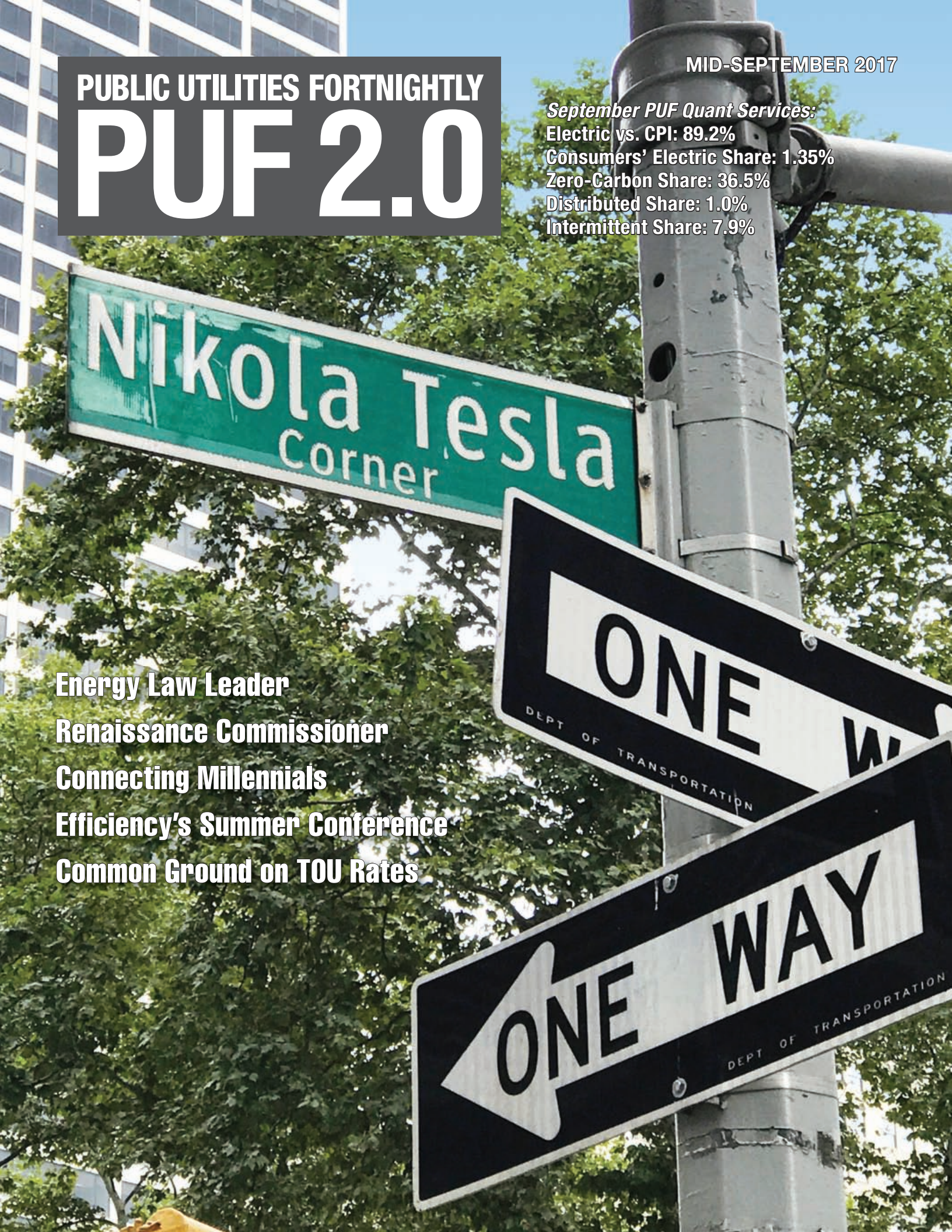
MID-SEPTEMBER 2017

PUBLIC UTILITIES FORTNIGHTLY

PUF 2.0

September PUF Quant Services:
Electric vs. CPI: 89.2%
Consumers' Electric Share: 1.35%
Zero-Carbon Share: 36.5%
Distributed Share: 1.0%
Intermittent Share: 7.9%



Energy Law Leader

Renaissance Commissioner

Connecting Millennials

Efficiency's Summer Conference

Common Ground on TOU Rates

TOWERS HIGH ABOVE THE REST.

When building a power transmission system, experience is as important as poles and wires. As a leader in transmission development, Duke American Transmission Co. offers you the critical experience you need to avoid delays in the construction and permitting process, and get up and running on schedule and on budget. It's just part of the power of partnering with DATC.

DATC
DUKE American Transmission Co.®

A POWERFUL PARTNER

datcllc.com

In PUF, Impact the Debate

PUBLIC UTILITIES FORTNIGHTLY
PUF 2.0

Mid-September 2017 • Volume 1, No. 4

Cover photo: Nikola Tesla Corner, Sixth Avenue and Fortieth Street in Manhattan, at Bryant Park. Photographer: PUF Staff.

Xcel Energy®
RESPONSIBLE BY NATURE®

Powering communities

The nation's utilities are literally connected to thousands of cities and towns across the country, serving as integral members of each community. With their ongoing investment in transmission lines, pipelines and generating plants, utilities provide the energy to keep things running. But that's just part of the work they do.

Xcel Energy serves communities across eight Western and Upper Midwestern states, and for more than a century has actively supported its communities to help them thrive.

"As a utility, keeping the lights on is a key part of our mission, but we do much more. Protecting the environment, driving economic development and giving back to our communities are just a few of the ways that we deliver more than energy."

Ben Fowke, chairman, president and CEO of Xcel Energy

"We know our success is directly tied to the success of our communities," said Ben Fowke, chairman, president and CEO of Xcel Energy. "As a responsible community partner, we are committed to delivering on our shared goals and continually raising the bar on our performance."

Fundamental to serving communities is the need for safe, reliable energy at an affordable price. While this original mission has not changed, there is growing interest in the environmental impact of energy. Energy providers are responding by changing how they produce and deliver energy.

Xcel Energy has helped lead the way by taking a number of steps to reduce its environmental impact, including adding significant amounts of low-cost wind and solar energy to its system, modernizing conventional power plants and offering customers a comprehensive portfolio of energy efficiency programs.

