all throughout this plant. I've been to almost every plant in TVA working on the safety side. I've worn a couple of different hats. But I always come back to the tools and being a laborer.

PUF: What did you do before TVA?

Kevin Baker: I was in the military. I joined the Army when I was seventeen, went active duty when I turned eighteen, and spent four years there.

When I came home, I worked for different contractors, and worked a lot for TVA as a contractor from 1999 to 2004. From 2004, I went to Iraq, since I was in the Reserves. Then I came home and went straight to work for TVA.

PUF: Is TVA like the Army or in some ways different?

Kevin Baker: Let me start with the similarities. You've got the camaraderie with your co-workers. You have a chain of command, which is little different than it is through the military.

In a lot of ways, TVA still feels like government. We still worry about budget, and about fiscal years, so that is the same. You still have a feeling of, I know I'm with the government.

PUF: Do you think the military was good preparation for you for your job at TVA?

Kevin Baker: Most definitely. I think everybody should do some form of military service. It's for the discipline, the knowing where you stand, the knowing where you come from, where you're going to go.

I've worked with managers and supervisors that hadn't been in the military. You can tell the different demeanors between who has and hasn't served.

PUF: Tell me what makes it difficult to work for a utility, or any job, for someone coming from the services?

Kevin Baker: When you're in the military, you know what you're going to wear every day. You know what your job is. You

know every two to three years, you're changing jobs and doing something different. You go from this year where I may be doing admin work, and then next year I may be in a tank, and then next year I may be a drill sergeant.

Then when you come into the public sector, you're going to do that job for a while unless you really progress quickly. You must get in the routine of doing the same thing over and over.

It's not the same culture. You don't have the same standards on the outside as you do in the military. Most of the military standards are strict.

That comes into play on the safety side, with the safety procedures. That's more of where a veteran would come into play as a positive.

They understand that you must have procedures. You must follow these rules. You must do things a certain way. It's where a military person will have an advantage coming into the workforce.

Military people come with that mentality of knowing they must work hard and prove themselves. They come with that work ethic. Younger kids going to college often don't understand that.

PUF: What can utilities do to attract more people from the military? And to make sure that their first year or two goes well?

Kevin Baker: I think one of the biggest ways is for military posts to have job fairs, and have people come in and talk. It's called Army Career and Alumni Program, or ACAP, for when people are getting ready to get out of the military. They'll have different companies there. If the utility companies could find a way to tap into that, it would be helpful.

A lot of active duty folks go to college while they're active duty. They could start getting the college they need for a utility job.

But it would have to be the utility companies trying to tap into the active-duty community to find out, ok, you're going to be retiring in four, or you're getting out in four years at expiration of term of service. Have you ever thought about utility work as a career?

And if you say yes, maybe we can help you out. So, when you leave the military, you fall right into that utility job and you know what you're going to be doing.

PUF: You participated in Vets in Energy, which seems to be growing every year. What's your involvement?

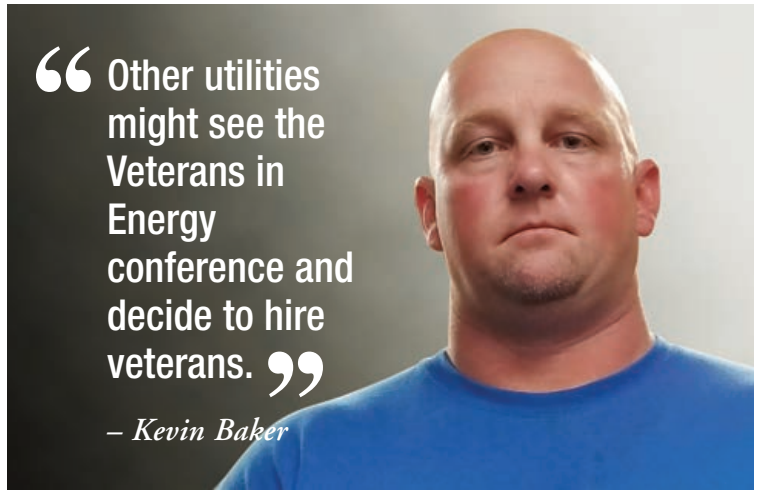
Kevin Baker: Last year was my first year going to Vets in Energy. VP of TVA coal operations, Sean Connors, invited me. And, TVA CEO Bill Johnson was there too. I really liked the direction it was going.

As far as our veterans' chapters, I thought we could help many other utilities. We've had a veteran's association at TVA for a long time. Some of the things that other companies were having issues with, we already have been through.

With this only being my second year of getting involved with the Veterans in Energy, I'm hoping to bring that TVA side. Letting other utilities know TVA's been doing this a long time, with thirteen chapters across seven states.

We are scattered. But we're making it work. Let us help where we can. But at the same time, let us learn to make ourselves better.

PUF: TVA and others like Arizona Public Service or Dominion, that have a lot of experience with veterans, maybe have good advice for across the industry?



Kevin Baker: That's what I'm hoping the other utilities start seeing as far as the Veterans in Energy conference. They might say, hey, we want to be veteran-friendly, we want to hire veterans, and maybe we need to attend this, and maybe we need to go see what it's about.

If your utility is having trouble getting started, you can always get phone numbers, emails and information from Veterans in Energy. It's a big networking system.

Same for when I was doing utility safety. We had a big networking conference in San Antonio. That's what made our process better. Because I networked with all those people.

PUF: If you were approached by somebody in the Army, or other services, what would you say to them about the opportunity at companies like TVA?

Kevin Baker: I would try to do everything in my power to help them. I would talk it up. The utility industry is not going away. Power is one thing we must have. It's the backbone of America. If you don't have power, you don't have anything else.

It's a good fit. There's so much fine-tuning details that you must follow to keep these plants running, to keep the lights on, to keep power moving down the power lines. It is a satisfying job. It is satisfying work. At the end of the day, you know that you're doing something that can make a difference. PUF

Large Public Power Council on FERC Reliability Technical Conference

Roy Jones, CEO, ElectriCities,
with Steve Mitnick

PUF's Steve Mitnick: Why is this FERC proceeding on reliability and renewable integration considered important to the Large Public Power Council?

Roy Jones, CEO, ElectriCities: We looked at the creation of the technical conference panels and the very topics that FERC was proposing. We felt like it was important to get the Large Public Power Council message out and get that in front of FERC.

I would characterize our message as one where we recognize that our generation mix is changing. It's changing significantly in the United States. We're moving away from large centralized generation. And while essential reliability attributes were inherent with the traditional generation mix, we're starting to see a lot more renewables coming onto the grid.

We felt like it was important to be able to have a conversation in front of FERC and talk about those essential reliability services. And make sure that as we keep our eye on low-cost reliable power for our community, that we recognize how critical those essential reliability services are.

From the Large Public Power Council perspective, in public power we've got lots of small members. There's over twenty-two hundred public-power communities across the United States that are locally-owned and locally-controlled.

Our largest member is Los Angeles, the Los Angeles Department of Water and Power, or LADWP. At ElectriCities, I may have one of the smallest members. It's Bostic, North Carolina. They've got two hundred citizens.

As you can see, we've got a wide range of expertise about what's important to public power. As we talk about distributive-energy resources and how those resources are now more and more connecting to the local-electric distribution system, it's creating bi-directional power flow challenges.

Many of these small utilities don't have the expertise to be able to manage distributed-energy resources connecting to their electric distribution system. We want to make sure that we talk to FERC about that. And make them aware of the fact that we need to make sure that, while there might be the opportunity to aggregate distributive-energy resources, and to offer them into a market, we still feel like it's important to keep that choice, control, and decision-making at the local level.

We also want to make sure that FERC understands, as we are starting to see more and more of this open system, that everyone remain diligent as to cybersecurity. We want to make sure that, as we are connecting devices to the grid, whether it's at the transmission level or the distribution level, that we keep our eye on cybersecurity.

I say that cybersecurity is a journey without a destination. We've got to constantly be sharing information, best practices, and lessons learned.

PUF: How do these issues hit home at your company?

Roy Jones: At ElectriCities, we've got over seventy members in Virginia, North Carolina, and South Carolina.

It goes back to our guiding principles. First and foremost is, we're not-for-profit. All our public-power communities are locally-owned. Making sure that we keep our eye on low-cost reliable power is paramount to everything we do.

We still feel like it's important to keep that choice, control, and decision-making at the local level.

Fuel diversity plays a significant role in ensuring that we do have reliable power.

The geographic diversity of the Large Public Power Council, with twenty-five members, is noteworthy. You've got in the Northeast and Northwest, a lot of hydro-generation. You've got in California and Arizona, a lot of renewables. In the Southeast, where I'm from and the Midwest, coal and nuclear play a big role in our portfolio mix.

As we look at that geographic diversity and look at the resource mix that's located within those geographic areas, we recognize that we don't want to be in the business of picking winners and losers when it comes to a fuel source. Nor do we think FERC or NERC should be picking winners or losers when it comes to fuel sources.

We think that they need to identify and define the reliability attributes that are needed. And allow those generators, whatever fuel source they are, that can meet those attributes, to be able to offer those.

I think that California's amount of installed renewables is going to be about nineteen gigawatts in 2020. We hear a lot of issues about the duck curve in California.

Well, North Carolina's had a lot of success in solar being installed. It's predominantly in the east part of North Carolina. We've had about seven-hundred megawatts, out of twenty-seven hundred megawatts in eastern North Carolina connected to the distribution system. I like to tell folks that the duck that was in California has now flown to North Carolina.

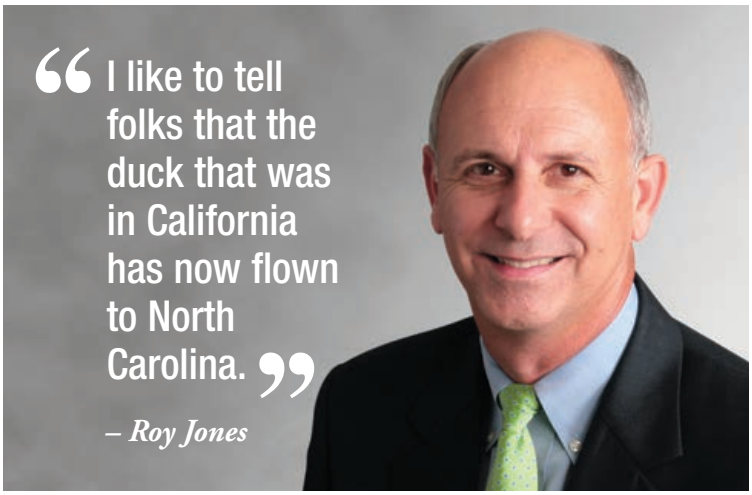
Duke Energy Progress is about a fifteen thousand megawatt

peak Balancing Area. This past winter, over two hours in the evening, we had a twelve hundred megawatt ramp. About six hundred megawatts on average for two hours.

If you look at the curve, you can see the solar production was coming off. That was putting a significant burden on the generation system to provide much needed ramping capabilities.

PUF: Do you find, as you're participating in the debate, that your company shares a lot of points in common with the other kinds of utilities?

Roy Jones: The common thread is making sure that you have a reliable power supply. No one wants to sit in front of a regulator and explain why they had operational issues and then had to curtail customers. That's just not a conversation that you want to have.



With the amount of distributed-energy resources that are now connecting to the grid, a lot of the balancing authorities don't have visibility into those distributive-energy resources. Are they online, are they offline? We saw with the Blue Cut fire issue in California, there were some transit stability issues, and some cessation issues.

The industry learned from that, as did NERC, and the solution was to go back and work with the vendors, to make sure that the appropriate inverter settings are set, so that they can provide some of those, once again, essential reliability services.

A lot of times there's not a single answer. Often, it's a multiple approach to solving problems. It takes both federal and state regulators, us as utilities, NERC, market solutions, and as we saw with the Blue Cut fire, it takes the manufacturer.

Collectively, we all must work together to make sure that as more and more distributive energy resources are connected to our grid, that we have the appropriate tools to be able to manage those resources and know in real time what they're doing. Because it does have an impact on the transmission system.

PUF: Put yourself in the shoes of a FERC Commissioner. What should a Commissioner be thinking about here?

Roy Jones: Of course, FERC plays a pivotal role here at the federal level. But we've got to make sure that we're cognitive of federal versus states' rights. And we want to make sure that what I think of as local distribution remains within local control.

It's critical that FERC recognizes and gives some deference to states and state policies with respect to renewables, portfolio standards, and even some of the interconnection standards of distributive-energy resources. That's first and foremost. Make sure we recognize there is a line, and at the federal level, we stay on the appropriate side of the line.

FERC's role in this, from my perspective, is to allow the market participants, whether you're the utility, the generator, the transmission owner, or load-serving entity, to determine together what's in their best interest in their region, especially as it relates to organized markets. Let the folks that are closest to the region come up with the appropriate market solutions, and then present that at FERC. And then FERC can look at it from a just-and-reasonable perspective.

NERC plays a role in this as well. On the issue of changing resource mix, NERC has done a fantastic job in analyzing operational reliability issues, like frequency response, as an example. NERC recognized that a lot of the larger generators were coming off line and that we needed to make sure that we're on top of frequency and maintaining sixty-hertz cycle frequency.

In response to NERC's collecting data, looking at metrics, NERC was able to inform FERC of that issue. And then FERC, in turn, issued an order requiring all new generators, both large and small to be constructed and built with frequency-response equipment on them. That process worked well.

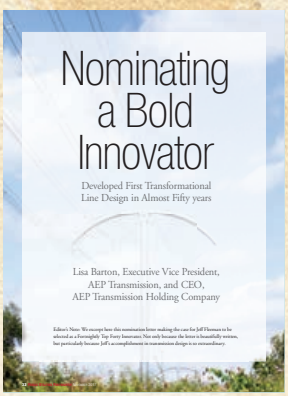
I also want to say that vendors play a role in this as well in securing essential reliability services. A lot of the generation coming online now, whether it's battery or solar is inverter-based, so making sure the inverter set points are set so that they can contribute to maintaining a reliable grid.

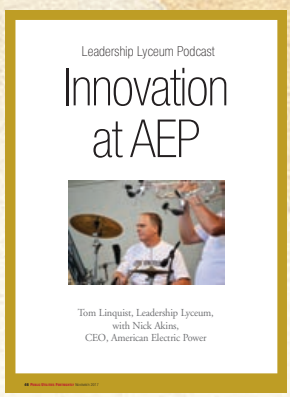
PUF: Are you optimistic or maybe pessimistic about where this debate is going?

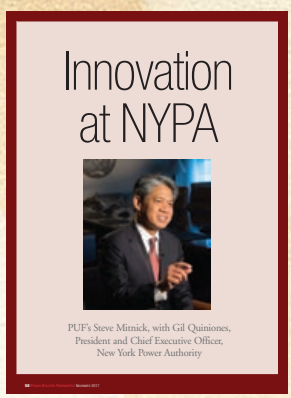
Roy Jones: I'm optimistic. I've been in the industry since 1981. I came in the industry in a time when we were just coming off of the oil embargo.

We were seeing a tremendous amount of nuclear and coal-fired generation being built in the country. Our industry has always been forward thinking and adaptive to change, and I think we will adapt again.

As we look at the renewable development, and we replace at a lot of our traditional generation, I am optimistic that we're going to find that right balance and continue to be a leader in the world in providing low-cost, reliable power. PUF







Nominate the Top Innovators at Your Organization

Celebrate Them in *Fortnightly Top Innovators 2018*

Submissions due Sept. 21

From your nominations of your top innovators – individuals or teams – we'll recognize and celebrate their accomplishments and stories in this November's *Public Utilities Fortnightly.* Utilities, vendors, professional firms, associations and government agencies can nominate, but especially the over two hundred PUF member organizations.

What makes a *Fortnightly Top Innovator*? In the last year, they developed equipment or a process or method that significantly advances the public interest for the customers of electric, natural gas or water utility service.

Here's how to nominate:

1. Send your organization's nominations to Alexandra Revel on our team. She's at arevel@fortnightly.com.
2. State the nominees' names and employee titles.
3. Succinctly summarize their innovations. Preferably in one hundred to three hundred words for each individual nominee or team. You can supplement with graphics, photos and even video.
4. Provide contact info so we can follow up, to help us select the top innovators, and then to help us tell their stories in *Public Utilities Fortnightly.*

Cities Getting Smarter

Paula Gold-Williams, CEO, CPS Energy,
with PUF's Steve Mitnick
at the Dentons Smart Cities Summit

Former U.S. Secretary of Energy Ernie Moniz. CPS Energy CEO Paula Gold-Williams. Alliance to Save Energy President Jason Hartke. Former National Security Advisor General James Jones. New York Power Authority General Counsel Justin Driscoll. BGE Senior Vice President Alex Núñez. What do they have in common? They were all speakers and panelists at the Smart Cities Summit in Washington D.C. on July 25 - 26, 2018, hosted by the law firm Dentons.

Attending the Summit, *Public Utilities Fortnightly* interviewed CPS Energy CEO Paula Gold-Williams. Check out this fascinating conversation which follows.

PUF's Steve Mitnick: Paula, start by telling us a little about CPS Energy.

Paula Gold-Williams, CEO, CPS Energy: Our company is the largest vertically integrated electric and gas, municipally owned utility in the United States. We are headquartered in San Antonio, Texas and provide the same products and services as investor-owned utilities. CPS Energy serves customers in the San Antonio metropolitan community, in eight surrounding counties. We have been in the business of providing electric and gas services for a hundred and fifty-eight years.

We generate and buy power. We also have transmission and distribution businesses, as well as manage our on-going relationships with our customers. There are over three thousand employees who serve a population of nearly one and a half million people.

We focus on maintaining a diverse generation portfolio and believe diversification is key. CPS Energy used to be primarily a gas-fueled company, but now we have gas, nuclear, coal, solar, wind, and battery storage, including micro-grids. Our diverse generation resources, whether they be utility-scale solar or customer-owned distributed generation, really gives our customers the choice to select a product that meets their needs and environmental goals.

PUF: Many see CPS as being on the leading edge. Is that by happenstance?

Paula Gold-Williams: It's definitely not happenstance. In part, it's because we have an absolute openness to new things. We've been challenging ourselves to not solve problems the way we always have.

We started evolving about ten years ago, but really began a significant transformation in the last five years. Every day, it's about optimizing our business around our customers and meeting their expectations.

For example, we used to solve our community's increasing demand of energy using the lens of building more generation is better. And we really are wonderful owner-operators of generation. In fact, most of the plants we have are named after past general managers who ran our business. And at the time, building new generation was the norm. We built it because the increased population was coming; we grew into new generation over time.

Then, we began saying to ourselves, what if we don't? What if we think about investing more in research and partnerships? What if we encourage new technologies coming forward?

For example, my predecessor, Doyle Beneby, came up with the concept of a New Energy Economy. This concept is one in which we invite organizations from across the globe to come do business with CPS Energy in San Antonio. We wanted them to supply innovative energy solutions to and for us, locate offices and jobs in San Antonio, as well as provide educational dollars into the community.

We've been challenging ourselves to not solve problems the way we always have.

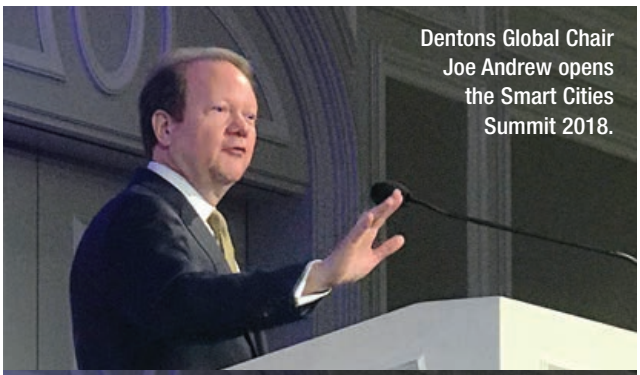
We had one of our proudest foundational relationships with a company called OCI Enterprises. OCI was headed by Chairman Soo Young Lee. Sadly, he passed away last year. Chairman Lee was foundational in helping us build the New Energy Economy, embracing the vision of bringing solutions in our community, and committing to making more renewables a viable reality. The partnership with OCI has been huge for San Antonio.

We've also been able to optimize our relationships with lighting companies. Greenstar, a growing global LED company for example, is also headquartered in San Antonio. The New Energy Economy is all about combining economic development benefits as well as new products and services, while networking and sharing ideas. All of these things are key tenets of our successful approach to the future of energy.

I believe people see our thirst for always learning, collaborating and partnering to deliver for our customers. It's our value proposition. We are not your grandfathers' old utility. We are going to continue to grow, learn and exceed expectations.

PUF: That approach draws in talent, draws in companies. I guess a smart city is a growing city?

Paula Gold-Williams: Absolutely. We are doing extremely well, because Texas is growing. We have a lot of people moving to Texas. San Antonio, in particular, is doing well in terms of attracting people. We estimate that in the next twenty to



Dentons Global Chair Joe Andrew opens the Smart Cities Summit 2018.

Dentons US Energy Practice Chair Clint Vince introduces the panel Survey of Key Developments and Challenges for Smart Cities and Communities.

twenty-five years, we'll move from having nearly one and a half million people to a population of nearly two and a half million.

It's a good problem to have, in terms of growth. But we're also beginning to realize that the infrastructure we currently have will neither accommodate this growth nor the next evolution of our business.

If you get the timing wrong, you'll actually suppress growth. So, we're getting more and more of our people thinking about the benefits of design and policy to enhance suburban and inner-city living.

But you have to think about it in multiple ways, whether it is technology, growth, processes or people. As an example, what can be done in terms of lighting? Lighting is probably the one smart city initiative that people often understand most readily because it's almost cognitive. We'll ultimately be able to have lighting that responds to how people want to live. If customers want walkable areas, where the lighting responds to pedestrian traffic flow, smart lighting will fit the bill. Lighting can also be adjusted to enhance security benefits.

It can function well in terms of architectural benefits. We have a council member, Roberto Treviño. He is an architect. He's been one of the most passionate people who has urged us to think creatively about artistic lighting.

PUF: You and your predecessor had a number of initiatives, and at some point, it came under the umbrella of smart cities. What happened?

Paula Gold-Williams: We're pretty well penetrated on our advanced metering installment. Over ninety-five percent of all customers in our service territory are now connected to our new digital system.

It was clear to me that we were getting more than ready for that designation of smart communities, smart cities. The backbone will be our ability to use our advanced metering network for delivering energy and information. And it's starting to happen.

PUF: What's your vision? What's a smart city versus a not-so-smart city?

Paula Gold-Williams: A smart city is integrated with what customers ultimately want. The interesting thing is, as we're thinking about products and services, we are focusing on capabilities customers don't currently have at their fingertips. But they know they want ease of use. They want apps and tools. They want control and convenience. They want integration that is affordable.

So, if somebody comes to San Antonio, they should be able to see the wealth of all the business offerings easily and in a single place. We have to make it easy for customers and visitors.

The continually evolving system will ultimately get customers general, but helpful information, about neighborhoods all across our community. Further, how does a customer get connected to energy, water, permits, etc.? Things that a customer needs, all at his or her fingertips.

Customers know they want ease of use. They want apps and tools. They want control and convenience. They want integration that is affordable.

We want usable and value-added information to be ubiquitous. We want products and services proactively and predictably coming to customers, instead of them going all around our large community, wasting gas and increasing transportation emissions to get what's needed.

This isn't about us telling people how to use products and services. It's about us thinking about ways to address problems that they want solved, before they know they have issues.

PUF: Many of your customers are concerned and want more sustainable utilities. How are you responding?

Paula Gold-Williams: We're all excited about sustainability and the unique opportunity we have as we continue to grow. We agree that we need to be sustainable, as well as reliable. That's why we have created our Flexible Path. We have listened to our customers' feedback, and we have taken it to heart. Our Flexible Path allows us to integrate new sources of generation or emerging technologies as they are available, and replace older, more traditional generation, as appropriate. Over time, we see our generation mix as being increasingly renewables and distributed generation, coupled with efficient baseload plants.

Creating the Flexible Path has been the next step in our

The panel Survey of Key Developments and Challenges for Smart Cities and Communities, from left to right, BGE Senior Vice President Alex Núñez, CPS Energy CEO Paula Gold-Williams, Houston County Commissioner Rodney Ellis, former President of the Conference of Mayors Stephanie Rawlings-Blake, and moderator Clint Vince of Dentons.

evolution. Since 1997, we have been strategically retrofitting our generation plants to be cleaner and have reduced nitrogen oxides and sulfur dioxide emission rates by over 83 percent and 71 percent, respectively. Through the use of nuclear generation and renewable energy, we've reduced our carbon dioxide emission rate by 31 percent.

We have a generation portfolio that is 46 percent natural gas, 18 percent coal, 14 percent nuclear and 22 percent renewables. Our Flexible Path puts us on track to have an increase in renewables of 127 percent by 2040 and is enabled by our earlier decision to deactivate – shut down – an old coal plant at the end of December 2018.

Our values are not just about our generation. As I said, San Antonio is growing, and as you grow, more issues can occur. Our growth is actually going to put more cars on the road than ever before, creating not only more congestion, but emissions. Particularly if those cars are not electric or some other type of new technology. In the spirit of partnership, we're all in on that and helping to be part of the new solutions ahead.

For decades, San Antonio has done air quality monitoring of the service territory to check emissions. The Alamo Area Council of Governments is the organization that had been conducting the environmental monitoring of air quality, supported by state funding. However, last year, the state funding was lost due to a budget reallocation of funds. We therefore saw an opportunity through which we could step up, and really help. We decided to combine what the Alamo Area Council was doing in terms of air monitoring with what we are doing. We now have just one platform for air quality monitoring.

In addition, with our new advanced metering infrastructure, we have connections and the ability to move sensors back and forth across the system. So not only are we able to help with current monitoring needs, we'll be able to put more sensors throughout our community and connect them to our advanced network. We'll be able to check emissions and air quality at a very micro level.

What we are finding is our business is about people. You're not going to lead in this industry just through engineering solutions.

The optimization of micro data will help us, as a collaborative city, determine needed changes to traffic flow. Through integrated sensors, we will feed that information into a helpful public platform, through which people can quickly learn not to take a route because of its heavy congestion and air quality implications. Working with our owner, the City of San Antonio and VIA, our community's public transit company, we will be able to provide information on better options, including more effective forms of public transportation.

PUF: That's cool. What's next on the horizon?

Paula Gold-Williams: When I first took over the company, I was interim. I'm an accountant. The company believed it was looking for an engineering-based CEO, with decades of experience in the energy business. I'm in my fourteenth year.

But what we are finding is our business is about people. You're not going to lead in this industry just through engineering solutions. Along the way, we are going to lead with a customer focus, thinking deeply about the community that we serve, while keeping our employees and the public safe.

I realized that, when I came in, I needed to create some things that were beacons of focus for our employees. So, I came up with the concept of People First.

More and more companies are utilizing that term. But we began using it about three years ago. Increasingly every day, it

FIG. 1 NEW ENERGY ECONOMY PARTNERS

Since the inception of the NEE Initiative, the cumulative impact of the operations of these companies on the local economy amounts to about five billion dollars in 2018.

OCI
400 MW solar
200 MW cell & panel mfg. plant
North American HQ for OCISP, Mission Solar Energy and KACO
Permanent jobs
Capital investments
Educational investments

Itron
Grid optimization program
Partner solutions testing & certification facility in SA
Permanent, high-tech jobs
Capital investment
Educational investments
Internships

Landis+Gyr
700K electric smart meters
Local office
Permanent jobs
Educational investment

SolarHostPA
Educational investment
Local office

Greenstar
55K LEDs (light-emitting diodes)
Local HQ with mfg. facility
Educational investments

FranklinEnergy
Energy efficiency programs
Local offices

is our thing. And what it initially allows us to do is to start to transform our organization.

We say, if it's not good for our customers, if it's not going to put our community in a better place going forward, and if it doesn't benefit our team members, we're not going to focus on it.

That ability to create clarity of what's important, and what our priorities are is huge. But I would tell you, we're a bunch of engineering and analytical people.

So, even a year after launching People First, I had people asking if I could provide a definition of People First. The joke was, look, I won't give you a definition, but if I said, "People Last," how does that make you feel? They said, that's horrible. I said in reply, well then, People First is the opposite of that; it is acts of excellence, professionalism, and authenticity that makes others feel better.

PUF: People needed an equation?

Paula Gold-Williams: They thought they did, until I told them, stop over-engineering it and just accept change.

We've been studying businesses and industries that did not change. For example, years ago there was once a thriving photofinishing industry. However, when was the last time anyone went into a Fox Photo to pick up pictures? It is too far back to remember actually.

"Change is inevitable; resistance to change is futile." My husband likes to say that, especially to our daughters. So we are telling our CPS Energy team members what we really need to do is encourage curiosity and change.

To help us change better as an organization, we are focused on innovation. We partner with other organizations. For example, we often work with the Electric Power Research Institute and Southwest Research Institute. We are also connected to the University of Texas at San Antonio. We're funding them potentially up to fifty million dollars of research to help us develop new ways to change our business.

Will the rate of change plateau eventually? I don't think so.

We spend a lot of time talking about what it takes to move us out of our comfort zone. To get us more and more comfortable every day with change. It's required to do a good job for our customers. And it never stops.

Look at how much the whole industry is changing. Will the rate of change plateau eventually? I don't think so. Think about the phones that we had fifteen years ago, compared with the phones we have today. Going forward, we're just going to move to virtual and augmented reality. We'll be able to see systems at our desk and make major changes at our fingertips. We'll even have some robots in the field to help us work more safely.

PUF: How is the CPS culture adapting?

Paula Gold-Williams: We are constantly moving forward, but we have external people on both ends of the spectrum. Some say, you are not moving fast enough, while others say, you shouldn't change at all.

So, it's very difficult to keep everything in balance. All that said, what I say to our employees is, the options in front of us are all actually very exciting.

I lead a great organization, with a strong cultural perspective, and extensive connections with our community. Further, we have great credit ratings, whereby our investors value our historic ability to run our company well. At the same time, we do all of this through a filter that keeps People – our customers, community, and employees – First. And that, as a business owned by a city, does the right things to implement great global solutions, locally where we live. PUF

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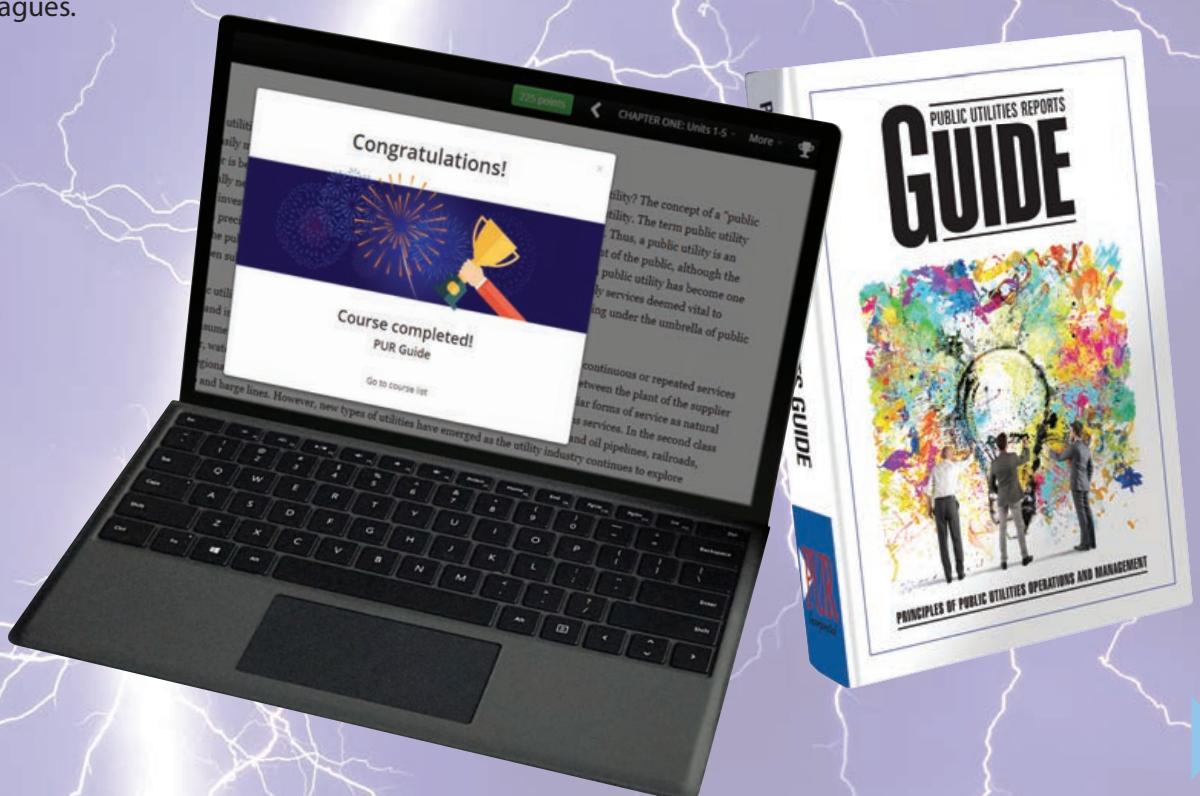

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APPA Fly-In

Ben Kostick, Commissioner,
Lewis County Public Utility District, and
Desmarie Waterhouse,
Vice President for Government Relations and Counsel,
American Public Power Association,
with Steve Mitnick

PUF's Steve Mitnick: Ben, tell us what this event is that APPA is holding. What's your role at this event, and at APPA, as a member?

Ben Kostick, Commissioner, Lewis County PUD: We are here for the APPA Policy Makers Council Summer fly-in. The Policy Makers Council is made up of forty-five members. Policy makers are elected or appointed officials from across the country, and we are here this summer to advocate for issues that are important to public power.

Desmarie Waterhouse, VP, APPA: The Policy Makers Council is a huge part of our grassroots-advocacy efforts. The council has existed for quite a long time, and we have the members come to Washington, D.C. every July. They also come to town every February or early March for our legislative rally, which is our large fly-in.

The PMC is a way for us to get across public power's key messages to the Hill and sometimes to federal agencies. The fly-in is very important to the association and something that we spend quite a bit of time on.

PUF: Ben, tell us about your role at the Lewis County Public Utility District.

Ben Kostick: I am one of the three elected board members of the Lewis County Public Utility District. I have been on the board for a little over eleven years. The board sets policy and gives direction to the utility.

We're responsible for three employees: the general manager, the treasurer, and the auditor. Then, they go do their work to manage and run the utility.

I'm elected to a six-year term. We are elected by the voters in our service area. We serve all of Lewis County, except for inside the city limits of one of the cities in the county. They have their own municipal utilities. We serve around thirty-two thousand customers.

PUF: What goes on at this meeting?

Ben Kostick: We're talking about the major issues that we see affecting public power at this time. The staff prepares us with six or seven major issues that we talk about, and then we usually bring some local perspective in our individual meetings with the delegation.

We come in, we schedule meetings with our state delegation, then we meet with them and have a question-and-answer session with the members.

PUF: What are the hot issues?

Ben Kostick: One of the issues that has come up in the past several years is the sale of the transmission assets, mainly of power marketing administrations, the PMAs. Across the country there are four power-marketing administrations that take power from federal projects and sell it to both private and public utilities.

Desmarie Waterhouse: That would be Bonneville Power Administration, the Western Area Power Administration, and Southwestern Power Administration. Southeastern Power Administration does not own transmission assets, so they aren't impacted by the proposal to divest the transmission assets, but three of the four are impacted.

This year, the president also threw in Tennessee Valley Authority transmission assets into the mix. So, that impacts folks that are in the Tennessee Valley.

There is strong bipartisan opposition to the Administration's proposals. We have spent a lot of time educating the Hill about the importance of the Power Marketing Administration.

– Desmarie Waterhouse

PUF: What's the quick take on why this is probably not a spectacular idea?

Desmarie Waterhouse: Our customers paid for those assets. The whole point of preference power was to provide affordable, cost-based power generated at federal dams, which were created as multi-purpose projects.

The dams are used for flood control, irrigation, and recreational use. Some of these dams also have the benefit of having a hydropower turbine on them, and the power they generate is sold at cost to the customers who have fully paid for the operation of those facilities. The operation of the hydropower facilities is not funded by the federal government.

The PMAs have played an important role in providing power to many areas of the country, particularly rural areas, that were slow to be electrified. I think the PMAs have worked quite well in meeting their mission.

For example, BPA has been incredibly important to the economy in the Pacific Northwest. There is strong bipartisan opposition to the Administration's proposals. We have spent a lot of time with our members educating the Hill about the importance of the Power Marketing Administration, and we'll keep doing that.

PUF: This time through, is this a serious possibility? Or is this probably going to pass as well?

Ben Kostick: It's always a threat, and it's always something

that we have to be aware of and be in front of. As one of the legislative staff here said, if we ignore it, they may sneak up on us and get past us.

We have to be on top of it.