Steps like these are making a real difference. For the first time in nearly four decades, the transportation sector surpassed the power sector last year as the top source of carbon emissions in the nation. Collectively, electric utilities have cut carbon emissions 25 percent compared to 2005 levels. In 2016, Xcel Energy achieved a 30 percent reduction in carbon emissions from 2005 levels and is currently on track to reduce these emissions 45 percent by 2021.

Investments in clean energy, as well as other utility infrastructure, deliver for local economies. Altogether, Xcel Energy plans to invest more than $18 billion over the next five years in renewable energy, transmission and other infrastructure—investments that will create jobs, increase local spending and expand the tax base.

But a utility's economic contribution can go beyond infrastructure investments. By working side-by-side with economic development organizations, utilities can provide valuable energy expertise to attract and retain business. For many businesses, energy is an important consideration when they're deciding where to locate.

Thriving communities also require a skilled workforce. That's why many utilities support STEM education programs that prepare students for careers in science, technology, engineering and math. In the next decade, U.S. demand for scientists and engineers is expected to increase at four times the rate of all other occupations.

In 2016, the Xcel Energy Foundation contributed $1.3 million to STEM education programs, and company employees generously volunteered as tutors, mentors and more. This giving, combined with the company's annual United Way campaign, energy assistance and other contributions, resulted in a total community investment for the year valued at about $63.4 million.

"As a utility, keeping the lights on is a key part of our mission, but we do much more," said Fowke. "Protecting the environment, driving economic development and giving back to our communities are just a few of the ways that we deliver more than energy."

Thousands of Innovators

Electric Industry Gets a New Vibe

BY STEVE MITNICK

We used to quote the exec that said he wanted his company to be tenth in everything. Let other utilities try that new technology, process or method.

We used to call ourselves Doug. It stood for dumb old utility guy, and portrayed a culture that was not dynamic and not diverse.

Made sense for an industry in which failure isn't an option. The lights must stay on. Can't take risks with safety.

Then this happens. Quite suddenly, in the last couple of years, the industry gets a new vibe. Sluggish is out. Dynamic is in, as is surprising diversity.

Execs are prioritizing innovation and personally driving it. Indeed, they're driving innovation innovatively. Aggressive recruiting of high-upside talent from all demographics. Partnering with the most inventive startups and labs. Incubators and contests to stir creativity internally.

Want proof that this is not your father's electricity industry? *Public Utilities Fortnightly* announces the Fortnightly Top Forty Innovators initiative. Then we ask leaders from utilities, associations, commissions, etc. to nominate their top innovators for the Top Forty issue this November.

There are thousands of innovators in today's industry, their numbers swelling every month.

And what happens? An incredible response. As many as a thousand nominations are heading our way by the October first deadline.

Any other year in my forty years in the industry, this simply doesn't happen. A top innovators initiative and issue? No way. A thousand nominations to recognize and celebrate the passion of top innovators? Again, no way.

There's a larger point here. We may receive a thousand nominations. But those thousand are just the tip of the iceberg.

There are evidently thousands of innovators in today's industry. And their numbers are swelling every month.

It will be tough enough for us to pick a top forty – those who are most advancing the public interest – among the far greater number of nominations. Consider how much tougher this will be next year and the year after, when we may receive two thousand nominations, maybe more.

We revere Thomas Edison, Nikola Tesla, George Westinghouse and Samuel Insull for how they made this industry. A hundred years from now, who among today's innovators will be similarly revered for remaking this industry? ❖

Join us in Charm City!

Baltimore is the host city for the 129th Annual Meeting and Education Conference!

Infrastructure, Innovation, and Investment
Driving the Future of Regulation

November 12–15, 2017 • Hilton Baltimore

We know that energy and utility matters affect everyone, every day.

NARUC convenes engaged stakeholders, informed experts, and dedicated state regulators for robust, timely discussions of energy policy, telecommunications, and other utility topics.

John Betkoski III will be formally installed as the NARUC President.

#NARUCAnnual17 **Register at naruc.org/annual-meeting/2017-annual-meeting/registration/.**

The best ideas naturally stand out.

Who are Innovators in Regulatory Policy?
Do you know Utility Industry Innovators?
Let us know by Oct. 1, 2017.

See **bit.ly/NARUCInnovationAwards** for complete categories, nomination information, and criteria. Winners will be announced November 14, 2017, at the NARUC Annual Meeting and Education Conference **Installation Luncheon.**

Energy Law Leader

Global Trends Are Game Changers

BY STEVE MITNICK, WITH CLINT VINCE

PUF's Steve Mitnick: Dentons' energy practice is known for its regularly published *Game Changers* series. What are your top game changers right now?

Clint Vince: We started publishing *Global Energy Game Changers* eight or nine years ago while assisting a corporate Japanese think tank. The project was an important learning experience and we decided to make an ongoing venture of it. We receive material from Dentons' offices around the globe. Our goal is the release of a new issue every quarter.

Let's start with game changers that keep utility and energy executives up at night. These include what we refer to as "the four Cs": cyber threats, climate change, cyclones – symbolic for turbulent weather, flooding, water scarcity – and competition. Competition may come in the form of new asymmetrical entrants into the marketplace, such as Google, Apple, Amazon, proactive consumers or even distributed energy resource players, to the extent that utilities have not yet factored them into their game plans.

Other game changers are disruptive technologies, big data analytics and unexpectedly large swings in energy prices. The plunge in gas prices blindsided the coal and nuclear industries, at least in the U.S. Oil and gas prices are critical, and both have been lower than anticipated. Another example is renewables. The cost has dropped so dramatically in the last five or six years that they are very viable now.

Clint Vince is Chair, Energy Sector, Dentons US LLP.

PUF's Steve Mitnick: Is the *Game Changers* research a good exercise for you?

Clint Vince: Everything we do now in terms of our strategic advice to clients is based, in large part, on industry trends, business plans and the globalization of markets. When we started out, clients looked to us for advice on regulatory matters, including permitting and compliance; sought our counsel about energy-related transactions, including mergers and acquisitions; or counted on us to advocate for them before federal and state commissions, and the courts. Now, it's also essential for an energy and utilities practice to provide business and strategic advice covering everything from power supply planning and transmission, including where to invest in infrastructure, to potential new entrants that could threaten our clients' financial viability. It's all interrelated.

I'm not suggesting that the legal assistance we provide our clients to enable them to operate their businesses in a legally compliant manner is unimportant to them, but that our role has expanded to include strategic counseling, and most of our longstanding clients have told us they appreciate the strategic advice as much as the technical legal advice.

The game changers are cyber threats, climate change, cyclones – turbulent weather, flooding, water scarcity – and competition.

PUF's Steve Mitnick: What are some of the mega-trends that are disrupting where we are?

Clint Vince: Distributed energy resources are one of the big disruptors now. We're moving away from just relying on central station generation. It's much more

of a hybrid now, where we're almost at the tipping point with new investment in things closer to the customer side of the meter. There's a lot of exciting technology coming into those areas—everything from improved battery storage to new smart grid technologies with multi-directional communications and energy transfer networks to electrical vehicles and, ultimately, more fuel-efficient driverless vehicles as well.

PUF's Steve Mitnick: Tell us about some of the big turning points that you've seen in your many years serving in the energy industry.

Clint Vince: I've been blessed with a long enough career to see many trends, but truth be told, today is the most interesting time to be an energy lawyer. The sector is now facing some of the biggest threats that I have seen. Fifteen years ago, for example, no one was worrying that much about cybersecurity. Today, vulnerabilities exist from the office environment to the production network to process control and safety systems. And climate change, once a subject of remote concern, is now an existential threat to the planet requiring a very dramatic change in how we behave, consume and produce.

The new technological trends are also very exciting. I think we're in a period of huge transition. We may realize it more fully looking back ten years from now, but the industry is changing fast and dramatically.

PUF's Steve Mitnick: What do you tell the young people you're trying to recruit to Dentons?

Clint Vince: The first thing I tell them is that every time the industry has seemed to be of one mind on a major trend, twenty-four to thirty-six months later we've discovered that we shouldn't have been so certain.

I co-chaired the Aspen Institute a couple of times over the past few years and shared this observation with the folks there—for the most part seasoned veterans—who nodded in agreement. Look at the impact of the shale gas revolution, for example. It was not predicted well in advance, and it totally transformed the industry, including stopping the nuclear renaissance that had been predicted. And remember when we thought we would be using coal as the primary fuel source in the U.S. for generations to come.

Gil Quiniones of NYPA, Her Highness Princess Lalla Joumala Aalaoui of Morocco, Clint Vince, and Kateri Callahan of the Alliance to Save Energy.

We're in a huge transition. We may realize it more fully ten years from now. The industry is changing fast and dramatically.

I urge young people not to dismiss minority viewpoints too easily, and to have the courage to be original thinkers. A lot of the people whose views were deemed to be outliers in the past, proved to be correct on everything from climate modeling to shale gas to oil pricing.

PUF's Steve Mitnick: What do you think our industry will look like in five years?

Clint Vince: Energy is an essential component of civilized society. That's not an original thought, but it's a true statement. I think energy will be radically transformed by technological advances, but it will also be affected by external factors like cyber, climate and other serious issues.

While it's hard to predict with any degree of accuracy where we'll be in five years, I think you'll see much more of a hybrid situation between central station generation, investment and distributed-energy resources.

I also think big data analytics will do things that we can't easily envisage today. I think the globalization of markets will continue. I used to have the hubris to think I had a fairly sophisticated understanding of global markets. I did a lot of international work, but now that our energy practice has a thousand professionals in 64 countries, I've come to realize how little I really understood about global markets.

Now, I'm in constant communication with our Dentons colleagues in China, Central Asia, Europe, the Middle East, Africa, Canada, Mexico, and South America. And by talking to my teammates on an almost daily basis, I have a better grasp on what's happening around the world.

PUF's Steve Mitnick: How do you see the energy lawyer's role changing in the next three to five years?

Clint Vince: I think the most successful law firms going forward will either be boutiques or very substantial, globalized firms, and that the latter will dominate the practice because the industry is globalizing. So much in the US and elsewhere

(Cont. on page 41)

ENERGY INSIDERS KNOW WHERE TO GO IN OCTOBER

ENERGY BAR ASSOCIATION

2017 EBA MID-YEAR *ENERGY* FORUM

October 16–17
Renaissance Downtown Hotel, Washington, DC

The Energy Bar Association's 2017 Mid-Year Energy Forum brings together a day and one-half of top level educational sessions on all aspects of energy law.

Don't miss:

- Discussions of the latest trends and developments facing the energy law sector
- Hundreds of attendees include preeminent energy attorneys, energy professionals, and regulators
- Top level educational sessions in all areas of energy law, including:
  - Best Practices in Oil & Gas Pipeline Transactions
  - Developing Offshore Wind in the United States
  - Energy and Environmental Justice
  - Intersection of State Policy and Energy Markets
  - Resiliency of Energy Infrastructure
  - The Rapid Expansion of Renewables
  - Ethical Considerations for In-House Counsel
  - The Future of Distributed Energy
- The conference will be approved for approximately 12 hours of MCLE and ethics credit

Also enjoy special events including the **Administrative Law Judges Reception**, the **Women in Energy Breakfast** and the **Closing Night Celebration Dinner featuring FERC Commissioner Robert F. Powelson**.

Learn more and register at *http://eba-net.org/2017-eba-mid-year-energy-forum*

The Energy Bar Association is an international, non-profit association of attorneys, energy professionals, and students active in all areas of energy law. The EBA promotes the professional excellence and ethical integrity of its members in the practice, administration, and development of energy laws, regulations and policies. The EBA provides superior educational programming, networking opportunities, and information resources.

Visit: EBA-Net.org

For information, contact:
Energy Bar Association
202-223-5625
DShaman@eba-net.org

Renaissance Commissioner

Making Energy Policy in A Key State

BY STEVE MITNICK, WITH BOB STUMP

PUF's Steve Mitnick: What are you doing these days, other than recovering from your time on the Arizona Corporation Commission?

Bob Stump: Given the dramas involving net metering that have enlivened the Commission over the past few years, recovering is probably the right word! In January, I was term-limited off the Commission, and my fifteen years of elective office went by in a flash.

I had the time of my life serving in the Arizona House of Representatives and the Commission, and I enjoyed being on the board of NARUC and learning from so many brilliant and generous colleagues.