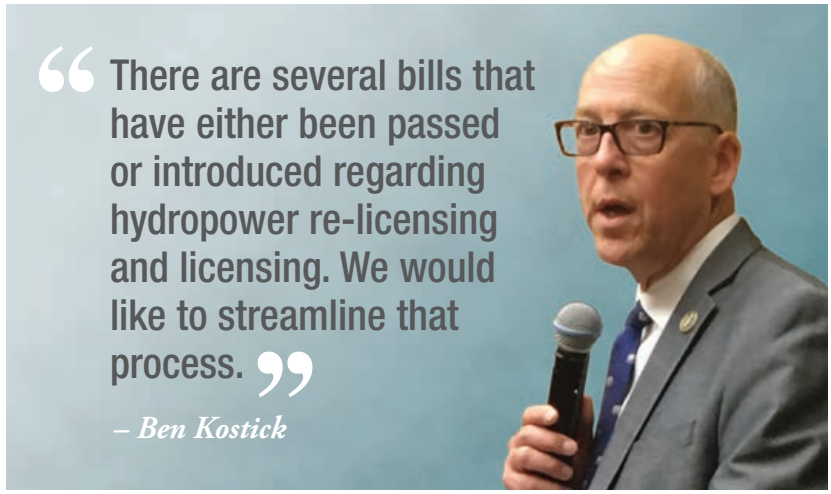
Desmarie Waterhouse: It requires a change in statute. Without Congress's approval, the President cannot divest the transmission assets, but the Administration can continue to propose it in its budget proposals.

PUF: What are a couple of the other top concerns or priorities for APPA members?

Ben Kostick: There are several bills that have either been passed or introduced regarding hydropower re-licensing and licensing. We would like to streamline that process.

Desmarie Waterhouse: For new projects, we've had members that have had relatively small projects that have taken over ten years to license, which is pretty long. Then there's the Cushman Dam whose relicensing process took over thirty years, I believe. That's ridiculous.

PUF: APPA feels pretty strongly about trying to make that process more time-efficient?



Desmarie Waterhouse: Yes. Hydropower is an important resource for our members. The McMorris Rodgers Bill was approved by the House last year. It also was in the comprehensive energy bill from the last Congress.

There is similar language in the Senate energy bill by Senators Murkowski and Cantwell. It's a top priority for the association that would like to see the hydro-licensing language get across the finish line and enacted into law.

Members can use this valuable resource, which is emissions-free. It shouldn't take ten years to license a run-of-the river project. These are not huge dams. They are pretty small. It should not take over ten years to license that sort of project, and this whole process should not drag out as long as it does.

Ben Kostick: Another topic that we talked about in each of the member's offices had to do with pole attachments and the Federal Communications Commission. It's something that we see as another attack on public power and something that we must, again, be aware of and try to stop.

Desmarie Waterhouse: There's a legislation in the Senate that seeks to promote broadband, a goal we support.

But there's language in the bill that would essentially gut an exemption that exists in section 224 of the Communications Act. It says that both public power utilities and electric cooperatives are not subject to the Federal Communications Commission's jurisdiction over pole attachments.

Investor utilities are subject to the FCC's jurisdiction, unless the state in which they operate reverse preempts the FCC. The language that's in the bill uses other provisions of the Communications Act to try to give the FCC jurisdiction over public power poles without explicitly repealing section 224.

Public power utilities are quite diverse in terms of the design of their distribution systems, their governance structures, and size. They are consumer-owned and not-for-profit. They were exempted by Congress from FCC regulation of their poles for these reasons. And they certainly want broadband in their communities.

The wireless industry is coming to Congress and saying they want one set of rules across the country. They want us to be subject to FCC jurisdiction, and I understand why. It makes it a lot easier for them to have one rate and one set of rules. But the bottom line is, two times Congress has affirmed our exemption from FCC jurisdiction over our poles because of our consumer, not-for-profit status. Congress recognized that it's not in our members' interest to try to keep communications companies from providing services their communities want.

The wireless industry wants to deploy small-cell technology on our electric poles. There are potential security and safety concerns with doing that. They want to place these on top of electric poles, and it is much more complicated to have an attachment over an electric wire that's live versus a fiber or cable attachment that's going through the middle of a pole in communications space well below the electric wire.

It's an issue we've spent a lot of time educating on the last two years. Pole attachments are a very arcane issue, and we're trying to educate folks about why we are best regulated at the local level. In some cases, we're regulated at the state level when the state has chosen to regulate public power poles

The wireless industry continues to argue that public power utility poles should be subject to FCC regulations, an agency that doesn't understand the electric-utility industry and appears unphased by having our ratepayers subsidize for-profit communications companies, just so they have a lower input cost on deploying their technology in the future.

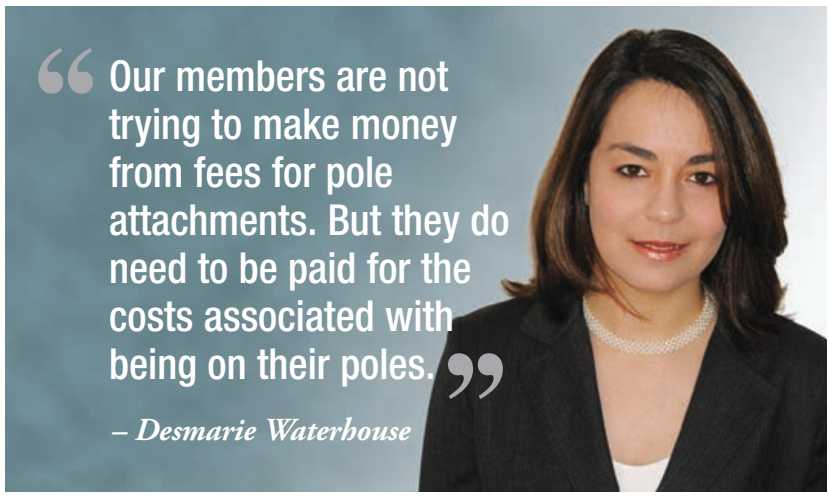
PUF: So, you're saying the reason why this is important to public power is safety and security on the poles, also the national telecommunication companies coming in and economically taking advantage of the poles. Is that why this is an important issue?

Desmarie Waterhouse: The bottom line is that they really want to cut costs and have one set of rules for the process of actually attaching to a pole. Our members are not trying to make money from fees for pole attachments. But they do need to be paid for the costs associated with being on their poles.

When it's a wireline attachment, such as fiber cable or a coaxial cable, it is a much simpler attachment process because there is usually a pre-drilled hole in the pole and the line is attached in the communications space below the electric line. The wireless industry wants to locate their small-cell devices on top of poles. But they emit radio frequency, which can interfere with the electric line.

And depending on how they attach small cell equipment on the pole, it could create a safety hazard for line workers when they need to climb a pole. So, it's a lot more complicated than a wireline attachment. It's not the same thing as putting a wire lower down the pole, and the FCC doesn't particularly seem interested in what we've had to say on any of this.

The bill, Senate Bill 3157, is only pending in the Senate. The House has chosen not to go down this path. But we've obviously spent a lot of time educating staff on the Hill, particularly on the Senate side about why this language is problematic for public power.



As a general matter, we strongly prefer local control versus the federal government coming in and telling us what we should do. We're on the ground. We know our distribution systems. We know what makes sense.

We're certainly not trying to get in the way of the deployment of these technologies where they'd be beneficial to our customers who own us. But again, the industry is creating a false narrative and saying that we're an impediment to deployment, which is completely untrue. This is really just about them reducing their own input costs for their own deployments.

Ben Kostick: One of the basic premises for public power is we are all cost-based. So, the price of a pole attachment is our cost. If some outside force like the FCC were to come in and tell us that we had to charge a lower rate, then our electric customers would, in effect, be subsidizing that pole attachment, because they wouldn't be paying the actual cost of being on our poles.

So, that would undermine our cost-based approach, as well as our local control. We're all about local control. If someone doesn't like the job I'm doing, they can un-elect me.

PUF: After talking about these things, what do you do?

Ben Kostick: We schedule our meetings with our delegations before we get to town. We're briefed on these issues and are coming in prepared with issues from our own regions. The second day we're here, we spend it on the Hill talking to our congressional delegation.

The thing about us being policy makers and being elected, is that the same people that voted for us and hopefully voted for me, are the ones that voted for the people we're talking to. So, we have a bond that way, and we're told that it makes us more effective on the Hill.

PUF: What kind of reception do you get?

Ben Kostick: We try to come as prepared as possible. So, we spend the short amount of time that we have in their office as efficiently as possible. For the most part, we are well received.

In my specific instance, our Washington state congressional delegation is behind us on most of the issues. But we also get some honest answers. We're a small group, so there's only three of us in a meeting with the congressman or congresswoman and staff.

I found a couple of times where I said, we would like you to support this or that bill has been passed, and they said, I didn't vote for that bill, or I can't support that right now. So, I really feel like it's an open and honest discussion with the members.

They still listen to us, even though they may not, for one reason or another, support our position. They're still willing to listen to us.

PUF: Are you optimistic that it can really have an impact on national policy?

Desmarie Waterhouse: Yes. We know first-hand it has an impact. July is an active time of year in Congress. There's usually some bill that's moving through the process, whether it's at the community level or on the floor, that impacts public power.

We've been told all our opposition on the pole-attachment language has gotten the attention of the folks that have drafted the bill. They may work on trying to address some of those issues.

(Cont. on page 55)

Clash of Titans: Regulators vs. Markets

Addressing Costs Imposed on the Grid

By Charles Bayless

"However beautiful the strategy, you should occasionally look at the results." – Winston Churchill.

As we deregulate our markets, and simultaneously transition our energy supply to renewable energy, many interesting interactions are occurring between our old and new systems. In the physical world, the increased need for ancillary services due to the variability and un-dispatchability of renewables clashes with a system built for controllable plants. But an equally interesting set of interactions occurs as the free and regulated markets clash.

Renewables require more ancillary services such as balancing, frequency and voltage support, and reserves. To understand this, consider the services needed for stability and reliability on a grid run by four-thousand-megawatt controllable elephants or a grid run by a thousand four-megawatt cats.

The extra cost of these services is overwhelmed by the environmental externality cost of fossil fuels. As a society, we have no choice but to transition to renewables. However, as we transition, our current market structure ignores these services and is not able to make the correct decisions, which will lead to much higher societal costs.

To understand how the market is failing, let's start with how and when units are dispatched. To understand this, we need to begin with a utility's load characteristics.

A load duration curve, as in Figure 1, shows the percent of time that different loads exist on one axis, and the loads on the other axis. In Figure 1, the utility has about five-thousand megawatts running a hundred percent of the time, ten-thousand megawatts running about fifty percent of the time, and a peak load of about eighteen-thousand megawatts.

This load duration curve indicates a utility with an extreme peaking pattern. To use this curve with the generation stack below, I have switched the axis from the usual presentation. The total generation for this utility having a peak of eighteen-thousand megawatts would probably be about twenty-thousand megawatts allowing two-thousand megawatts or ten-percent reserve for outages, maintenance and other purposes.

Next let's look at our hypothetical utilities dispatch or marginal cost curve as shown in Figure 2. Each generating unit is represented by a separate bar. The width of the bar represents the megawatts of the generator. The height is the marginal cost to run the unit.

Marginal cost is primarily determined by fuel cost – in dollars per million BTU – times a generating unit's heat rate – in BTU per kilowatt-hour – divided by a thousand. For instance, a gas turbine having a fuel cost of four-dollars-per-million BTU and a heat rate of seven-thousand BTU per kilowatt-hour would have a marginal cost of twenty-eight dollars (four times seven) per megawatt-hour.

Charles Bayless recently retired as President and Provost of the West Virginia University Institute of Technology. Previously he was Chairman, President, and Chief Executive Officer of Illinova Corporation and its wholly owned subsidiary, Illinois Power Company. Prior to joining Illinova Corporation, he was Chairman, President, and Chief Executive Officer of Tucson Electric Power Company.

Consider the services needed for stability and reliability on a grid run by four thousand-megawatt controllable elephants or a grid run by a thousand four-megawatt cats.

In the dispatch curve, the generating units are lined up from left to right in increasing "merit order," which is merely increasing marginal generation cost. When the utility needs more generation, it simply walks up the curve dispatching the next unit to the right. It makes no sense to dispatch a unit having a marginal cost of forty-five dollars per megawatt-hour if a thirty-dollar per megawatt-hour unit is available, unless there are other considerations. This alignment is also referred to as the "generation stack."

Let's now look at Figure 3, a combination of the two curves with no renewables included. To reduce clutter, I have left out the individual generating units and shown the dispatch curve as a solid red line.

An economist will recognize this as a classical supply curve. The load duration curve is not a classical demand curve, however, as it is a function of other variables such as weather and economic activity, in addition to price.

At load B, the utility will be running all available units in the generation stack to the left of the vertical blue line. The last generating unit running, unit A, has a marginal cost of just under thirty dollars per megawatt-hour.

The utility would expect the unit to run about ninety percent of the time if it was a stand-alone utility. Of course, it is probably a member of a power pool, which has its own load duration curve and generation stack, so the actual run time may vary slightly.

Fig. 1 Load Duration Curve

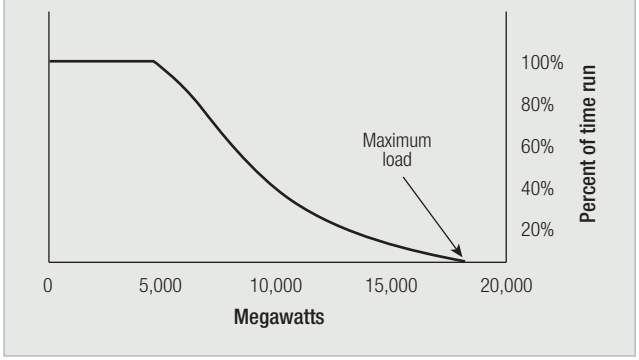
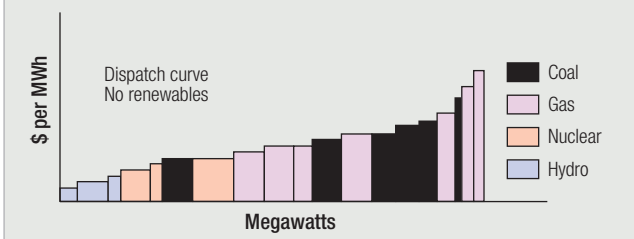


Fig. 2 Dispatch Curve



Let's then look at a rough description of how pricing in many power pools works. One-day ahead utilities will bid in their generating units based on units' marginal cost. The pool then selects enough units to cover the projected load.

Everyone gets the price of the last generating unit selected by the pool. This is the highest price unit selected.

In this case, assume it was Unit A and its bid was thirty dollars. All units which bid successfully would then get thirty dollars, even if they bid zero, which some plants such as nuclear units do to insure they will run.

How does unit A make money? If all it gets is its marginal cost, it clearly cannot cover its large fixed costs and continue in business. The answer lies in Figure 4.

Figure 4 illustrates a high-load day. In this case, we have load C and the last unit running is the pink unit. Its marginal cost is about seventy dollars. So, everyone including unit A gets seventy dollars.

To explore the interactions between regulated and free market systems, let's now include renewables in the generation stack. Renewables, having the lowest marginal cost, zero, will and should dispatch first. The effect of this is that the dispatch curve is shifted to the right by the megawatts of renewables online.

Let's look first at the effect this shift has on run time. Figure 6 looks at unit A, represented by the pink vertical bar, from a run-time point of view. On the old red curve, its position was the left pink bar, and from the load duration curve, we see that it ran about ninety percent of the time.

When renewables are online, and the stack is shifted to the

Fig. 3 Dispatch Curve And Load Duration Curve

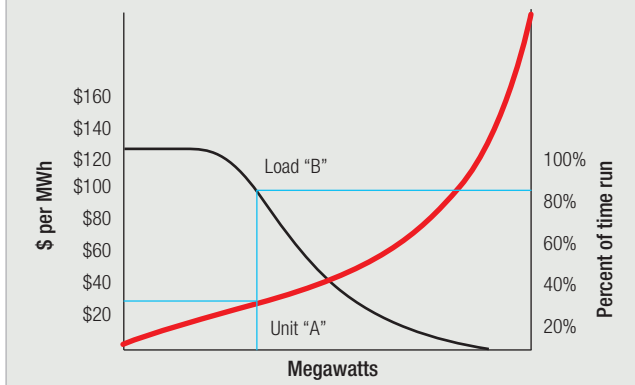
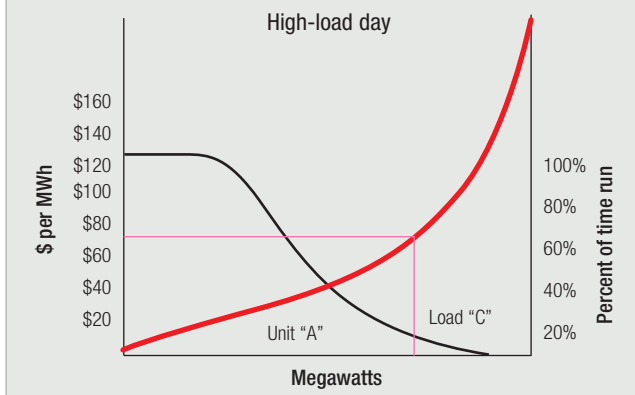


Fig. 4 Dispatch Curve And Load Duration Curve



right, its position has also been shifted to the right, along with all other units. It now runs about forty percent of the time.

When renewables are online, all existing units, except those to the left of the hundred-percent point (and reliability must-run units), will run less, giving them less revenue to cover their fixed costs. That however is not the end of the economic story. We shall now see that all units, including renewables, are paid less when renewables are running.

To understand why each unit receives less, let's look at the effect on price of the shifted dispatch curve. The vertical pink line indicates the load.

Without renewables, the clearing price would be determined by the price of the unit at the vertical pink line and the old red dispatch curve. It would be about seventy dollars per megawatt-hour.

When renewables are running, and the dispatch curve is shifted to the right, the market price is now determined by where the pink vertical line intersects the new shifted green dispatch curve. It would be just under forty dollars.

Thus, when renewables are running, generating units will dispatch less, and will receive less when they do dispatch. Note that some units have been shifted off the curve. They will never run when renewables are running.