Earlier this year, I advocated at the Colorado General Assembly for the passage of energy efficiency legislation. I testified at the Florida State Legislature and pushed for legislation promoting consumer protections for rooftop solar adopters in Florida.

Many moons ago, I worked as a reporter for the *Weekly Standard*, and so I've enjoyed writing on energy issues again. *National Review* published a couple of my analyses about Trump and energy, and I've written about Nevada and Arizona's solar wars for the *Daily Caller*.

Truth in Power Project, my new blog, features some of my writing on the power sector. I've also founded Stump Strategies, a firm that will be focusing on energy policy nationwide and a variety of issues at the Arizona Legislature, as well as helping good candidates win elections.

PUF's Steve Mitnick: What do you think you achieved as a commissioner?

Bob Stump: During my chairmanship, Arizona became the first state in the Union to implement a way to address rooftop solar cost-shifts. It was a model for the nation's utility commissions.

We also discerned a new way to value solar last year. I was not shy about offering my perspectives on what regulators needed to do, in my view, to ensure that solar power is sustainable in the long-term. Our efforts involved reforms that certain industry players were reluctant to endorse, even as they trumpeted their desire to be innovative and disruptive.

I argued that disruption shouldn't apply just to utilities. Advocates of distributed generation shouldn't cling to the regulatory shore, either, or dig in their heels to preserve an outmoded tool, net metering.

We ended net metering in Arizona, thanks to the great leadership of Commissioner Doug Little. It was the right thing to do. I was also happy to work on passing Arizona's first energy efficiency standard, as well as critical water reforms.

I took my first-ever drug test after an aide found traces of marijuana in the Commissioner's bathroom.

PUF's Steve Mitnick: Can you tell us of some particularly interesting or even funny moments in your time in regulation?

Bob Stump: I took my first-ever drug test after an aide found traces of marijuana in the Commissioner's bathroom. Three out of the five commissioners, and their aides, consented to take tests to prove to their constituents that they were not making multi-million-dollar decisions while under the influence.

Former Arizona Corporation Commission Chair **Bob Stump** is President of Stump Strategies, Chair of Phoenix Opera, and a former reporter for The Weekly Standard.

That was an interesting time. Also, you know, one of the best ways to take the temperature of a commission is to peek into its mailbag.

The shortest political email I've ever received was but one word, presumably directed at me: "Dirtbag." The second shortest I received seemed to have been composed by a high school cheerleader: "Go solar! You stink. Coal sucks."

When the Commission was examining the possibility of electric retail competition, I received one of my favorite e-mails: "Please consider deregulation of electric utilities in AZ. My dogs and I would appreciate the change." Utility regulators are here to serve all creatures, great and small.

PUF's Steve Mitnick: What was it like to run in an election for commissioner?

Bob Stump: I managed, with some help, five of my own campaigns, two of them statewide. I've often told colleagues that I prefer millions of bosses, not just one. That's why I do prefer the elective over the appointed model.

I even joked that what elected commissioners lose in knowledge they gain in suavity, the ability to move voters when advocating for reform. Being elected gives one a bully pulpit and a modicum of independence. One never has to answer to other politicians.

Running statewide clarifies one's thinking on complex regulatory matters because one has to explain it, and distill it, to laypeople. One hears directly and intimately about how one's decisions affect people, and it's invaluable.

PUF's Steve Mitnick: For regulators nationally, what do you think are the greatest challenges facing them?

Bob Stump: Regulators need to have the independence of mind and depth of knowledge to cut through the misinformation and hype in the energy sector. I do believe that electricity is the most political of commodities in the United States, and distinguishing fact from fiction continues to be one of the greatest challenges facing regulators today.

They need to let the political chips fall where they may, which can be easier said than done. Institutional support, the knowledge that demagogic attacks on commissioners won't be tolerated, is critical.

We need to do better, in that regard. Regulators may be accused unfairly of bias and be asked to recuse themselves if they answer their attackers. Too many are indeed attackers, not merely critics.

> **Old rate structures and aging infrastructure must keep up with technologies that are mercurial and decentralized.**

The demagogues know this. I think of the Energy and Policy Institute, quite frankly, and too many of them continue to smear regulators with impunity, while self-righteously claiming the mantle of environmental stewardship.

SolarCity learned its lesson after funding the Checks and Balances Project to intimidate regulators and squelch any reform that might threaten its profits. But others think it's effective to corrupt the process in this way. The preservation of anonymous donors' business models depends on it.

PUF's Steve Mitnick: What's your vision of the future of utilities and the future of utility regulation?

Bob Stump: I had the privilege of speaking about this last year, at a marvelous forum at the Aspen Institute. A shift in thinking needs to occur on the issue of energy prices and growing peak demand.

I believe the clean peak policy, proposed in Arizona, could be a model for others who are trying to tackle ratepayer costs while advancing renewable energy policy to meet future grid challenges.

We hear a lot about how the utility must redefine its mission as it partners with consumers and third-party providers. I do wonder if we need to step out of our wonkish shoes and remember that the average customer spends just a few minutes a year pondering his utility bill.

Will new consumer choices change this level of interest in a dramatic, long-term, widespread way? What is the price of empowerment via distributed generation resources if utility-scale green power has a far greater bang for the buck in reducing carbon dioxide?

How can customers feel empowered by using distributed resources without the industry investing scarce resources into less efficient means of production? How does customer empowerment differ from customer satisfaction?

Old rate structures and aging infrastructure must continue to keep up with technologies that are mercurial and decentralized. The challenge will continue to involve developing models that support seamless grid upgrades and allow seamless integration of new technologies without impairing reliability.

Regulators will continue to ask what the utility's core services will be. Will the utility serve as a network manager and aggregator? As points of entry proliferate, I believe it will have to pursue vastly better data analytics and cybersecurity measures.

Also, we have to ponder whether the utility will remain an anchor in an increasingly dispersed system, and what this will mean. These questions are hardy perennials, and it's been the privilege of my life to try to provide answers over the past eight years. I'm looking forward to continuing to do so. ❖

Connecting with Millennials

Seamless Experience is Table Stakes

BY STEVE MITNICK, WITH ASHLEY NICHOLLS

PUF's Steve Mitnick: How can utilities begin to connect with millennials?