Many generating units, running less and receiving less, will

Fig. 5 Dispatch Curve With Renewables

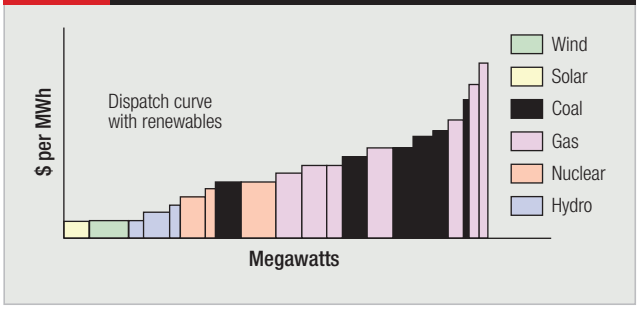


Fig. 6 Decrease in Run Time

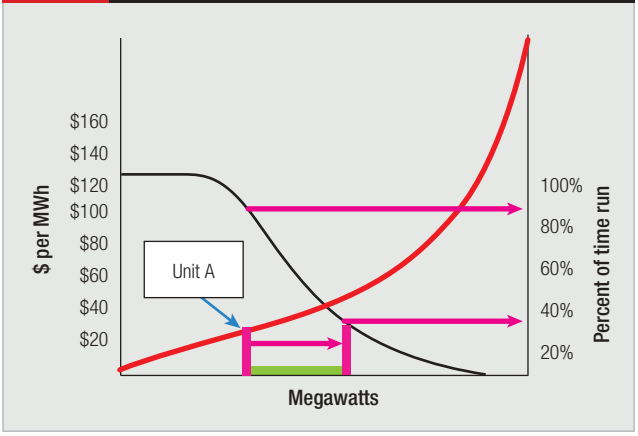
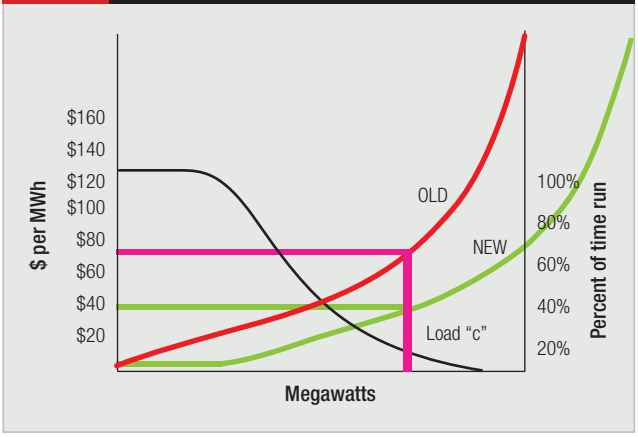


Fig. 7 Load Duration: New And Old Dispatch Curves



not be able to cover their fixed costs, forcing their shutdown. Many of these units should be shut down. But many should not.

Here our transition to a free market falls short. Currently the market decides which generating units survive and which are shut down, using energy cost as the sole metric.

But generating units provide far more than energy. They provide reserves, balancing, frequency support, inertia, VAR Support, N-1 contingencies, etc.

But we currently ignore the provision of these services when generating units live-or-die based solely on energy costs. To a market based on energy costs, ancillary services and physical factors such as generator inertia are externalities. As such, no market exists for them. They cannot be handled by the market. They must be handled by regulation or setting up a market.

As a side note, this type of "everyone gets the clearing price" protocol wreaks havoc on carbon pricing. Assume a coal plant is on the margin, and that it prices at an extra ten dollars per megawatt-hour due to carbon pricing. Everybody gets the ten dollars per megawatt-hour, even renewable units. Consumers pay far more than they would just for the carbon dioxide emitted from the coal plant.

Of course, the carbon price shifted the coal plants to the right. So they dispatch less. But it seems unfair for a consumer in a twenty-thousand megawatt system to pay for twenty-thousand megawatts of carbon reduction if only a thousand megawatts of coal-fired generation is online.

Another point. On high-demand days, prices will drop rapidly, as renewables shift the steeply-sloped portion of the supply curve out of the picture.

Many generating units, running less and receiving less, will not be able to cover their fixed costs, forcing shutdown. Many should be shut. But many should not.

A perfect market for apples will not ensure an economically efficient distribution of oranges. Neither will an energy market ensure the optimum provision of reliability services.

Choosing which units shut down, based entirely on marginal energy cost, has about the same likelihood of choosing the optimum future system configuration as: choosing which football team to bet on, based entirely on the abilities of the right tackle. Or, selecting a car, based solely on its gas mileage.

This decrease in pricing, caused by the rightward shift of the dispatch curve, also decreases revenues for renewables. As all units, including renewables, get the new lower price.

Let's assume a hundred-percent-renewable system. If the energy market were the only market on any given day, the market clearing price would be zero. Each generating unit, including renewable units, will receive the market clearing price of zero. No unit can survive, unless it receives adequate amounts from the capacity and reliability markets.

We don't need to go to hundred-percent renewables to illustrate this point. Assume that renewables provide our power eight-thousand hours a year. And that therefore, conventional units only run as backup seven-hundred-and-sixty hours a year.

Who is going to pay for these absolutely necessary units? They cannot economically survive running at a nine percent capacity factor.

Some will say that no fossil fuel units should run at all. They

Left: The future utility CEO and PUF author when he was six years old. Middle: The author wasn't always a utility CEO. Here, as a lineman. Top right: Bayless isn't always writing articles for PUF. Here, he's touring Greenland during a blizzard. Bottom right: The Seabrook nuclear plant was shut due to licensing concerns. The banks were frantic about what Bayless, CFO of Public Service of New Hampshire during the eighties, could do. So he had this pic taken for the company's Christmas Card.

will say these periods should be served by batteries. A position I – as Co-Chair of the Climate Institute – would be happy to accept. But the same question arises. Who is going to finance the batteries if they only have a nine-percent capacity factor?

We are increasing the capabilities of other markets such as the capacity and ancillary services markets. But we must continue to improve these markets. We must insure these capacity and ancillary services are valued correctly, for the market to make correct decisions.

Another factor making even gas units uneconomic in the southwest is that solar generation is highly-coincident with peak load. Twenty years ago, many units in the southwest made a great deal of their yearly profits in a few hours. These were during extremely hot days, when prices peaked at over a thousand dollars per megawatt-hour.

Today solar, thankfully for consumers, has destroyed peak pricing. When load peaks, due to high temperatures, so does solar generation. An executive at one large southwest utility told me that, in a few years, they would routinely export energy on peak, due to excess solar.

The rightward shift of the dispatch curve is also having a major impact on the coal vs. gas cost equations. It is causing units to operate outside the range for which they were designed.

In the period before renewables, plant type was based on trade-offs between construction costs and fuel costs. Coal plants had cheap fuel. But they had high capital costs. Gas plants had the opposite.

Coal plants were thus the best choice for baseload units. Baseload units had very high load factors. This allowed the high capital costs to be depreciated across a lot of kilowatt-hours. Coupled with low fuel costs, this made them the cheapest plants for baseload.

Gas plants had low capital costs. But they high fuel costs. So, they were optimal for peaking plants. They ran far fewer hours. Thus they had fewer kilowatt-hours over which to depreciate their costs.

But these plants were not impacted as much by high fuel costs, as they generated less. For example, consider a plant that would run only ten hours a year. The utility would want to build one that had the absolute lowest capital cost. It would ignore fuel cost (due to the low runtime).

Today, the abundance and low price of natural gas, together with the fact that it takes less BTU to produce one kilowatt-hour at a gas plant, has stood that old logic on its head. In the past, baseload coal had an advantage in its portion of the load duration curve. This advantage has disappeared. In most locations, natural gas is the cheapest plant for both baseload and peaking. But coal's problems don't stop there.

Are they trying to reduce carbon dioxide emissions? Or to maximize their profits?

When renewables are available, and when the dispatch curve shifts to the right, baseload units are suddenly on the steeply-sloped portion of the load duration curve. They are then called upon to cycle, which many cannot easily do.

But even if the fuel costs and heat rate of coal and gas generation were equal, baseload coal's higher capital cost will doom it. This is due to the rightward shift of the renewables curve. Baseload coal will have less runtime, and thus it will have a higher capital cost per kilowatt-hour. Its high capital cost will now be depreciated over fewer kilowatt-hours.

Many coal units that ran last winter in the northeast had an artificial cost advantage. This was due to high gas prices, which was in turn due to lack of gas pipeline capacity. When additional pipelines from the Marcellus and Utica Shales are completed, this advantage will disappear, forcing the closure of even more coal units.

Renewables are obviously critical to the reduction of carbon-dioxide emissions. But, according to the Energy Department, nuclear provides over half of our carbon-free electricity. Renewables – hydro included – provide slightly less than half.

But the introduction of renewables, coupled with the market

imperfections described in this article, is forcing the closure of nuclear units. This leads to the question: is the imperfect market forcing us to take one-step-forward and one-step-back on our journey to a carbon-free economy?

If we had any reasonable form of carbon pricing, we would not be closing nuclear units. Further, the closure of nuclear units will not lead to a one-to-one adoption of renewables. When a nuclear unit closes, the system loses dispatchability, stability, firm reserves, generator inertia and other services that will be made up primarily through the addition of gas turbines.

Further, to replace one megawatt of nuclear takes about three megawatts of renewables due to the difference in capacity factor. (The Energy Department reports average capacity factors of twenty-seven percent for solar, thirty-seven percent for wind, and ninety-two percent for nuclear.)

Those in the renewable community who are calling for the closure of all baseload units, including nuclear, should question. Are they trying to reduce carbon dioxide emissions? Or to maximize their profits?

If we worry about our future, we have no rational choice but to transition to renewable energy. But we do have a choice as to which renewables. And how we provide the necessary ancillary services to achieve the overall lowest system cost and best performance.

Today peakers are valued more for their ability to furnish peak power than they are for their energy cost. In a renewable world, a generating unit's economic viability will be based more on its ability to furnish the ever-increasing need for ancillary services, than it will for its energy cost.

But today, plants which provide these services are being forced to close by our use of energy costs as the determining factor of whether a unit runs or is retired. To keep these indispensable plants online, we must increase the price of the ancillary services they provide. As they cannot recover their full costs in the energy market. Thus, for ancillary services, we will be faced with increasing needs and increasing costs.

To provide these services, we must either have markets for frequency response, ramp rate, reserves, energy imbalance, etc. Or we must have regulations such as reliability must run designation.

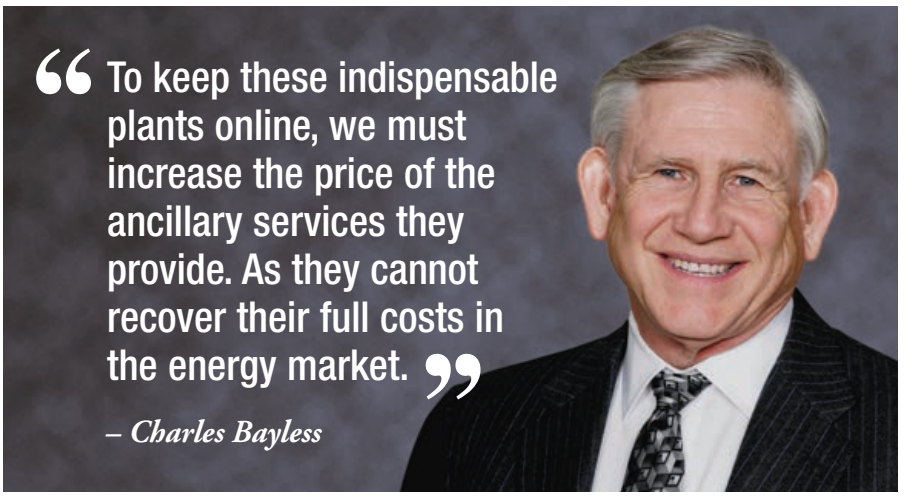
As we simultaneously transition our system to renewables, and our markets to competition, we effectively have seams problems between old markets and new markets. And between the old grid and the new grid. We must make sure that markets and regulation are set up to provide the necessary services at the lowest cost.

Regulators cannot simply say: we have deregulated the energy market, so let the market handle it.

There is no market for the increasingly vital ancillary services. No market can handle externalities, unless regulators set up a market as they have done with sulfur dioxide.

It is incumbent on FERC, NERC and reliability coordinators to continue to ensure that either regulation or a regulatory-established market ensures the cheapest provision of ancillary services as we transition.

The main point of this article was to point out how an energy-only market could not effectively provide ancillary services as these are externalities. A similar situation has now arisen in the capacity market.



On June 29, 2018 FERC ruled on a Calpine request concerning subsidies and their effect on the capacity market. Calpine and others had pointed out that state subsidies such as zero-emissions credits and RPS standards have interfered with, and suppressed, prices in the capacity market. Calpine et al. are clearly right. But is this bad?

Climate change is an externality and cannot be handled by the existing capacity market. Externalities can only be handled by so-called Pigouvian taxes on carbon producers, Pigouvian credits to low or zero carbon facilities, “thou shall not” type of regulations, or setting up a market (such as cap-and-trade). Where the Federal Government has clearly dropped the ball on climate change – actually, dropped, deflated, burned and buried it – don't state governments have the right to try to correct the situation?

And if their corrective actions interfere with the functioning of an imperfect market – imperfect because the market cannot handle externalities – which has the highest priority? The functioning of the imperfect market? Or society's interest in reducing climate change?

Just as in the energy market, regulators must stay involved.

(Cont. on page 55)

Blockchain: Future of Renewable Trading?

Blocking and Tackling

By Caitlin Shields and Macklin Henderson

What's blockchain? No, it's not the pseudonym of the latest rapper. If you haven't heard of it, the editors of *Public Utilities Fortnightly* should be thanking you, because it probably means you've chosen to read *PUF* rather than *Computer World*.

Why it should matter to you, though, is that blockchain, the technology behind bitcoin, stands to become one of the next disruptive forces in the energy industry – at least if Big Tech has it their way.

Blockchain, What Is It?

Blockchain is a peer-to-peer digital ledger that can be used to automate a wide range of transactions, making them more transparent, secure, verifiable, and, ideally, cost-effective. When parties conduct a transaction using blockchain, the details of the transaction are broadcast to all authorized computers in the network, which verify the validity of the transaction.

A blockchain ledger network can be public, as is the case when it is used to record cryptocurrency transactions, or private where only specific stakeholders have specific permissions.

Parties can enter into transactions through mutual agreements or through Smart Contracts – lines of code that execute automatically if certain conditions are met – to automatically conduct transactions. If the nodes agree that the requested transaction is valid based on the distributed ledger, it is approved, time-stamped, and recorded to the ledger, thereby enhancing the transparency and authenticity of transactions recorded on the blockchain. Thus, the blockchain makes transactions more transparent and easier to authenticate.

This process makes transactions easier to verify by reducing the risk of human error, given that it allows all parties to the transaction to utilize the same ledger, and by automating transactions that otherwise involve human inputs.

The blockchain is also a more secure method for recording transactions, because as a distributed ledger, it does not have a single centralized point of storage that can be manipulated, that is, hacked. In addition to enhancing the transparency and security of transactions, by automating the tracking and verification process associated with complex and high-volume transactions, blockchain technology stands to drastically reduce transaction costs. Ideally, blockchain will eliminate the need to maintain duplicative ledgers, serve as a replacement for time consuming due diligence processes, and allow parties to transact without unnecessary negotiation.

Furthermore, because transactions are timestamped and recorded to a ledger based on the sequence in which they occur, blockchain can provide verifiable and valuable details about a good or instrument being traded, such as the precise time and location it was created.

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The blockchain is a more secure method for recording transactions, because as a distributed ledger, it does not have a single centralized point of storage that can be hacked.

Potential and Challenges in Energy

While blockchain has already been successfully deployed across a number of industries, like the shipping industry, technology companies across the globe are beginning to introduce blockchain technology into the energy space.

In the Park Slope community of Brooklyn, homeowners and L03 Energy developed the Brooklyn Microgrid project, which relies on solar photovoltaic cells to generate power. In 2016, L03 managed a sale of renewable energy credits, RECs, between two neighbors connected to the Brooklyn Microgrid using smart meters and blockchain technology.

In Australia and Germany, residential communities similar to Park Slope are using blockchain to trade physical energy generated from home solar systems on relatively large scale. Companies have also begun to develop blockchain software for energy efficiency, electric vehicle, and battery applications.

Significant regulatory and operational barriers make it hard to envision peer-to-peer retail energy transactions occurring in the United States anytime soon. Most states only allow utilities or qualified retail electric providers to sell at retail, and the thought alone probably gives most distribution operators reading this a mild heart attack. That said, a potentially overlooked area ripe for blockchain disruption, or at least experimentation, is the renewable-energy and emissions-trading market.

There are a number of trading platforms that already trade

RECs and other, similar instruments. Blockchain makes it easier to track the authenticity of these credits and simplifies the audit process. Most of the tracking systems charge notable transaction fees, which can include issuance fees as high as five cents per REC, transfer and retirement fees upwards of ten cents per REC, and export fees of five cents per REC.

Alternatively, companies may elect to hire a portfolio manager, which will usually charge percentage-based management and commission fees. These fees can be significant, particularly for high-volume REC players like PG&E, who retired some twenty-two million renewable portfolio standard-eligible RECs in 2016.

In addition to regulated utilities, corporations are becoming increasingly sophisticated players in voluntary REC and carbon markets, demanding more scientific and cost-effective approaches to their energy transactions.

Because credits are detached from actual electricity distribution, and current tracking systems do not record the time of day when the renewable electrons were produced, there is currently no way to easily tell if the energy associated with a renewable resource offset a carbon resource, or to what extent.

Hence, the common criticism that while all RECs are not in fact created equal, they are nonetheless assumed to have the same intrinsic value. Conversely, credits created and tracked using blockchain can easily track the time, date, and location they were created, meaning it's easy to decipher whether a wind REC was created at 6 p.m. in Dallas in July, or at 2 a.m. on the Kansas plains in January.

This data point stands to fundamentally shift the way in which RECs or similar credits/offsets are valued, from monetary, social, environmental, and operational perspectives.

Given the benefits of blockchain and increasing demands from voluntary market participants – such as Amazon, Microsoft, and Google – the voluntary markets appear well-positioned for disruption.

Given the lack of automation, to buy and sell unregistered credits today, parties often use expensive audit companies to validate items like whether a seller has the right to sell the credit, that the credit is what it claims to be, and that it has not been previously retired. Because parties must keep their own ledgers, disputes can arise when organizations use different ledgers, requiring them to manually correct mistakes. Blockchain, on the other hand, essentially automates every step of the tracking, verification, and auditing process without the need for human interaction.

Each power producer would be a permissioned user on the network and have a node at its generating station. Every time that power producer produced a megawatt-hour of electricity, the node would record the production of a REC or carbon offset, including the underlying resource and time of production. The generator could then retire the credit itself or allow other permissioned members on the network to purchase it and then retire or resell it, eliminating the need for cumbersome audits and verifications in the voluntary REC markets.

If every REC were recorded on the blockchain, each permissioned user would have an accurate record of that REC's contract path and any transaction for an invalid REC would be automatically rejected by the network. Furthermore, because each REC would have a timestamp indicating when it was produced, each could be more accurately valued.

While there is undoubtedly potential for blockchain in the compliance REC markets, unlocking its full potential anytime

soon seems like a little more than a pipe dream due to numerous regulatory barriers.

First and foremost is the inherently state-centric nature of state renewable portfolio standards. Most states, for instance, can't agree on a uniform definition of renewable energy resource. Some states recognize hydro, waste heat, or biofuels as renewable resources, while others do not.

Likewise, many states have developed different policies regarding whether out-of-state renewable generation can count toward their RPS. Adding further complexity, most states have similarly developed their own approach, often by law, rule or regulation, governing how compliance RECs are to be tracked, monitored, verified, and certified, usually relying on one of ten regional tracking systems in the United States, such as W-REGIS or PJM-GATS.