Ashley Nicholls: I think one of the first steps is understanding what the word millennials means.

For a lot of people there's a picture of a very young person, potentially in or just getting out of college, with a phone, using SnapChat. But really, that's not what millennials are. Millennials could be in their mid-thirties with a mortgage that they are tenured into and two children.

One of the mistakes that organizations make when they think about millennials is they consider it to be a life stage. It's not that. It's a set of beliefs about the way that they can interact with the world, and businesses, and their career, and their family.

None of your customers, particularly the millennials, are comparing you to companies with similar experience.

One of the keys to those beliefs is the idea of things being seamless experiences. We would say that one of the first things utilities could do to connect with millennials is help them disconnect from the utility process.

Because it really is not about the utility, or their process, or their business model, or what they want to accomplish. It's about the customer. That's always true. But it is particularly true for millennials.

If you think about the companies that you interact with daily, from your cell phone, to your cable provider, to the bank, to Uber, the companies that you feel the best about are the ones where the experience is seamless.

With Uber, you're getting that ride delivered to wherever you are in the world with minimal effort on your part. No money is exchanging hands. At this point, that seamless experience is table stakes. It's not just nice to have. It's not something that you should be getting patted on the back for.

One of the challenges utilities face is that when they start to improve experiences, and let's be honest, some of the utility experiences are driven by bureaucracy and big business, it's hard to make changes inside these organizations.

But when utilities finally do make a change, we're like, "Hey, look what we've done." We expect the customers to be thankful, but really this is just table stakes for them.

PUF's Steve Mitnick: Are you saying it is hard for people who run most of the utility companies to get it?

Ashley Nicholls: Yes. I think that a couple of things happen. When you're inside an organization it's easy to do things that make sense to you because of all the things that you know. But your customers don't have those experiences or that information. They only know the experience they are having, not the reasons behind it.

Until you've talked to your customers and gone through the experiences that they're going through and experienced the places where there is friction, it's easy to get removed from the processes you're asking your customers to go through.

The truth is, none of your customers, but particularly the millennials, are comparing your company, or your process, to

Ashley Nicholls is Executive Director of Strategy, KSV Advertising.


KSV's Burlington VT office.

companies with similar experience. They are comparing you to the next best-in-class organizations like Amazon and Netflix, who are catering to them.

That is their expectation now of how business should be able to service them, at this point, at this day and age. Anything less than that, frankly, doesn't look innovative.

PUF's Steve Mitnick: What do you mean by "trusted advisor to millennials"?

Ashley Nicholls: The terminology is changing. KSV talks to our clients about being a trusted advisor. Because of the J.D. Power metric, we know how crucial it is to many of our clients' businesses.

Let's talk about the components of trust. Reliability means that there must be a lot of trust. But we also know that the reliable availability of electricity, when you flick a switch, or natural gas, when you turn a knob, is taken for granted.

In fact, people don't ever appreciate it when they flip on the light switch and say, "Thank goodness the lights turned on." They are just frustrated when the opposite happens, and they want it fixed as fast as possible.

> **If you went to an ATM to make a withdrawal, and your money wasn't available, you wouldn't say, "Oh no, the bank is usually so reliable."**

Again, just like the seamless experience, the fact that you're there when they expect you to be there is table stakes. The same way that if you went to an ATM and tried to make a withdrawal, and your money wasn't available to you for some reason, you wouldn't say, "Oh no, the bank is usually so reliable." You aren't grateful to the bank when you can get your money out of an ATM. It's table stakes.

Trusted advice means you trust the utility to give you information about how they use energy and about how you should use energy.

Some of the conversations that KSV is moving towards with some of our partners, very progressive, forward thinking utilities, they're interested in leading clean energy transformations in this country. That's never going to happen if all you are is the company who makes sure that the lights come on when you flip the switch.

PUF's Steve Mitnick: Do utilities have a chance to be successful and create brand loyalty?

Ashley Nicholls: Yes, they absolutely do. But one of the issues that we see some of our partners facing is, utilities have this push and pull inside.

There's a desire to service their entire customer footprint, but then when it comes to energy efficiency, and programs like demand response, you have to segment them. You have to be smart about the messages that you're delivering to the world.

By the very nature of what you're doing, segmentation leads to people falling outside of the segment. Millennials frequently fall outside of propensity models because they don't have the discretionary incomes. Perhaps they're renters.

But utilities are missing the opportunity to begin the conversation with the next, most valuable, customers that we're going to have. Even the youngest millennials

(Cont. on page 40)

Finding Common Ground on TOU Rates

Consumer and Clean Energy Advocates Find Common Ground

BY RICK GILLIAM, JOHN HOWAT AND JOHN COLGAN

The idea of disparate parties working together on substantive issues seems quaint nowadays, given the shrill tones heard in our current political discussions. Recent cooperation on healthcare by the Democratic governor of Colorado and the Republican governor of Ohio was seen as an anomaly. As Governors Hickenlooper and Kasich observed about an issue with such far-reaching repercussions for so many, a one-party plan is doomed to failure.

The issue of managing the ongoing transition in our nation's power sector is another issue that affects everyone. It goes all the way down to individual households where families are paying monthly bills and making decisions about investments in efficiency upgrades or solar panels. Here too, public policy decisions on topics like electricity rate design must include a diversity of perspectives and priorities.

Increasingly, groups representing clean energy, environmental and low-income consumer perspectives are trying to do our part to talk with each other, find common ground, and help utilities commissions succeed in a challenging time. Most recently, this cooperation has produced concrete guidance on time of use rates, described in a new joint paper.

Time of use rates price electricity differently at different times of day, typically to reflect utility costs. That means higher prices during peak use periods and lower prices during off-peak. One idea behind this approach is that if many customers move consumption off-peak, that shift can bring down utility costs. This potentially avoids future utility system capital requirements and operating costs to meet peak demand.

These time-varying rates are also proposed as a path toward helping customers reduce their bills, enabling power plant emissions reductions, aiding integration of wind and solar by enabling consumption that better tracks their power production, and facilitating electric vehicle charging that maximizes utility system benefits.

On the other hand, time of use rates may have negative repercussions. Consider the customer who has less flexibility to shift energy usage away from a higher-priced period to a lower one, or who can't readily afford technologies like smart thermostats or appliances that could help with the transition.