Future of Blockchain

The benefits of a distributed peer-to-peer ledger will only materialize if market participants make the necessary initial investments in software and hardware and trust the platform. Nonetheless, it appears to be less a question of if blockchain will disrupt renewable energy trading markets, but when it will occur.

While there inevitably remain several practical hurdles to implementing a large-scale voluntary blockchain-trading market, at this point, it seems only a matter of time before some mix of tech and utility companies band together to experiment with a voluntary blockchain market, particularly given the level of interest tech giants like Oracle, IBM and SAP have displayed.

As this happens, regulators and policymakers should take note, as successes and lessons learned in the voluntary markets may inspire reforms in the REC compliance markets, ideally to the benefit of consumers.

Examples include reduced transaction, audit and verification time and costs, and enhanced security. Moreover, because blockchain unlocks more granular data about the true environmental and operational attributes of a given REC, compliance markets could be reformed to more accurately reflect the true operational, social and environmental values a given REC provides. PUF

APPA Fly-In

(Cont. from p. 45)

When our members are in town, they are quite effective advocates for public power. They are a great resource in terms of educating the staff and members of Congress about what they're doing day-to-day to provide their constituents with reliable and affordable power.

If there's an issue that's important to the industry, whether its hydropower-licensing reform or grid security, the fact that members of Congress and their staff hear from our members is helpful to them in making decisions on what position to take.

They don't always take the position that you want, but a lot of times all that work, in terms of education and keeping them up to speed on what's going on and how federal policies that impact their state or the district, really does move the needle.

That is why we do the fly-in every year and why we consider the Policy Makers Council an incredibly important part of our advocacy efforts.

Ben Kostick: I always feel it's a worthwhile trip. We do see the effect of our visits back here. The weather is not always enjoyable, but we've learned from being up on the Hill in the summer for several years, that there are ways to beat that heat and get around things. PUF

Clash of Titans: Regulators vs. Markets

(Cont. from p. 51)

They cannot wash their hands and let the market handle it. The market cannot handle it.

Regulators must handle it. And their handling will invariably interfere with market decisions by an imperfect market.

Neglecting externalities resulted in society choosing fossil fuels. Neglecting the externality costs imposed on the grid by various types of renewables, and the services necessary to compensate for them, may cause us to pick the wrong system configuration. This would impose high and unnecessary costs on society as we transition. PUF

At This Year's Exelon Innovation Expo, August 16, at the D.C. Convention Center, Hundreds of Employees Competed with Their Innovations

Clarifying the Conflicts in Wholesale Market Design

Find Common Ground and Focus the Debate

By Jay Morrison

ENERGY BAR ASSOCIATION
EBA Article Series

At the recent Energy Information Agency's annual energy conference, one of the speakers offered a rousing defense of the RTO markets against perceived challenges from state policy mandates. He considered the mandates to be reregulation piece-by-piece.

He further explained the multitude of benefits that RTOs have offered consumers and the system including: elimination of multiple control areas, regional planning, the use of redispatch instead of transmission line-loading relief, increased utilization of the grid, and increased transparency.

The speaker contrasted the present state with the "bad old days" in the 1970s, before competition developed in the electric utility industry, when consumers were "mad as hell." He then suggested that state policies supporting individual resources or resource types put all of the benefits of RTOs at risk and threatened to return us to the bad old days. To prevent that retrogression, he supported policy and market-design responses that would pre-empt or mitigate the effects of state policies.

Unfortunately, the speaker's argument conflates some settled historical issues with current policy disputes on which parties disagree. And, in so doing, it makes it more difficult to focus on the crux of the policy disagreement underlying the conflict between the RTOs and the states.

To help figure out where we have common ground and where we don't, it will help to unpack the argument a bit.

First, it is true that the seventies are not a model to which the industry should return. Those were the "bad old days." In those days, smaller load-serving entities, and those that were transmission-dependent, were at a deep disadvantage. Because it was difficult for load-serving entities to obtain transmission service from their neighboring utilities, it was often impossible or simply uneconomic for them to own generation or buy generation from anyone other than their neighboring utility.

Unless they could site a plant in the middle of a load pocket served entirely by their own transmission and distribution facilities, they would have difficulty getting their power delivered from their own resources to their load. They often couldn't contract for service from generators located one or two utilities away without the grace of their neighboring utility – frequently available only at a very high price.

And, they rarely had any access to economy energy in real time from generators around the region. As a result, most transmission-dependent utilities had to enter into cost-of-service requirements contracts with their neighbors and many of them spent years or decades in lopsided litigation at FERC over the rates, terms, and conditions of service.

There were a few bright spots in this dark time. New York, New England, and the original PJM footprint had power pools that somewhat enhanced options and reduced reserve costs. During the initial phase of nuclear construction, some transmission-dependent utilities were able to use their neighbors' need for capital and the anti-trust provisions in the Atomic Energy Act to negotiate joint-ownership and transmission-sharing arrangements that gave them greater access to transmission and thus better generation options. These, however, were exceptions to the rule.

It's not clear, however, what any of that has to do with state decisions to support particular resources.

The preamble to Order No. 888 does a good job of reciting this history. And, this history is why cooperatives and public power were among the earliest and loudest proponents of transmission open access and wholesale competition.

Co-ops and public power recognized that open access and wholesale competition had the potential to dramatically reduce power costs for their consumers. Open access would enable them to build their own resources and deliver their output to their members, contract with more distant suppliers of wholesale power and energy, and access economy energy on a near-real-time basis.

As hoped, open access worked well. It accelerated the development of an independent power producer industry and it encouraged generators to increase their efficiency, reduce their costs, and become more responsive to wholesale customers.

Of course, there was still room for improvement. There was still some discrimination in transmission planning and service. There was still transmission rate pancaking – the need to pay separately for wheeling service across each intervening transmission system between a resource and load. And, there were still significant inefficiencies in the operation of the transmission system.

That's why cooperatives and public power in many parts of the country again supported change: the formation of independent system operators. The idea was that ISOs would operate the transmission system regionally and independently. The goals were

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to further reduce discrimination, enhance regional planning, eliminate rate pancaking, increase efficient utilization of the transmission system, and in so doing, further increase reliability and competition, reduce power costs, and improve service.

So, that's the birthplace of RTOs and ISOs, as transmission operators centrally dispatching resources to maximize value and minimize cost on the transmission system. As Order No. 2000 provided when it established principles for RTOs, the RTOs were expected to establish energy markets to manage transmission congestion. Those markets were designed to serve as operational tools. RTOs, ISOs, and the markets they run still serve in that role today, and it is in that role that RTOs and ISOs provide the operational value noted in the second paragraph above.

Where does that leave us?

We agree that the seventies are a bad model. We agree that wholesale competition benefits consumers. We agree that RTOs and ISOs, in the areas where they operate, can provide significant operational, reliability, and competitive benefits.

It's not clear, however, what any of that has to do with state decisions to support particular resources.

There's no doubt that state policies, and federal policies for that matter put a definite thumb on the competitive scale. That is, after all, the point: to give those preferred technologies or resources a competitive advantage over others.

But, how is that relevant to the Federal Power Act's direction that the rates and terms and conditions for interstate transmission and wholesale sales be just and reasonable and not unduly discriminatory? How does that return us to "the bad old days" of the seventies?

The development of competition in the electric-utility industry has generally not been about ensuring a level playing field between different fuel sources. Nor has it been about protecting individual competitors or types of competitors.

Rather, the Federal Power Act has been read – at least until recently – as a consumer protection statute. It has been read to ensure that regulated monopolies do not gouge their wholesale customers and transmission customers. FERC reviewed public utilities' tariffs to ensure that they were cost-based and didn't discriminate against wholesale and transmission customers vis-a-vis the regulated public utility. The goal was to ensure that monopoly utilities didn't use their ownership and operation of the system to advantage their own generation and their own customers at the expense of others seeking to use the system.

When FERC moved toward market-based rates in the 1990s, it did so, based on analyses demonstrating that the wholesale suppliers were subject to sufficient competitive pressures to drive prices down toward cost and that open and independent operation of the transmission system prevented the individual public utilities from discriminating against their wholesale customers.

In other words, competition was not about ensuring a level playing field between natural gas generation and nuclear or between wind and coal. It was about ensuring that customers had access to enough choices that no one supplier could drive up wholesale prices or limit customers' options without a competitive check.

So, we come again to the question: Do state policies supporting individual resources or individual resource types undermine RTOs' and ISOs' abilities to ensure competition? I think the answer is no.

State policies do change the competitive landscape. But, they do not reduce competition per se.

First, state policies have no impact on the open-access revolution of Order No. 888. Nor do they deprive wholesale customers of the ability to obtain non-pancaked, non-discriminatory service across RTO and ISO grids.

Second, because customers still have access to multiple options, state policies do not undermine competitive incentives for suppliers. An RPS may give a wind generator a competitive advantage over a gas generator. But, to be successful vis-a-vis other wind generators, wind developers must still improve their product, improve their service, and drive down their costs as much as possible. And, gas, coal, and other developers must do the same.

Those fossil and nuclear generators that survive in an environment where consumers prefer – or are required to buy – renewable resources, must have competitive advantages that make them attractive to consumers and/or their political representatives. For example, efficiency, location, service quality, operational characteristics, environmental characteristics, contribution to the reliability or resilience of the portfolio, or willingness to enter into contracts that meet other customer needs.

Consumers still have options, and competition still drives suppliers to be more efficient and better at what they do. Who is competing may change, consistent with the state and federal policy goals, but the level of competition does not.

Just as state policies are unlikely to return us to the seventies, those policies are unlikely to undermine the RTOs' and ISOs' abilities to perform their core operational tasks.

In their role as system operators, RTOs and ISOs maximize the efficient dispatch of the resources that are available to them subject to reliability constraints. They are, or should be, indifferent to which resources those are. And, the benefits of that centralized dispatch and independent system operation – regional-transmission planning, elimination of rate pancaking, the use of redispatch instead of transmission line-loading relief, increased utilization of the grid, increased transparency – are unaffected by state support for resources or the resulting changes in the resource mix.

If the concern is not truly based on the impact of state policies on RTOs' and ISOs' operational benefits or on wholesale competition, we need to isolate the real source of the dispute between RTOs and states. The problem seems to come down to the impact that state policies have on what's being called "efficient" price formation. That is, the impact state policies have on the RTOs' and ISOs' ability to establish prices that serve as the primary incentive for exit and entry and the primary if not sole source of revenue for generators.

If so, it is true that state policies can undermine that function. It is not clear, however, that that is a problem under the Federal Power Act or a problem for wholesale customers.

The answer to that question depends on how we answer some other questions:

Do we believe in long-term or integrated resource planning and the long-term reliability, resilience, and integrational efficiencies they can provide?

Do we believe that the electric utility industry must serve a broader range of public interests beyond efficiency, such as environmental performance, economic development, technological evolution, or long-term reliability?

Or, do we believe instead that electricity is a pure undifferentiable commodity like gold or silver, and thus that the industry ought to pursue efficiency and short-term reliability as its only two goals?

Do we believe the decision between these visions should be made by states and wholesale customers or by FERC, RTOs, and RTO stakeholder processes?

Suppose we conclude that electricity is a commodity unaffected by the public interest and that FERC or the RTOs are empowered to make that decision. Then bilateral markets, native-load-service obligations, integrated resource planning, and state policies aimed to protect the environment, long-term reliability, and local economies may in fact be inconsistent with the future we're pursuing.

We agree on the operational value that RTOs and ISOs can provide. Let's please drop that argument as well.

That's the core of our disagreement. We agree that we don't want to go back fifty years to before open access. Let's drop that argument. We agree on the value of wholesale competition. Let's drop that argument. We agree on the operational value that RTOs and ISOs can provide. Let's please drop that argument as well.

Let's focus instead on the debate over the nature of electric service and who decides.

Has the industry changed so much? Is the Federal Power Act so flexible? That FERC and the RTOs are empowered to decide that electric energy should be regulated and traded as a pure commodity over the loud objections of states and load-serving entities that see "the business of . . . selling electric energy for ultimate distribution to the public [as] affected with a public interest?" As the Federal Power Act says?

And, even if the RTOs and FERC have that authority, should they so fundamentally redefine the nature of our industry? Those are questions worth debating. PUF

It could be nothing. Or it could be something. Sure, the weather's been hot. But, 8.2 percent? That's how much higher residential electric sales were this year, through May, versus last year. 7 percent. That's how much higher they were compared with the year before.

The all-time record high for residential sales through May was in 2014. This year, 2018, was 1.8 percent short of the record and now takes second place historically. 2010 and 2015 fall to third and fourth place. 2011 is now in fifth place.

Could this year – when all is said and done – have the highest residential sales ever? It's possible given June through December sales in these prior years. And could this year's sales beat last year's sales by double digits? It's possible given June through December sales last year.

Commercial electric sales you ask? They were 2 percent higher this year versus last and 1.5 percent higher versus the year before.

What Netflix and Amazon Pricing Tell Us About Rate Design's Future

Alexa, Pull Up My Energy Service Subscription Plan!

By Lon Huber and Richard Bachmeier

America is becoming a nation of subscribers. Blue Apron, Netflix, Verizon, Amazon; the list of subscription services goes on. Even Lyft is offering a new subscription service with unlimited rides for a fixed monthly fee.

The subscription e-commerce market has grown by more than a hundred percent a year over the past five years. The largest retailers are generating more than 2.6 billion dollars in sales in 2016, up from 57 million dollars in 2011.

This growth is fueled by consumer interests in convenience, control, choice, and comfort. Subscriptions are especially surging among the twenty-five to forty-four-year-old demographic, whose annual incomes range from fifty thousand to a hundred thousand dollars. If other industries are transitioning from a pay-per-use and volumetric model to a subscription model, why should utilities not consider this option as well?

Technology unlocked this subscription revolution by providing new ways for customers to acquire products and services, particularly on e-commerce platforms. The energy sector is also affected by these innovations.

At the same time, the sector is experiencing its own share of new energy service technologies that can further unleash innovation, such as advanced meters, smart thermostats, distributed generation, and digital apps. It is now time to leverage this technology and give customers the option to access a new pricing platform for their energy needs.

Navigant and Tucson Electric Power Company teamed up to explore what this offering could look like at a high level. An in-depth whitepaper will also be released on this new offering, which Navigant is classifying as an Energy Service Subscription Plan. The acronym, ESSP.

At its most fundamental level, an Energy Service Subscription Plan is a utility service offering that enables energy customers to pay a fixed monthly bill for energy use. While similar to present day flat bill rates, an ESSP can unlock much more when combined with advanced analysis of customer interval load data and smart devices.

ESSPs, which rely on the integration of new customer-sited technologies, offer more choices and can have longer, multiyear terms for consumers. Service plans would be offered on a subscription basis and be tailored to differing customer risk and convenience preferences.

For example, customers wanting full control of their energy use might choose a premier plan with a premium price that allows the participant full latitude on the volume and timing of electric usage. Think, all-you-can-eat.

Alternatively, some customers may prefer an economy plan offering a lower monthly bill in exchange for full convenience and some control over usage. These lower-cost plans would provide utilities with some control over the customers' usage profile, enabling them to manage system demand to create value for the grid. If this scenario sounds familiar, you might be recalling your Netflix account, which offers three simplified options to customers.

If other industries are transitioning from a pay-per-use and volumetric model to a subscription model, why should utilities not consider this option as well?

Plan Benefits

Energy Service Subscription Plans can be beneficial to middle- and lower-income ratepayers by improving their access to newer, more efficient technologies and appliances. Many of these customers cannot afford to invest in newer, more efficient technologies and appliances. Nor do they have access to credit at rates that would make such investments economical for them.

According to Tucson Electric senior director Dallas Dukes, "If the utility can provide these customers with newer, more efficient equipment and technologies in return for something akin to on-bill financing in the form of an ESSP, the utility can recover its investment and participating customers can realize the increased convenience and comfort associated with these investments – a true win-win."

Plan Criticisms

The concept of an Energy Service Subscription Plan will generate feedback. A criticism that may be leveled by energy-efficiency advocates is that a fixed monthly bill sends no direct price signals to customers to limit usage and is therefore not consistent with energy-efficiency objectives.

However, this service offering could be viewed as something

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Fig. 1 Example of Energy Service Subscription Plan

This new pricing platform can allow the bundling of different smart home services, such as home monitoring, appliance warranty/maintenance programs, or other services, to further diversify the utility's risk. This is similar to Amazon's interconnected subscription services in Prime (e.g., Prime Music, Delivery, Video, etc.).

Utility near you	Basic	Standard	Premium
Monthly price based on profile usage	$57.99	$99.99	$130.99
50% renewable	✗	✔	✔
100% renewable	✗	✗	✔
Free smart thermostat	✔	✔	✔
Smart EV charger & free public charging	+$10	+$10	+$10
Control days	30	15	7
Free event overrides per year	0	5	7
LED light bulbs	2	4	6

like a risk swap, where the risk associated with volumetric usage is shifted onto the utility. Under conventional rate designs, the customer faces volumetric price risk. An ESSP allows the customer to swap this risk to the utility in exchange for a fixed subscription charge, with the utility taking on the volumetric price risk.

Risk swaps like this are transacted all the time; the key point of an ESSP is that the risk of excess usage is now on the utility. The incentive to limit usage has not gone away but has been shifted to another party – one that is arguably better at managing risk than a typical customer. This now puts the utility in full alignment with energy-efficiency goals.

Subscription-style offerings often generate resistance from within the utility because of the increased volumetric risk. While perhaps understandable in a historical context, this resistance is misplaced, for four reasons:

One: Rather than overconsumption, current electric-usage trends show flat or declining energy use. Complicating matters is evidence that many utilities are experiencing decreasing usage per customer without seeing commensurate reductions in peak demands.

This situation results in the degradation of system load factors, does little to relieve the need for future generation capacity additions, and puts upward pressure on rates as utilities struggle to recover fixed costs in the face of declining sales.

Two: Utilities may be underestimating the risks posed by conventional rate design, which would fade away under a subscription model. Using conventional rate design, utilities are increasingly struggling with recovery of fixed costs in the face of declining energy sales.

A properly designed ESSP can allow utilities more stable fixed-cost recovery, thereby mitigating some of the upward rate pressure associated with fixed-cost recovery shortfalls.

Although there is some risk associated with overconsumption, that risk is confined to fuel and capacity risk during certain times of the year. For portions of the year – such as Tucson Electric Power's shoulder season when solar PV generation is abundant relative to usage – there may be little to no fuel or capacity risk.

In fact, increased consumption during these periods may benefit the system by allowing the utility to optimize its load shape relative to its resources. For those key periods when fuel and capacity risk are present, it becomes the utility's responsibility to limit these risks.

Three: Not all customers are the same. Although some customers may use electricity in excess of the amount assumed to price a subscription plan, others will not. Given sufficient diversification with participating customer demographics, the utility would likely see a portfolio effect in which, on average, subscribed customers are not using more energy than is priced into the plan.

This service offering could be viewed as something like a risk swap, where the risk associated with volumetric usage is shifted onto the utility.

If the utility is still uncomfortable with the level of volume risk, the program could be designed with limits or guardrails on monthly kilowatt-hour usage. Take Verizon, for example, with three different plan options like Netflix, each with some form of data limitation.

Four: Offering some of the utility's customers an ESSP option gives the utility a portfolio-diversification benefit with respect to revenue recovery. Just like a personal retirement account, that employs some combination of income streams based on the prospective retiree's risk profile, an ESSP option would provide more diverse revenue streams for cost recovery.

A utility's revenue stream under conventional rate design is skewed significantly toward volumetric risk, where utilities are recovering fixed costs using volumetric rates in the face of declining usage per customer. Introducing product offerings with a fixed revenue stream into the utility's portfolio would serve to mitigate volumetric risk.

Next Steps

Any new product offering should be something that customers are more likely to buy. Another good reason to approach an Energy

Service Subscription Plan structured offering in stages is to better understand and facilitate customer acceptance and satisfaction.

However, we suspect that customers will be open to this concept based on our own experience with Tucson Electric Power's solar subscription model and analogous offerings in restructured markets. In fact, according to one survey, about two-thirds of respondents want their utility to offer a flat or fixed-bill option.

That is why this concept is worth exploring in service territories across the United States. Proper subscription pricing will not be easy and will require advanced analytics, cross-functional coordination, and measurement and verification of customer product offerings. Yet consider the promise of a new pricing platform in terms of customer choice and access. See Figure One.

America's one hundred and eighteen million households have over two hundred million subscriptions. These are expected to grow to three hundred and fifty million in less than a decade.

Perhaps the competitive private sector is on to something. Subscriptions focus on uses of the service rather than overall consumption. Targeting customer preference and needs based on behavioral data rather than kilowatt-hour transactions empowers utilities to focus on increased customer choice, comfort, and convenience with a focus on high-value outcomes.

Perhaps the competitive private sector is on to something. Subscriptions focus on uses of the service rather than overall consumption.

With the historical restrictions of high fuel prices and inadequate metering technology mitigated, utility companies are now able to offer this pricing platform, creating wins for all stakeholders.

These wins would include predictable bills for customers, a hundred percent alignment between the utility and energy conservation goals, access to managed distributed energy resources for low- and moderate-income households, and improved fixed-cost recovery for the utility. Soon customers will be able to play an active role in managing their usage, stating with one sentence, Alexa, pull up my Energy Service Subscription Plan! PUF

At This Year's Exelon Innovation Expo, August 16, at the D.C. Convention Center, the 'Reinventing Energy in Our Cities' Panel

Exelon Utilities CEO Anne Pramaggiore, left, moderates the panel and speaks with Baltimore's Director of the Mayor's Office of Sustainable Solutions, Kendra Parlock.

Also on the panel, from left to right, Chicago Deputy Mayor Robert Rivkin, District of Columbia City Administrator Rashad Young, Philadelphia Managing Director Michael DiBerardinis.

A Day (Two Actually) at the Florida PSC

(Cont. from p. 23)

You walk up and down the hallway, and you find folks with similar tenure. I don't know what better proof there is. To remain in a place for that long, has to be a combination that they are being fulfilled in every or most aspects of their life, both professional and personally.

PUF: How do you describe your job to others?

Braulio Baez: To anyone else that asks, I read for a living. I'm half joking, but you know the business. We put out a lot of paper.

The decisions of the Commission impact every aspect of life in Florida. And I think by extension, the rest of the country. I truly feel that we do have the best staff in the nation, with all due respect and admiration toward our sister commissions.

Our methods have been favorably received by the regulatory community over the years. Our professionals including Commissioners have distinguished themselves in leadership of industry committees and associations. We have had a fairly long reach in that respect.

Still, when you say we're from the Public Service Commission, and we regulate utilities and prices and so forth, I can't remember ever meeting a ratepayer who says: oh yes, I'm very happy with how much I have to pay for electric rates, or gas or water, et cetera.

That person I just assume doesn't exist.

> **We want to recruit people that are here for the long haul, who can easily adapt and not have such a large learning curve, if that's possible.**
>
> *– Apryl Lynn*

We make all your hurt possible. But, kidding aside, I think everybody recognizes that the work we do as regulators is difficult. I guess it could be worse if there wasn't regulation of some sort. Nevertheless, difficult work, difficult decisions are rarely popular.

PUF: How do you keep a good rapport with external parties like the Legislature, the Governor's Office, and the utilities?

Braulio Baez: They're very good at hiding their frustration. God bless them. I think part of the job is knowing how to have the awkward or difficult conversation. You're speaking to the Commissioners, or Commissioners individually, or you're talking to utilities, or you're breaking bad news to the Executive Branch, or to Legislative leadership.

There's no profit in sugar-coating anything, and since we're an information agency we try and give information to the Commission and others for them to make their decisions. We say, this is where everything stands.

What the result is or isn't probably doesn't matter for purposes of this conversation, but these are the facts and the conditions that we know will lead to a result, and it's up to everyone else to react to that information as they make their best decision.

PUF: Mark, do you have ways to develop teamwork and get them to all contribute together?

> **I started as an entry-level analyst as an economist. For some reason they gave me a few more things to do over time, and circumstances led me to this opportunity.**
>
> *– Mark Futrell*

Mark Futrell: We try to maintain a close communication. The nature of the work brings people together. Part of my job is to ensure those processes are working efficiently and that people are meeting their deadlines and working well together.

Fortunately, a lot of the people that you talked to this morning, and even people underneath them have been here a long time, so they've been kind of baked into the culture, which is to work together.

We've worked particularly hard to improve that efficiency across divisions, work better together, and be open to each other's ideas by understanding our roles clearly. I think we're in a good place with all of that.

PUF: Apryl, is the Commission going to be a lot different in ten years than where it is now?

Apryl Lynn: A lot of the changes that the Commission will make are going to be driven by statute and, rule. Ten years down the road, I think we could be a little farther along with our technology and our staff will continue to be great resources of knowledge.

We work hard to hire and retain good staff. Our functions are unique. We want to recruit people that are here for the long haul, who can easily adapt and not have such a large learning curve, if that's possible.

We have great teachers here, and we have great training. We've worked hard to cross-train, pull down the knowledge and post it. We've done a great job of trying to use our resources. The more experienced staff is more than willing to play a role in the agency's future. Those people that have been here forever love the Commission. They want to see it grow and continue to strive.

I think that when the younger tenured staff come in, they'll do a great job. The Commission will be just fine. It's definitely here to stay, and we'll just keep advancing as time allows us.

PUF: Mark, do you see the work of your divisions being a lot different five or ten years from now?

Mark Futrell: As Apryl mentioned, a lot of work is driven by statutes. We have to ensure that the policies the Legislature has established are adhered to. Those are where a lot of the requirements are driven.

However, we have a whole range of types of companies that we interact with and regulate, from very sophisticated utilities to very small water companies.

We're trying to do everything we can to ensure all utilities stay viable and provide good service to customers at reasonable rates. We have a process for small water and wastewater utilities where the staff steps in and assists in a rate case process to ensure that they can generate the revenue they need to provide good service to customers.

Deputy Executive Directors Mark Futrell, Technical, and Apryl Lynn, Administrative, discuss the agenda for an upcoming Commission Conference.

That is an area we want to focus on, trying to find ways to be more efficient with staffing, as Apryl mentioned. That's an area with great potential for that, because it's a very heavy staff-driven process.

That's required by statute. It's a small percentage of customers in the state who receive water service and sewer service which is regulated by the Commission. But those are, in some cases, very vulnerable companies. We need to make sure that those customers are getting good service.

Finding a way to deliver regulation in an efficient way is something we've been thinking about and trying to work on for many years. It will continue. We're trying to find ways to monitor where they're going and be able to position ourselves to have more knowledge and be able to react and be prepared when they seek Commission action.

In Florida in the nineties, and the early two-thousands, we were looking at three to three-and-a-half percent annual electric growth.

Now we're in a very different mode as far as electric growth. There are new technologies that are coming to Florida that are more cost effective than they use to be, like solar, battery storage and smart-grid technologies. So, we're all trying to learn new things, and new ways to take a look at some of these resources.

PUF: Braulio, is the Commission going to be pretty much the same in five or ten years?

Braulio Baez: I think Mark's points are well taken. We have a lot of constituencies that we deal with, and not the least of those are the companies that we regulate. They play a part in our process, in terms of the corporate decisions they make and how they set their corporate strategies in order to meet the expectations placed on them.

By virtue of our regulatory construct, that often necessitates getting some kind of permission from the regulator. So, the utilities will pursue their objectives through the regulatory process.

The objectives are changing in nature, or maybe they're changing in path. We have to be adaptable on both sides of that equation. We have to adapt our processes, our knowledge, and our philosophies in a way that doesn't become a hindrance to innovation, or an unreasonable hindrance to utility objectives, as they meet their obligations to the public.

At the same time, we have to perform the function of regulation, which means you're not abandoning the public interest, or unreasonably burdening the customer. That's a balancing act, where the objects on the scale are running around from one end to the other. So, while there's no turmoil, there is constant imbalance, constant shifting, and constant change. We're stuck in the middle having to make both sense and use of that change in that public interest. ❍

Keith Hetrick, General Counsel, and Mary Anne Helton, Deputy General Counsel

PUF: Mary Anne, what's your typical day like as Deputy General Counsel?

Mary Anne Helton: Your to-do list may change quickly in the morning, depending on the issues that come up during any given day.

On a typical day, I usually spend some time editing. I might get to do a little bit of writing, but not nearly as much as I would like to.

It seems that I attend a lot of meetings – internal meetings with our lawyers, technical staff, Commission management. I also attend meetings that involve the parties to docketed matters. Sometimes I'm there to see what's happening – to stay in the loop, and sometimes I'm there to talk about real issues and how to resolve them.

One of my roles is to advise the Commission during hearings and public meetings with respect to process and procedure, and evidentiary questions. My hardest job is to stay alert, so I can answer a question when asked, without having much time to think about it.

PUF: Tell us a little about the Public Service Commission process.

Mary Anne Helton: I see myself as the Keeper of the Process. My goal is to make sure that the process is consistent, fair, and lawful. I hope I successfully meet that goal.

I know some commissions send their litigated issues off to a hearing officer or a hearing examiner – but that is not the model the Florida Commission follows. The Florida Commissioners sit as hearing officers during most of our hearings. Some Commissioners are not lawyers, and even those that are lawyers will sometimes ask me evidentiary or process questions.

There are no administrative law judges employed by the Commission. We used to have hearing examiners, before I started. In Florida now, all administrative law judges are housed in the independent Division of Administrative Hearings. We could send our cases over there, but because of the policy issues often infused into our cases, our Commissioners preside over most of our proceedings.

PUF: Keith, what's your typical day like as General Counsel?

Keith Hetrick: Let me begin the answer to the question by saying that Mary Anne takes a lot off of my plate. She can spearhead matters and advise our lawyers on the intricacies and strategy of day-to-day issues that may arise in their cases. The way that she applies her institutional knowledge here at the Commission is nothing short of brilliant. Also, we have a pretty extensive review process on recommendations that go to the Commission monthly for agendas. Mary Anne will read and edit every recommendation before it gets to me. And I really appreciate that. There are also a lot of meetings that Mary Anne can cover that I don't need to be in and that is a huge help.

I simply don't have time to review and read everything, so what I tend to focus on is more the notables and the controversial matters and issues, so I understand what the fundamental legal issues are in the case. Then, when the Commission turns to me, I can articulately answer their questions.

I see myself as the Keeper of the Process. My goal is to make sure that the process is consistent, fair, and lawful.

– Mary Anne Helton

I usually begin my day by quickly checking emails and news clips. I typically have meetings scheduled on my calendar throughout the day but typically get pulled into unscheduled and unforeseeable meetings involving unique or novel legal issues that need immediate attention, and sometimes meetings intended to address controversial or more high-level issues. I focus on the larger strategy that can get a controversial matter to the finish line. So I navigate those issues and make sure my opinion is considered.

So, my calendar is constantly in flux and changes every day. I can have X, Y, and Z on my calendar and I wind up doing those things plus other things that just pop up as I also have an open-door policy. I allow my attorneys to come in on issues and make sure that they have access to me. We're not bureaucratic in setting up meetings. I want them to have direct access.

I routinely spend time dealing with: upcoming agendas and associated issues, upcoming hearings, trying to organize how we're going to address matters, tightening important recommendations, rulemaking, and visiting with and advising Commissioners. On rulemaking, although we have a rulemaking section that handles rules, some of our rulemakings are controversial. I want to make sure that I'm involved to understand and guide the policy impacts of those. I make sure I carefully review every brief that is filed to make sure that the arguments are clear. There's lots of reading, directing research, answering questions, meetings

with stakeholders and litigation strategy session with my attorneys.

One of the things that has surprised me since I've been in this job is that you don't always see the same issues over and over, day-in and day-out. I've been here two and a half years and it's almost every week that there's a new issue that this Commission hasn't dealt with in many years, or it may be a unique issue or case of first impression. But that's one of the things that makes this job fun and challenging every day.

The biggest challenge in my job is finding the time to be able to sit down and have an hour or more to focus on one issue or read a brief, without being interrupted.

PUF: How do you figure out where and how to focus?

Keith Hetrick: We know what the controversial matters are as the cases bubble up, so we can prepare for that. I try to make sure that the Commission has all of the options available based on the evidence in the record.

Deputy General Counsel Mary Anne Helton and General Counsel Keith Hetrick talk with PUF's Steve Mitnick.

I've been here 2½ years and it's almost every week that there's a new issue that this Commission hasn't dealt with in many years, or it may be a unique issue or case of first impression.

– Keith Hetrick

Some cases are black and white, clear-cut and routine. Others are more complicated, and some are controversial or not as clear-cut. We work hard to give Commissioners clear analyses, thorough information and where necessary, options, so that they have the tools and flexibility to render their own judgment and make informed decisions in the public interest.

We are mindful of and never want any group of Commissioners to be perceived as rubber-stamping staff recommendations. As a result, we work hard to avoid that perception by educating Commissioners in briefings and by making sure that they have complete, accurate and concise information. We have to make sure that the information, our recommendations, and our legal imprint, is objective and also full and complete to avoid boxing-in decision-makers. In the end, our job is to be good educators.

The job of the Commissioner is to be educated on a matter so that they can evaluate the pros and cons of their prospective decisions and understand their options. So on controversial and often complex matters, we spend a lot of time. I know that education sounds simple, but it often requires breaking down and presenting complex information to Commissioners in a concise and simple manner that is easy to understand. To do so requires discipline and an ongoing effort and commitment on the part of all of us.

On the policy side of the equation, my experience, my background, my history and my career has been as an administrative lawyer and a lobbyist. So, I understand the importance of establishing relationships, the flow of the legislative process and how to convey information to both legislators and the media. I am involved in the legislative process and also in responding to media inquiries. I think my broad-based background and different career experiences help me maintain focus and perspective when I advise the Commission.

Rulemaking is another area and opportunity to make policy, consistent with the law. In order to achieve success and focused results in rulemaking, it is important to be not only transparent and

fair to all stakeholders involved, but also be clear in the objectives and to really listen to and have a dialogue with all stakeholders.

PUF: One issue that you look at constantly is, does it fully comply with the law and the evidence so that it's not going to be challenged. How do you do that?

Keith Hetrick: Absolutely. Whether it's rulemaking or any matter that's before us, my job, and Mary Anne's job is to make sure that we fill out the record with all of the evidence. If we need to put witnesses on to shore up the record, we do so – we need to leave no stone unturned and build a very supportable case from our perspective.

We also need to understand not just the position of all parties in a case but also their perspective. This allows us to make recommendations that give the Commission the full ability to fashion a decision they are comfortable with. If we do our job, no matter how the Commission may pivot, we will be able to defend their decision in court if challenged.

PUF: How do you two work as a team?

Mary Anne Helton: I think we work really well together and we have a great management team. We have three attorney supervisors with whom we work closely, and there are twenty lawyers total, including Keith and me.

Keith Hetrick: I agree. We complement each other very well and work together closely as a team. Mary Anne is not only an indispensable and invaluable resource, but she is also an absolute delight to work with. People do matter and her knowledge and skill set, work ethic, steady firm hand, congenial personality and her unwavering commitment to our team atmosphere makes a huge difference not only to me but also to the efficient operation of this office.

PUF: How do you work with opposing parties and say, hey, can we get a settlement?

Keith Hetrick: I don't think we're pre-disposed toward settlement of any matter as a Commission. The Commission certainly welcomes parties settling matters, and part of that reason is because settlements are recognized by statute. But we don't depend on settlements or go out of our way to encourage or signal a settlement preference.

So, settlements are a natural part of the process and the legal system – a way to resolve issues and not go through an expensive, long, hearing for everyone involved, but the timing of settlements can create downsides. If the settlement comes too early in the process, staff may not have a chance to vet the data leading up to the settlement because staff does not participate in settlement discussions among the parties.

It may be difficult for staff to go in after-the-fact, ask questions, obtain data or break through the black box and figure out what is going on because parties to settlements compromise among themselves and are often reluctant to explain how or why certain provisions exist. Staff is not privy to how or why certain numbers or provisions might be agreed to. Therefore, it may be difficult for staff to grasp how the settlement may be in the public interest, which in turn can make providing sound advice to the Commission difficult.

Alternatively, if we've had a settlement that comes in on the eve of the hearing, and we've had a chance to vet the case through the legal discovery process, we'll have a better understanding of the settlement when the parties present us with that settlement, because we know a lot more of what has gone into that settlement. Therefore, we'll be able to better answer Commissioner questions about the settlement.

Same with cases that settle after a hearing. We've developed a record and we can understand that settlement. But if the settlements come in too early – and we've seen some evidence of that lately – the question becomes how do you unpack that settlement to give the Commission the information that it needs to fashion a judgment on whether the settlement is in the public interest.

If the settlement comes too early in the process, staff may not have a chance to vet the data leading up to the settlement because staff does not participate in settlement discussions.

– Keith Hetrick

We're now looking at what other states are doing with settlements, how best to handle settlements that may come in early, whether this is a trend, and how best to unpack those types of settlements that come in early, without us either having to recommend a "no" because we don't have adequate information, or without us being co-opted as a staff by participating in the settlement process. We need to be able to get the Commission the information it needs so they can render an informed decision on whether this is a good settlement or not a good settlement in the public interest.

Mary Anne Helton: Another point to be made in terms of how we work together and how we function with opposing parties is during cases where some staff members are in a prosecutorial mode. We prosecute when we are enforcing a Commission order, rule, or statute.