RICK GILLIAM

Consider the customer who has less flexibility to shift energy usage away from a higher-priced period to a lower one.

These rates may also hurt households living on tight monthly budgets that cannot afford unpredictability on an electric bill. One example would be bad weather leading to higher usage that hits during a higher-priced usage period.

With those two sides of the coin, it's not hard to see how different stakeholders can end up on different sides of the aisle on these rates. Indeed, some of the authors of "Guidance for Utilities

Rick Gilliam is Program Director at Vote Solar. **John Howat** is Senior Policy Analyst at the National Consumer Law Center. **John Colgan** is a former member of the Illinois Commerce Commission.

Other paper co-authors include Marcel Hawiger (TURN), Douglas Jester (5 Lakes Energy), Mark LeBel (Acadia Center), Ellen Zuckerman, Andre Delattre (US PIRG) and Bret Fanshaw (EARPC).

JOHN HOWAT

JOHN COLGAN

Commissions need to carefully consider the drivers of new generation as well as new transmission and distribution capacity.

Time of use rate design is generally consistent with customer-sited solar deployment.

Commissions on Time of Use Rates: A Shared Perspective from Consumer and Clean Energy Advocates" came to the discussion waving red flags about time of use rates, while others were favorable from the start.

It's that diversity that should make the resulting guidance especially durable for utilities commissions. First and foremost, goals need to be explicitly clarified right up front. Is the objective economic efficiency, deployment of distributed energy resources, peak load reduction, emissions reductions, more equitable cost/benefit allocation, or a combination of several of these factors? Depending on the goals, a time of use rate may or may not be the right option.

The next step is to identify and evaluate the costs and benefits associated with the full range of alternatives to achieving the stated goals. This could include tiered rates, utility direct load control programs, peak time rebates, or greater efficiency spending. The common ground here among diverse stakeholders is an expansive analysis. Evaluation should not be confined to these rates alone, before determining if these rates are the right answer.

When evaluating impacts of these rates on customer bills, commissions need to carefully consider the drivers of new generation as well as new transmission and distribution capacity in the relevant jurisdiction. The key is to understand not only the degree to which a change in overall residential load profile may occur, but also the degree to which that change will impact utility system cost drivers and cost allocation to their customers.

Any rate structure must be both reflective of underlying utility costs and at the same time understandable and actionable for consumers. This means keeping the rate design to two or three periods, with a pricing differential between periods large enough to entice load-shifting but small enough to avert excessive bill volatility or adverse impacts on affordability. Shorter periods such as two to four hours typically allow for closer ties to utility costs and are less complicated for customers to respond to as a price signal.

Ensuring that customers have the advance education and technology they need to respond to pricing periods is vital with any rate design, particularly time-varying designs. Commissions should use a variety of programs to achieve this.

Some suggestions: pilot programs implementing time of use rates first with customers who have larger loads that are easier to control, such as electric water heaters or electric vehicle charging; shadow billing for a year to give customers a chance to understand how they will be affected; and distribution of smart appliances such as timer controls, grid-integrated electric water heaters and smart thermostats for space conditioning, if such distribution is found to be cost-effective based on incremental demand response benefits.

If emissions reductions are a stated goal, commissions need to carefully study what generation resources will run more as a result of load shifts. Those could include gas versus coal versus hydro or solar or wind. This analysis needs to inform structuring of time of use periods that will result in maximum potential emissions cuts.

Time of use rate design is generally consistent with customer-sited solar deployment.

But the extent to which these rates are compatible for the residential consumer with solar is highly dependent on the rate design that applies to the self-generation. While peak pricing periods often coincide with solar photovoltaic peak production periods, this will vary from utility to utility, state to state and region to region. It needs to be specifically assessed.

Consideration should be given to combining time of use rates with inclining block rates to provide a more powerful price signal.

That has been done in several states, including California and Washington.

Further detail about these and other recommendations is available via "Guidance for Utilities Commissions on Time of Use Rates: A Shared Perspective from Consumer and Clean Energy Advocates." ❖

Energy Efficiency Conference

New Technology and Changing Business Models

BY STEVE MITNICK, WITH AESP'S JOHN HARGROVE, MICHAEL VOLKER AND RAEGAN BOND

PUF's Steve Mitnick: Tell me how this conference of the Association of Energy Service Professionals is going so far.

John Hargrove: This summer conference is going great. We bring our summer conference to Canada every other year. The Canadian energy efficiency industry is booming, especially in the eastern part of the country. It is starting to spread across the entire country of Canada.

We have around three hundred seventy-five people here at the conference, which is a little higher than our normal counts. Almost half of those folks are Canadian. We have tremendous support from the Canadian utilities and the consulting companies that locate here in Canada.

JOHN HARGROVE

Energy efficiency has grown dramatically in Canada over the last ten to fifteen years.

PUF's Steve Mitnick: Give me a demographic breakdown.

John Hargrove: We have a significant number of utilities that are members. There are also a lot of folks from the consulting industry that serve those utilities.

Michael and Raegan are both utility professionals. Their jobs include the implementation of energy efficiency for their customers. They have several partners that are in the field. A lot of those representatives are here. We also have a pretty good representation of technology and services within the industry that are being demonstrated at our expo hall for the attendees.

John Hargrove is CEO, Association of Energy Services Professionals (AESP). **Michael Volker** is Board Chair, AESP, and Manager of Rates and Treasury, East River Electric Power. **Raegan Bond** is Vice Chair, Strategic Initiatives, AESP, and Vice President - Conservation and Demand Management, Alectra Utilities.

PUF's Steve Mitnick: Michael and Raegan, tell me what you do at your companies.

Raegan Bond: I'm the vice president of conservation and demand management for Alectra Utilities. We're located here in Ontario. We're the host utility for the summer conference.

At the highest level, I'm responsible for overseeing a team that delivers a robust portfolio of demand-side management programs to all our customers. These range from residential and low-income programs that are offered free of charge through the Small Business Program, your local mom-and-pop shops, up through our largest customized program for our large industrial manufacturing facilities in our service territory.

We do this both through in-house staff and outsourcing with third party providers. Alectra has a team and about thirteen of my eighty people are here to speak at the conference.