In those cases, Staff applies the "Cherry model." It's based upon a Florida case from the early nineties where the court told us that the lawyer who litigates a case cannot also advise the Commission when it comes time for a final decision. The prosecutorial team is a party that advocates a position before the Commission.

So, when the Commission enters a show cause order, we split the Staff assigned into prosecutors and advisors. Those who

prosecute cannot communicate with advisory legal staff and vice-versa about the issues of the case.

The Cherry model is different from most cases, where the Commission's role is more legislative in nature. For most matters that come before the Commission, we are not required by Florida law to split the Staff. And in most cases, staff does not act formally as a party. We typically don't take positions before a hearing or advocate for a particular position.

PUF: Are there Staff members who are witnesses?

Mary Anne Helton: Yes. There are Staff members who are witnesses. Under our ex parte rules, Staff witnesses who testify in a hearing cannot engage in discussions with Commissioners or advise the Commission on the subject matter covered by their testimony.

PUF: Keith, how did your career lead you to this role?

Keith Hetrick: I was at the right place at the right time with the right experiences. Most of my career has been in the regulatory and legal technical world devoted to problem solving for clients. At the time, I had my own legal and lobbying practice. But my background has been diverse and balanced, having worked in-house for several law firms, a state environmental agency, and a major trade association, as well as having my own practice representing many private clients and trade associations before many state agencies. I am an administrative lawyer by trade, with much legislative and policy experience.

Bringing the economics together with the regulation, as far as the substantive work, was very intriguing to me, as well as serving the public interest in a meaningful role. I'm one of these regulatory nerds. I enjoy the entire regulatory process including rulemaking and have spent the better part of my career representing clients who want efficient regulatory decision-making. I have an appreciation for both an agency perspective and a private perspective (having worked in both the public and private sector). The opportunity to have exposure to a major industry, such as utilities, and to be able to contribute to and foster an efficient regulatory system in the broad public interest was exciting to me.

While I had never done any work with the Florida Public Service Commission in my career, because of my broad based background as a regulatory attorney, I thought that my balanced background could be beneficial to the Commission and apparently, they thought so too. And that's how I came to the Commission.

PUF: Pick out a couple things that you really like about your job.

Mary Anne Helton: There are a lot of reasons why I've stayed here so long. One is that every day is different. I am constantly learning new things. We get to work with a great Staff – we have a great team of lawyers, and we have an awesome technical Staff.

The practitioners who come before the Commission are usually wonderful lawyers, and it's a collegial bar, which helps make the work enjoyable. The Commission has a family-like atmosphere. I have a lot of flexibility, which makes it easier to manage both my work and my family. It's been a good work-life balance for me. I'm lucky because I work with wonderful people and on interesting issues.

Keith Hetrick: For one, I think my ability to bring an outside perspective to problem-solving is rewarding. I have a platform to advocate for policy issues when we have rules or precedent in place that don't lead to fair and just results on a consistent basis. It's that outside perspective of how to package up a case or issue so that we create a win-win situation for the Commission and in our recommendations. In just about everything we do, we create opportunity to solve problems in the public interest.

The 'Cherry model' is based upon a Florida case from the early nineties where the court told us the lawyer who litigates a case cannot also advise the Commission for a final decision.

– Mary Anne Helton

When I know that the Commission is comfortable in its decision-making because they can figure out what direction they want to go because we've built a solid foundation for their decision-making based upon clear, concise and comprehensive information and discussions with staff, that's a good day. I know we've done our job and served the public interest well.

I also like the management side of it, hiring and mentoring our attorneys. We've had several openings because a few attorneys decided to do different things or move on, and I think we compete well with any other agency in terms of pay and giving folks opportunities.

I'm never upset if anyone leaves. I want attorneys to know I have their back, and that as they progress in their careers and move elsewhere, that's not a detriment to us. I'm happy for them. I think that frees them up to enjoy their work.

So, the management side, for me, is intriguing. And I enjoy spending time going the extra mile to make sure we hire the right folks who will excel here.

Thirdly, the Commission side of my job is also fun and challenging. I never take anything for granted and I work on those relationships. It is perhaps the most important part of my job and one of the several things I love so much about my job. I also thrive on packaging and finding creative ways to solve outside problems, including bringing groups together.

At the end of the day, how any Commission functions is about relationships and finding fair and just resolutions to matters. The more relationships you can bring to bear, including getting

the right folks in the room to resolve problems, that's where you really get results.

Whether it's in an agenda meeting, a settlement, the rule-making process or a matter completely outside the scope of the Commission, the parties resolve these issues and if we can help bring about an efficient process to assist in resolving matters, we're contributing in a meaningful way and we've done our jobs. I'm constantly thinking about creative ways to address issues and solve problems. And every day, I never forget what an honor it is to be entrusted by the Commission to serve in my position as General Counsel of the Florida Public Service Commission. ❍

Division and Office Directors

Cayce Hinton, Laura King (Bureau Chief), Andrew Maurey, Cindy Muir, and Greg Shafer

PUF: You have five divisions represented here. Greg, tell us what you do.

Greg Shafer: Our responsibilities are varied. We are responsible for reviewing conservation programs and the costs of those programs. We are also responsible for making sure the programs are cost effective as they're implemented, and they're implemented correctly.

We handle depreciation analysis, and depreciation studies. We are responsible for forecasting for energy prices, energy load and customer growth. Anything in the energy world that should be forecasted, we're looking at, except for the physical plant.

PUF: How do you fit into the process?

Greg Shafer: As for the forecasting section, the companies file their forecasts and wade through the discovery process. We access the data that they have used, and we review the description of their models.

We have software where we can attempt to replicate the companies' models. Our forecasting staff are looking at whether the assumptions are reasonable, what's the error factor in the companies' results, and what is their track record in terms of the accuracy of the forecast.

The other main thing our division does is rate design. The money people tell us how much, and then we figure out how to get it and who to get it from.

PUF: Laura, how does engineering fit in?

Laura King: We're a little unique. We have staff in Tallahassee. We also have a Tampa office and a Miami office because we're responsible for gas and electric safety.

As far as in Tallahassee, we have about twenty-five staff here. We do a little bit of everything. All our divisions have varied responsibilities that connect.

Engineering staff work on water and wastewater cases, where they look at quality of service, used and useful, and pro forma plant additions. Those kinds of things. We have staff that also work on the electric issues. Things such as need determinations for generation capacity, setting conservation goals, reviewing utility ten-year site plans and producing the Commission's annual distribution reliability reports.

Our forecasting staff are looking at whether the assumptions are reasonable, what's the error factor in the companies' results, what is their track record in the accuracy of the forecast.

– Greg Shafer

We are also responsible for staffing the emergency operation centers during hurricanes. That can get a little intense. We also do site visits for water and wastewater companies and field inspections for electric and gas companies. We do a little bit of everything.

PUF: Cayce, tell us about your division.

Cayce Hinton: We are Industry Development and Market Analysis. We are a mixed bag, with four sections. Two of our sections focus on energy issues, and two sections handle what remains of the Commission's involvement in the regulation of telecom here in the state.

Telecommunications has largely been deregulated here in Florida, but we still handle issues like oversight of the relay system for the deaf and hard of hearing and are also involved with the Lifeline Assistance program.

We still handle intercarrier issues, where we approve interconnection agreements, and if there's a dispute between carriers we can arbitrate those wholesale issues under the federal telecom act.

PUF: What about 5G?

Cayce Hinton: It's not really an area that is within our

jurisdiction. It's wireless for one thing, which has never been under our jurisdiction. In addition, it appears a lot of the controversy revolves around municipal right-of-way issues. Those are two areas that we've never had a role in. But the legislature has been very active in that over the last few sessions. That's where these issues are going to be resolved.

Then for our energy sections, we're outward facing. We monitor federal agencies. FERC, FCC, NRC, and EPA. When the legislature is in session, we'll also take the lead on developing bill analyses for use by the various legislative committees and their staff.

We also handle special issues, such as the nuclear cost-recovery docket, net metering and renewable energy. We will often take the lead if a particular area of interest comes up, such as investigating electric vehicle charging and its impact on the electric grid.


Division Directors, from left to right, Greg Shafer, Cayce Hinton, Andrew Maurey and Laura King stand outside the FPSC building in Florida's sunshine.

PUF: Andrew, tell us about your group.

Andrew Maurey: The accounting group covers rate of return, capital structure, making sure that costs are prudently expended. Return on equity is always important. But we do, as the name implies, any accounting and finance issues in all the cases. Those include rate cases for electric, natural gas, water and waste water.

We also work in other areas. Right now, we're getting ready for several hearings. For instance, there was a mention about storms. We have five storm dockets related to recovery for Hurricane Irma in 2017. One docket just closed, and four more are going to hearing. We're the lead on these cases, but engineering is involved as well.

Part of the strategy is to have a storm reserve funded by accruals from rates, but as a result of recent settlements, the companies have agreed to suspend their annual accruals, so their storm reserve balances haven't been growing.

Now in lieu of that, within sixty days of filing a petition they can get an interim storm-recovery charge, which will recover their estimate of costs and replenish the reserve to a predetermined value. We have hearings to determine the prudency of those costs.

It's very important to have the companies be financially sound. It's important for them to recover that money in the near term and then let us do the prudency later.

Some of the other dockets with hearings scheduled are for tax reform. We're lead on all of those dockets. Our first hearing is at the end of August, so we'll see how controversial it becomes.

PUF: Sometimes the cost of capital, the rate of return can be among the hottest, most litigated areas of cases. Do you have people that will testify on that or present some models? How does that work?

Return on equity is an important issue. For an electric case, we might have four or five ROE witnesses.

– Andrew Maurey

Andrew Maurey: We maintain models. We have our own discounted-cash-flow and capital-asset pricing models that we maintain. I've testified many times on rate of return on equity. But not since the nineties.

When I first arrived, we had over four hundred people in the agency. Now we're around two hundred and eighty. We've

contracted as an agency, which limits us in our ability to testify because then you have to have an advocacy and an advisory staff.

We will testify when it's absolutely necessary. If there's just one side represented in a case and testimony is necessary, we will do it in order to supplement the record.

But as you mentioned, return on equity is an important issue. For an electric case, we might have four or five ROE witnesses. So, there's usually no need for staff to participate in that role.

PUF: Cindy, tell us about your group.

> **I had someone come to me saying there was a critical need for restoration ASAP. I was like, where, what, who? It turns out it was a Waffle House.**
>
> *– Laura King*

Cindy Muir: The Office of Consumer Assistance and Outreach is the face of the Commission, since we directly interact with the public. We handle press inquiries, issue press releases and plan monthly outreach events. The office also includes a bureau of analysts who help customers resolve their complaints against the utilities we regulate.

When the Commission is involved in a rate case or there is a controversial issue before the Commission, customer calls will escalate, and the analysts are very busy. Our dockets drive the issues the office handles. Some are cyclical, such as cost recovery dockets each fall or the storm season that begins each spring.

We depend on the other Commission divisions and offices to ensure that the information we disseminate to the public is accurate, and they also help us resolve customer complaints. I truly appreciate their responsiveness and willingness to work as a team.

PUF: Do you use social media to communicate to the public?

Cindy Muir: We have an active Twitter account. We feed all of our press releases to Twitter and post Commissioner activities, outreach events, and customer meetings and hearings. We also monitor the feed for comments to be proactive in addressing customer concerns, when appropriate.

PUF: Greg, what's the most fun part of your job?

Greg Shafer: There are things that maybe we find fun because they're ironic. One area where this is true is rate setting for the water and wastewater industry, where there are a lot of small companies.

Part of the process is to go to the service areas of these small companies when they file for a rate increase and hold what we call "customer meetings." A preliminary analysis report prepared by staff is available for their review, and the customers can tell us what they think about that report.

But also, quality-of-service issues might come up. Those are very interesting sometimes. I've had situations where it felt a little hostile in the room, as you can imagine if customers are looking at an eighty or ninety percent increase or greater. Sometimes, people bring really nasty water and want you to drink it. Those kinds of things add some comic relief to the process.

We get that from time to time at the customer meetings, but that's a bit out of the ordinary.

PUF: Laura, what are some fun things in engineering?

Laura King: Some of our experiences at the emergency-operations center are interesting. We staff Emergency Support Function 12, which handles power issues. We generally have someone there 24/7 prior to the storm, during the height of the storm, and for several days following the storm.

During Hurricane Irma there was a great deal of concern for critical infrastructure and facilities. I had someone come to me saying there was a critical need for restoration ASAP. I was like, where, what, who?

It turns out it was a Waffle House. This was a day after Irma hit and I politely explained, well, waffles are wonderful and coffee's great, but it was not a critical facility that needed power restored immediately.

The counties and the utilities have a very good working relationship based on our experience. They understand that you can't just go into the middle of a neighborhood and wave a magic wand. There's a process. There's a logical order to things and there are reasons for priorities.

PUF: Cayce, what are some of the fun things or interesting things in your group?

> **It's very rewarding when you feel like you've helped customers and made a difference for them. When consumers call our office, they reach a person, not a recording.**
>
> *– Cindy Muir*

Cayce Hinton: Being involved in the development of regulatory policy and watching how it continues to develop and have an impact has been great.

For example, I was involved with writing the net-metering rule back in 2008. I have enjoyed the process of developing that rule and then watching how it has impacted the growth of residential solar over the years.

The number of customer-owned renewable systems grew fifty percent from last year. We've gone from sixteen thousand to twenty-four thousand customers with new systems this past year. We started with five-hundred and seventy-seven customers

in 2008. It's gratifying to have played a part in that.

PUF: Andrew, what about accounting?

Andrew Maurey: We enjoy doing the same thing every day. It's interesting to see how the issues evolve over time. History has a tendency to repeat itself. When I started here, we were dominant with oil. We had problems with fuel diversity.

Now, thirty-five years later we've got all this diversity. We're dominant in natural gas. So, we're right back where we were before.

There will be some changes. We like to see how the issues evolve. I like to see how the newer analysts come in and get excited about this work because it's important work. Some people on the outside look at it and say, you're just number crunching, or you're a public servant, or you're this or that.

We deliver a valuable service, collectively. We all add to that. It's important work, and to see someone start their career and get excited about it, that's enjoyable.

Chief of Consumer Assistance Rhonda Hicks discusses a consumer's complaint resolution with Director Cindy Muir.

Being involved in the development of regulatory policy and watching how it continues to develop and have an impact has been great.

– Cayce Hinton

Cindy Muir: For my office, it's very rewarding when you feel like you've helped customers and made a difference for them. When consumers call our office, they reach a person, not a recording. Maybe we help them resolve billing issues, so they can meet their payments, or we connect them to an actual person who can help them at their utility.

If consumers aren't sure who to call, it seems like they call our office, since Public Service is part of our name. And, it's rewarding to help them find their way, whether that ends up being the Commission or another State of Florida agency.

PUF: You're not Google or Apple. Are you able to attract young people to these jobs?

Andrew Maurey: There is turnover. It's just like the industry itself. You've got people aging out. That's happening here. A third of our division has been with the Commission for less than five years. We've got a lot of new blood coming in, and developing that is important, because these issues are just going to get more challenging over time.

Cayce Hinton: It's always a testament to the quality of the agency and the working environment when we have so many people that have been here from the beginning to the end of their careers. We've got people retiring after thirty or thirty-five years here at the agency. You have people who've made their entire professional career here. That's a testament to the work that we do.

PUF: Who has the best division here at the Florida Public Service Commission?

Cindy Muir: There's no one best division. We all depend on each other.

Cayce Hinton: There's very little that we do that doesn't involve other divisions.

Greg Shafer: This tends to be more a functional structure as opposed to an industry silo type structure. When there's a rate case, you get rate-design staff, accounting staff, engineering staff all working together from the different divisions.

We're working together constantly. That's fun. We've got a good group of leadership folks and a good staff that works together very well. Our Executive Director and Deputy Executive Director set the tone, in my mind. They emphasize cooperation and openness with one another. There doesn't tend to be turf battles that some workplaces have. That makes it a lot of fun.

Laura King: I think the teamwork here is wonderful. That's something that surprises so many of our new employees, that you can go to your director's door and knock and walk in if they're available.

There's not this rule where you've got to follow the chain of command. If you have a question for accounting and Andrew's available, he'll answer the question. Doesn't matter if you're an engineer, starting out, or you've been here thirty years.

We all work together. It's really good. I like that people will tell you if you're wrong. I think that's very helpful.

It's a good, honest, open working relationship. I think all the divisions share that. PUF

Accelerating Generation Changes Make Assuring Reliability More Complex

A NERC Perspective

By Thomas Coleman

Assuring the reliability of the bulk-power system in North America requires identifying challenges and formulating appropriate solutions to a rapidly evolving generation-resource mix.

As the Electric Reliability Organization, NERC is charged with assuring the effective and efficient reduction of risks to the reliability and security of the grid. As such, NERC conducts annual, seasonal and special reliability assessments to identify and analyze trends or potential risks.

One of the areas of focus has been the generation mix's potential impact on bulk-power system operations. Natural gas is becoming the predominant generation fuel, a reality reflected by the U.S. Energy Information Administration's recent projection that gas-fired power plants are providing more electricity to consumers during the 2018 summer than all other generation resources.

Similar growth in renewables is underscored by grid operators in North America and Europe experiencing new records for the amount of electricity provided by solar or wind during a twenty-four-hour period.

NERC recognizes that natural gas and renewables present opportunities as well as reliability challenges due to their operating and fuel-system characteristics. In this new generation-resource paradigm, NERC's 2017 Long-Term Reliability Assessment identified the need to ensure a sufficient level of essential reliability services including voltage and frequency support and to assure timely delivery of natural gas over the next decade.

The major growth in power generation from natural gas and renewables is causing a historic shift in grid operations that makes maintaining reliability a more complex endeavor.

While an increasing number of renewable generators can provide essential reliability services to the bulk-power system because they use inverter technology to turn direct current into alternating current, NERC and the industry have learned that inverters must be programmed for reliability.

The programming of inverters came to light due to performance in response to California wildfires. NERC conducted disturbance analyses of the Blue Cut and Canyon 2 fires in Southern California, which identified the potential susceptibility of solar-photovoltaic-inverter tripping and reduction of output during these disturbances.

NERC and the Western Electricity Coordinating Council launched a task force to identify the primary causes of the August 2016 Blue Cut disturbance, leading to the publication of the Blue Cut Fire Disturbance Report. The report identified potential risks to the reliability of the bulk-power system, including erroneous frequency-based tripping in some inverters and the use of momentary cessation used by inverters nearly across the fleet.

Once these issues were identified through the event analysis, NERC began outreach with the industry and vendors to educate them on the potential risks and mitigation strategies.

The operational issues related to renewables and their current intermittency is an opportunity for natural

The programming of inverters came to light due to performance in response to California wildfires.

Tom Coleman is Director of Reliability Assessment at the North American Reliability Corporation, NERC.

gas-fired power because it is able to ramp up in response to a drop in output from solar and wind.