Michael Volker: I'm the rates and treasury manager for East River Electric Power Cooperative. East River is what's called a generation and transmission utility.

We provide wholesale electricity for the distribution cooperative. We also provide the design, implementation, evaluation, and all aspects of various demand-side management programs.

PUF's Steve Mitnick: The conference has a pretty good turnout. Is interest in efficiency growing among the companies and among investors?

John Hargrove: Yes. Energy efficiency has grown dramatically over the last ten to fifteen years. It's not growing as quickly in the U.S. right now, simply because it

MICHAEL VOLKER

RAEGAN BOND

There's a lot of different revenue streams to capture, and plenty of opportunities as battery prices come down to utilize the battery more.

Of these three hundred seventy-five people, I feel like I know three hundred fifty of them.

has grown so much in the last decade. However, it is growing tremendously in eastern Canada. That's one of the reasons we locate the conference here every other year, to make sure that we can tap into that.

There is a tremendous amount of growth and innovation in the industry now in that it is becoming mature. We wrote a three-part piece for your magazine describing the birth of energy efficiency during Jimmy Carter's presidency about forty years ago. The evolution has been on a definite hockey stick: it has really grown since then.

Federal policy tends to impact it. In the U.S., most states, most utilities, and most municipalities are charging ahead full speed with energy efficiency because it's the right thing to do, regardless of what federal policy is. It's not that we don't have a supportive federal policy. It's just that we are not getting new supporting policy in the U.S.

Canada is the other way around. There's a tremendous amount of drive at the federal level. That's what is really driving the innovation in the industry. That's where the real change is happening.

PUF's Steve Mitnick: What are some good sessions that are being offered at the conference?

Michael Volker: I've had the chance to catch one particularly interesting session that's relevant to what I do. It had to do with battery storage systems.

It wasn't just about the evolution and development of batteries. It was focused on integrating batteries into a solution that can do so many things. That's more than just the cost of a backup power source for a storage system. It's about integrating this system to possibly capture a half-dozen or more different revenue streams at a regional transmission organization level.

There's a lot of different revenue streams to capture, and plenty of opportunities as battery prices come down to utilize the battery more. We can use it as a provider for a lot of different revenue streams, increasing the value of it.

PUF's Steve Mitnick: Raegan, did you catch a group session?

Raegan Bond: Yes. I've been to a couple. As I continue to go to these conferences, I tend to spend more and more time networking and building those relationships with other people in the industry.

It's been particularly great for me at this conference. Of these three hundred seventy-five people, I feel like I know three hundred fifty of them.

Overall, with the theme of this conference, we've seen emerging technology and changing business models.

John Hargrove: I'll add one more thing. When you're running an energy efficiency program at a utility, you are quite often not in the core business lines. You find yourself running your own little company. Finding other people that have been through that and can help you see the ninety percent of the iceberg that's under the water, as opposed to the ten percent that's out of the water, is very comforting.

Raegan Bond: Especially being at a utility, one of the great things about this conference is I get to learn from my fellow utilities. We aren't competing. There really is a very open and cooperative tone in the industry as well as in the conference.

John Hargrove: You will quite often find very aggressive competitors on the same panel, talking about the same thing, and both sharing their best practices. That's really something I've not seen in other places as much as I see it here.

They will be competing on Monday. Then they'll be at this conference together, networking, and talking, and sharing, and spending time with their competitors. Then, back on Friday, they're competing again.

Steve Mitnick: Are there some good things being rolled out that vendors and consultants are talking about?

Michael Volker: I mentioned the battery, and it's a single focus, but that's a big thing for me right now. There's a lot of different words for it, but it's a convergence of what used to be separate categories.

We had energy efficiency and demand response. We had smart grid, which we usually refer to as big data tied to advanced metering systems. We had renewables. So many things are converging together.

The example that I talked about with batteries is really a convergence. There

(Cont. on page 20)

Electrifying the Energy Sector

Public Policy Perspective

BY KENNETH COSTELLO

With deepening concerns over climate change, policymakers, environmentalists and others are increasingly championing the idea of electrification. That involves the replacement of fossil fuels with electricity for direct end-uses like transportation and space heating. Electric vehicles and heat pumps are the electrification technologies that have received the most attention so far.

Some folks contend that climate goals are out of reach with future widespread use of fossil fuels in home appliances and vehicles. That is, if fossil fuels remain a major source of energy for transportation and buildings, the numbers just don't add up to deep carbonization.

The electric industry sees electrification as a potential bonanza for revitalizing sales and revenues. A growing number of utilities view electrification as an integral part of their future business plan. With smart dispatching, utilities can optimize their load shape from electrification of transportation and water heating.

According to many analysts, electrification represents one of the four pillars for transforming the energy sector to meet stringent climate goals, specifically curtailing carbon by eighty percent by 2050. The other three are efficiency and conservation to reduce energy use per capita; decarbonization of electricity to reduce carbon emissions per kilowatt-hour; and decarbonization of both liquid and natural gas fuels with sustainable biofuels or synthetic decarbonized fuels.

Supporters of electrification contend that massive electrification must happen over the next two or three decades, and that the only way to achieve it is through subsidies and other governmental inducements. Some advocate for mandated electrification, saying it is indispensable for saving the planet. Others point to the less lofty goal of revitalizing the electric industry.

EPRI is doing its part by undertaking innovative research on electrification on behalf of the electric utility industry through its Integrated Energy Network. It is also actively disseminating information and educating stakeholders about the benefits of electrification. At the present time, electrification seems to have a strong tailwind.

Ken Costello serves as principal researcher for energy and environment at the National Regulatory Research Institute. Costello previously worked for the Illinois Commerce Commission, the Argonne National Laboratory, Commonwealth Edison Company, and as an independent consultant. Contact him at kcostello@nrri.org.

Diffusion of new technologies such as electric vehicles normally follows a gradual, dynamic process.

Core Question for Policymakers

As an economist, I would begin by asking whether market obstacles and flaws or governmental barriers have prevented socially beneficial electrification. Another way to say this is to ask whether an electrification gap exists where the actual use of electricity for end-uses is less than the socially optimal level.