Fast-ramping natural-gas units are an especially important addition in a North American generation mix with increasing renewables and accelerating coal and nuclear retirements. NERC is scheduled to release a special assessment in November underscoring how accelerated coal- and nuclear-power-plant retirements could impact the reliability of the bulk-power system.

Power plants that run on natural gas receive their fuel through a pipeline and storage network that spans North America and has a unique set of challenges. In California, for example, leaks from the large underground storage site at Aliso Canyon have limited the natural-gas supply available to utilities in the southern part of the state. To compensate for this loss of fuel, imports of natural gas and electricity from outside Southern California have increased.

While the impact of the Aliso Canyon constraint on California's power-plant fuel supply is well known in the industry, NERC in November 2017 released Special Reliability Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System across North America. This report found that a severe disruption to natural-gas infrastructure could result in various instabilities of the grid.

Building new natural gas storage facilities and pipelines or increasing existing pipelines' capacity is an opportunity to supply electric utilities with more natural gas as the fuel's production has risen steadily following the shale-technology breakthrough. A key challenge, however, is opposition by state government, local government and environmental groups to new natural-gas-infrastructure projects.

Firm-fuel agreements from supply source to burner tip provide the highest level of reliable natural-gas delivery. Transmission planners and operators should identify and report on expected reliability concerns related to interruptible natural gas.

The accelerating move toward natural gas and renewable generation means the industry must adopt a more robust approach to planning the bulk-power system so that it continues to be reliably operated.

As bulk-power-system planning continues to evolve and improve, NERC is also working with the industry on a comprehensive review of reliability standards. The review's goal is to ensure compatibility with the changing resource mix and flexibility in the bulk-power system given the growing dominance of natural gas and renewable generation.

NERC assessments of the future reliability of the bulk-power system provide a vital service to the industry, grid operators and policymakers, including those at the Federal Energy Regulatory Commission, state utility commissions and in Congress. NERC will continue to work with industry and its stakeholders to identify potential issues that could affect bulk-power-system reliability. PUF

> **The accelerating move toward natural-gas and renewable generation means the industry must adopt a more robust approach to planning the bulk-power system.**

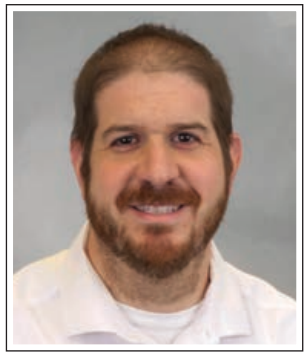
Glimmer of Good News

The federal government – specifically the U.S. Bureau of Labor Statistics – announced on August 10 that real average weekly earnings for Americans rose just 0.1 percent in the last year. This disappointing result came from the combination of inflation's increase of 2.9 percent and average hourly earnings' increase of 2.7 percent.

What pushed real average earnings to slightly over zero, as opposed to slightly under zero, was a 0.3 increase in the average number of hours worked weekly. Not great news. When real earnings don't grow as is the case presently, the buying power of Americans is stagnant. We're not getting poorer, true, but we're not getting wealthier either.

However, there is a bright spot. While overall inflation, as measured by the Consumer Price Index, increased 2.9 percent, average electric bills fell 0.8 percent during the same period. That's an enormous gap between overall inflation and electric bill trends. It means that real inflation-adjusted electric bills – doing the math – fell an eye-catching 3.6 percent!

As we said, average hourly earnings increased 2.7 percent. With hours worked weekly up, average weekly earnings increased 3 percent. Since average electric bills fell 0.8 percent, Americans have become wealthier in at least one way, when it comes to paying for their electric service. Now, that's a glimmer of good news.



Value of the Grid in High-DER Future

New APPA Perspective

By Paul Zummo

Are distributed energy resources making electric utilities and the grid that supports them obsolete? While some argue these new resources will force electric utilities into a diminished role, we believe that the most effective way to ensure the maximum potential of these new resources is an enhanced electric grid managed and operated by electric utilities.

For a new paper, The Value of the Grid, the American Public Power Association examined the potential reach of distributed resources to examine what role utilities can and should play in the future. We determined that there is still tremendous value in both the electric utility and the electric grid in meeting evolving customer expectations.

Despite growth in distributed resources, complete grid defection, where customers disconnect from all utility service and rely on self-supply, is unlikely and counterproductive to customers seeking low-cost reliability or a decarbonized future. Moreover, despite decreasing costs and improving technologies, using a combination of solar and storage to power a typical house is still a relatively uneconomical option. The cost to reproduce the benefits of the electric grid far outpace what most customers spend on electricity each month.

Distributed resources can certainly help customers achieve energy savings. Energy storage is on a similar path to solar photovoltaic technology, meaning it is getting increasingly cheaper to produce. More and more customers will be able to take direct control of their energy production.

Though these technologies are improving and getting cheaper, some things cannot change. The sun will not shine all the time, especially during the winter. Except for certain parts of the southwestern United States, it is simply not technically feasible to rely on solar plus storage for a hundred percent of energy needs without oversized solar and storage systems. But this adds to the cost of those systems.

There are also limits to the productive capacity of rooftops for solar production. Not everyone, no matter the costs, has suitable roof space, not to mention the millions of people who do not own their homes.

As it stands today, the grid is enormously reliable and available to customers more than ninety-nine percent of the time. Replication of this level of reliability would be costly for non-grid connected customers.

Looking at research conducted by the Electric Power Research Institute, as well as analysis conducted internally by APPA staff, the cost to replicate this level of reliability for a non-grid connected customer would be two-to-three times what a typical customer pays monthly. Customers would have to purchase two or maybe three Tesla Powerwall storage systems and significantly oversize their rooftop PV systems to achieve the same level of production.

Looking just at the potential production doesn't fully account for more extreme weather conditions. The basic calculation of energy need and potential production also assumes a fairly moderate level of usage and might drastically undercount how much energy would be required for a customer to disconnect from the grid while maintaining a

The cost to reproduce the benefits of the electric grid far outpace what most customers spend on electricity each month.

Paul Zummo is Director of Policy research and Analysis at the American Public Power Association.

similar lifestyle. The payback to achieve this level of production would be two or three decades, making it a questionable investment for most.

The likeliest scenario for the future is that most distributed resources customers will continue to be tied to the grid as it is a reliable and valuable backup source of electricity.

Grid defection is made all the less likely due to a countertrend: electrification. The electrification of vehicles, water heating, and home heating could more than compensate for declining demand for electricity because of energy efficiency and distributed resources.

Electric vehicles are becoming more economical, and the overall life-cycle costs are less for EVs than traditional vehicles. Other forms of electrification are more efficient, and generally less energy intensive, leading to environmental benefits even if the fuel sources are not all zero emission.

Increased electrification, along with greater penetration of DERs, will be transformative for the electric industry, and these new developments will create operational concerns. That is why utility management of a centralized grid – and integration of resources – is essential for efficiency and reliability.

This also assumes a fairly moderate level of usage that may drastically undercount how much may be really required for a customer to disconnect from the grid while simultaneously maintaining a similar lifestyle. It also doesn't fully account for more extreme weather conditions. In the end, the payback to achieve this level of production would be two or three decades, making it a questionable investment for most.

Grid architecture will have to evolve to accommodate and integrate distributed resources and electrified resources. We will need enhanced communication systems so that distributed resources can work in sync with each other and with existing resources. The grid will remain essential, but not unchanged.

Though different models of grid management will emerge, the electric utility will continue to play an essential role. There are some suggested future paths that outline a diminished role for the utility, envisioning it as something like a gatekeeper.

> **We will need enhanced communication systems so that distributed resources can work in sync with each other and with existing resources.**

Some utilities might take this path, but overall, we think electric utilities should have a much more integral role in managing the grid. It is best for the development of new technologies, and more important, best for customers.

There should not be, and almost certainly will not be, one specific model for the electric grid of the future. There will be different rates of adoption of both distributed resources and electrified end-uses.

Partnerships will likely become particularly crucial, and solution providers will have a role as well. But the utility will be at the center. Utilities have an obligation to serve all customers, and this is an obligation we have performed well for decades.

Much will hinge on local circumstances and customer interests. In this regard, public power utilities are well positioned to understand these local circumstances and modify their business model accordingly.

Public power utilities are especially suited to thrive in this future. Because public power utilities are nonprofit, and their employees and leadership live in the communities they serve, they typically have a better pulse on what the community wants and are driven by the interests of the community. The relatively small size of most public power utilities – their median size is just over two-thousand customers – also provides them with keener insight into what the community wants.

A number of public power utilities are already taking steps to prepare for the new energy future, and they are exploring new services and business models to lay a groundwork for their future role. A few examples outlined in the paper show a small sample of the programs our members have developed.

The report can be downloaded from the web, at PublicPower.org/Resource/Value-Grid. PUF

Nikola Tesla made it possible to locate generators of electric power distant from the users of the electricity. Generators could be large and at an economical scale – like the "groundbreaking" Niagara Falls – to serve a region of users. Hence the term central station.

Absent Nikola, numerous small uneconomical generators would have been built in the nineteenth and twentieth centuries, each to serve a small concentration of users – like the Pearl Street Station (which was groundbreaking in other ways). This would have been less reliable, more polluting, more expensive. And infeasible for communities in the suburbs and rural America.

NARUC Summer Meeting in Scottsdale

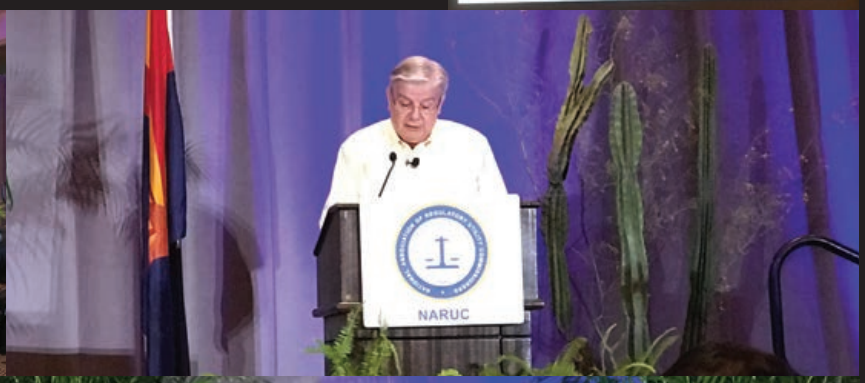
Another great NARUC Summer Meeting. Were you there with all of us – in late July – in Scottsdale? NARUC President Jack Betkoski and NARUC staff packed the schedule with panel after panel, but as usual it proceeded seamlessly unlike inter-RTO flows.

On this page you'll see – in the upper right – prez Betkoski honoring Commissioner Lorraine Akiba after winding up her term on the Hawaii Public Utilities Commission. Below that pic is a shot of the theme for NARUC political advocacy within the DC Beltway.

At the bottom of this page, we have scenes from the featured panel of the first general session. It was called "How to Create and Implement an Innovative Ecosystem in the Water and Energy Nexus." That's prez Betloski on the right, Commissioner Nick Wagner on the left, he of the Iowa Utilities Board. Incidentally, with the prez from the Connecticut Public Utilities Regulatory Authority and Commissioner Wagner from the Iowa Board, do you know the only other two full member state utility commissions without commission in their name? Answer below.

Between Commissioners Betkoski and Wagner are, from left to right, Emerson Collective senior advisor Dr. Dan Arvizu, SUEZ president David Stanton and Israel New Tech director Oded Distel.

On the next page, we have scenes from the featured panel of the third general session. It was called "Regulatory Yoga: Are We Flexible Enough?" Chair Asim Haque of the Public Utilities Commission of Ohio is at the podium introducing his panel of utility and regulatory leaders. You can »




NARUC

see at the top of the page, from left to right, AEP CEO Nick Akins, Puget Sound Energy CEO Kim Harris, Cox Communications senior vice president John Wolfe, Aqua America CEO Chris Franklin and Pennsylvania Public Utility Commission Chair Gladys Brown. Akins represented investor-owned electric utilities, Harris represented IOU natural gas utilities, Wolfe represented telecom (which is no longer price-regulated by the states), and Franklin represented IOU water utilities.

On this third page, we have scenes of attendees before and after the general sessions. Can you spot Commissioner Travis Kavulla, former prez of NARUC now finishing his term on the Montana Public Service Commission? How about Chair Ed Finley of the North Carolina Utilities Commission and first vice president of NARUC? And then there's Chair Angela O'Connor of the Massachusetts Department of Public Service - that's one of the commissions without commission in its name – sitting at a table with Commissioner Mary-Anna Holden of the New Jersey Board of Public Utilities. And that's the other commission – the New Jersey Board – without commission in its name.

But who are the others in these pics? Do you know? I can see friends at AEP, AGA and ... Some with great smiles, some deep in discussion, about the nexus of this or that. All in all, it was a super summit of the utility regulatory universe in Scottsdale. PUF


Joe Paparello


Lori Burkhart


Steve Mitnick


Angela Hawkinson


Mike Eacott


Alexandra Revel

PUBLIC UTILITIES FORTNIGHTLY

Impact the Debate

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Advertising Index

A Day (Two Actually) at the Georgia PSC

Coming up next, in your October issue of *Public Utilities Fortnightly*, the cover article on our two-day visit with the Georgia Public Service Commission.

Check out our unique conversations with Chair Bubba McDonald, Commissioners Chuck Eaton, Tim Echols, Doug Everett and Tricia Pridemore, Executive Director Deborah Flannagan, Director of Utilities Tom Bond, Director of Electric Sheree Kernizan, Director of Natural Gas Nancy Tyer, Director of Facilities Protection Michelle Thebert, Director of Operational Support Jada Brock, Director of Internal Consultants Pandora Epps, Executive Secretary Reece McAlister, Manager of Consumer Affairs Claudette Willingham, Manager of Human Resources Cheryl Dumas, Public Information Officer Bill Edge, Budget Director Terry Pritchett, and other members of Staff, Jamie Barber, Janey Chauvet, Kelli Cole, Nancy Gibson, Patrick Reinhardt, Steve Roetger, Jeff Stair, Tara Surratt, Preston Thomas, Rob Trokey, Tony Wackerly.

That's twenty-eight Commissioners and Staff, approximately one-third of all the employees of the Georgia PSC.

We snapped this pic of a discussion in the Chair's conference room. In the pic, from left to right, Manager of Human Resources Cheryl Dumas (facing away from the camera), Commissioners Chuck Eaton and Doug Everett, and Chair Bubba McDonald.

Light Up Navajo

Over 15,000 Navajo Nation Families Without Electricity

Through partnerships with other utilities, Navajo Tribal Utility Authority renewable energy projects on and outside Navajo Nation boundaries have raised funds for materials and infrastructure.

To further its mission. To bring more electrification to the Navajo Nation. This will help improve the standard of life for Navajo families who will be connected to the electric grid for the very first time.

The American Public Power Association has also provided grant funding for the #LightUpNavajo Initiative.

Public Utilities Fortnightly encourages our industry to participate in the upcoming planning session on September 10-11, 2018. To be held in the capital of the Navajo Nation, Window Rock, Arizona.

For more information:
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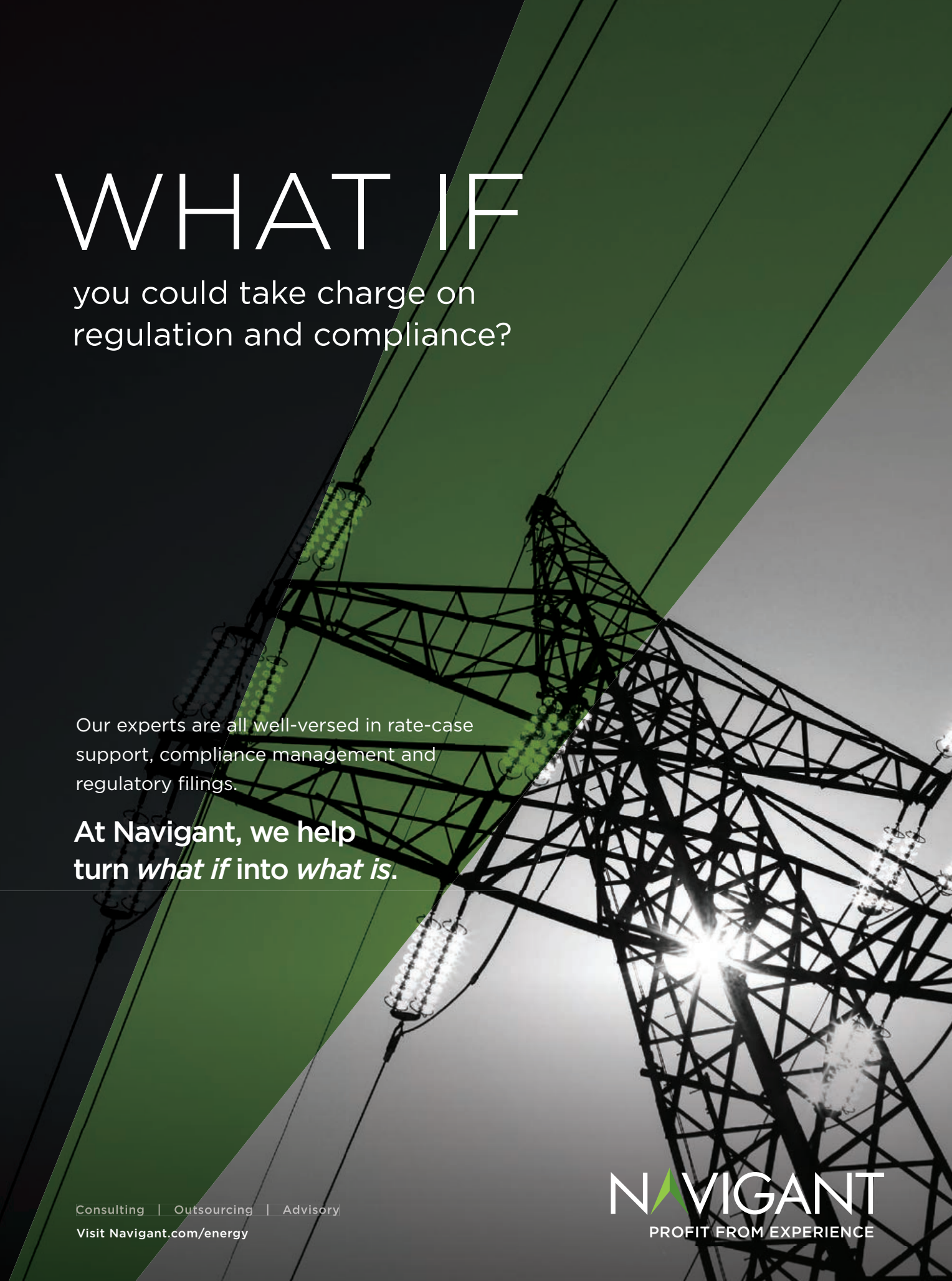
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