A first-order area of inquiry is whether these problems exist, what effect they would have on consumer behavior and whether outside actions could rectify them in an economical way. If end-use markets for electricity and other forms of energy

are functioning well enough in the interest of customers and the society at large, then there is little rationale for out-of-market intervention.

In almost all U.S. sectors, whether energy or nonenergy, the market is the primary institutional arrangement for consumer decision-making. Consumers' responses to the market determine what they buy and what benefits they receive from purchases.

Their decision can involve, for example, conversion from natural gas to electricity in an existing home or installation of electric equipment in a new home. In each case, the consumer must decide on the appliance or energy-using equipment he or she wants to purchase.

An energy consumer's major consideration is the sum of capital and energy costs required to provide the level of heating comfort and other benefits that the consumer desires. Non-price factors such as comfort, reliability and the carbon footprint also play into the consumers' decisions. Another important consideration is the high cost of conversion from natural gas to electricity for space and water heating, which can dissuade many consumers from switching.

Overall, whether energy consumers rely on fossil fuels or electricity for their transportation and space-heating needs comes down to a rational choice of what source of energy would best satisfy those needs. In most instances consumers express their choices and make the best decisions for themselves, given the market which they participate. Sometimes, however, markets fail to operate the way they should for various reasons, justifying at least some consideration of outside intervention.

Conditions for Out-of-Market Intervention

The presumption is that at some point in the future, clean energy will be the primary source of electricity production, so the argument for electrification becomes more defensible. The real question is, then: Should markets alone drive this technological evolution or should public policy provide a "push" to hasten its penetration in the marketplace?

In other words, should we hurry electrification through governmental actions or instead allow the market to determine the speed and amount of electrification by itself?

> **Diffusion of new technologies such as electric vehicles normally follows a gradual, dynamic process.**

One can reasonably argue that the latter posture is more justifiable if we have a carbon tax that would send proper price signals to consumers who are making energy choices. A well-designed tax would include the societal cost of carbon emissions in the prices of competing forms of energy. It could make moot the debate about the role of out-of-market policies to encourage electrification.

Without a carbon tax, however, we must resort to second-best or inferior actions to position clean electricity on a level playing field with fossil fuels. These actions include various standards and incentives, which up to now have been the most prominent policy mechanisms for mitigating climate change. We have seen that many of these policies are seriously flawed, however, especially when they violate even basic economic principles.

Diffusion of new technologies such as electric vehicles, advanced heat pumps and water heaters normally follows a gradual, dynamic process, rather than a process where a new technology is adopted en masse. The process usually starts with a few early adopters, followed by a more rapid period of adoption, and then by a more moderate adoption rate once a certain number of users have purchased the technology.

Often times, a technology that appears to surpass competing technologies in performance and cost will not immediately be chosen over existing technologies. A key question for policymaking is whether the actual diffusion rate is a product of rational actors facing dissimilar incentives and constraints or a consequence of market inefficiencies and undue barriers.

Good public policy intervention in consumer markets should pass a broad-based cost-benefit test. Specifically, there should be evidence of market problems serious enough to justify the inevitable cost of intervention. For example, consumers making poor choices for themselves or market prices leaving out external costs. Otherwise, government involvement to promote electrification will likely make matters worse; namely, the societal costs would exceed the societal benefits.

Economists have long understood that market failures including environmental externalities, inefficient pricing of energy, decision-processing errors, lack of information, and principal-agent issues can lead to under-investments in energy efficiency. For example, landlords lacking incentive to make their buildings more energy efficient. This argument can carry over to switching from fossil fuels to electricity, where consumers might realize many of the same benefits that they would with energy efficiency.

Public policy actions to address market problems should strive to mitigate any market defects. The first step should be to identify features of a well-functioning market and evaluate whether energy end-use markets lack any of those features. Tailoring subsequent intervention to a particular market defect would best steer public policy in the right direction. Policymakers must therefore exercise prudence to ensure that any action addresses the problem at hand and does so cost-effectively.

A micro perspective in rationalizing market intervention is superior to using macro data. Macro studies are not able to accurately calculate the benefits and costs for individual customers located in a particular area. That is, policymakers should rely on market characteristics and performance rather than on simplistic economic analysis at a fifty thousand-foot level, as the trigger for action.

Looking Ahead

Although it is not yet prime time for electrification, it seems more imminent for transportation (light duty vehicles and short-range heavy-duty vehicles) than for space and water heating. The potential for reducing carbon is greatest in the transportation sector. Industry and heavy transport also have the potential for electrification, but face greater challenges and barriers.

For electrification to take center stage, clean energy must first be the dominant fuel for electric generation. That means no coal or natural gas, in the absence of carbon capture sequestration. It is obviously premature to believe that electrification outside of transport would have a major effect on reducing carbon in the next several years.

That said, technological advancements are moving in a direction that favors electrification, with its emphasis on digitization and clean energy. If these developments further evolve, we will almost certainly see a more electrified economy with less dependency on fossil fuels to meet future direct-energy demands.

> **Technological advancements favor electricification, with its emphasis on digitization and clean energy.**

Instead of prematurely promoting electrification, we should wait to see where the technology takes us. Technology, not subsidies and other governmental policies, will ultimately determine the success of electrification. Subsidies could distort the diffusion of electric appliances and vehicles and even obstruct their long-term penetration in the marketplace.

For electric vehicles, the challenges are still huge; namely, infrastructure investment in chargers, customer and utility upgrades, rapid DC charging, education and outreach, range anxiety due to limited battery storage capability, the availability of charging stations across the country, and demands on the electric grid.

For heating, economics seems to be the biggest hurdle. Most electric heat pumps are only cost-effective in areas that have low electricity prices and moderate winters, at least in comparison to natural gas. Further technological improvements will make heat pumps more economically viable, but that may take years to transpire. A carbon tax could also boost the market for heat pumps.

Finally, premature electrification can be a win for electric utilities and the environmentalists but a loser for everyone else. The problem of new electrification technologies funded by a majority of utility customers and taxpayers with only a distinct minority benefitting is hard to avoid. Policymakers need to do more homework before they extol the wonders of electrification. In the meantime, they can capture the low-hanging fruit by identifying any undue obstacles to socially-beneficial electrification. This simple step would seem to easily pass any cost-benefit test. ❖

Energy Efficiency Conference

(Cont. from p. 17)

are a lot of different things, even on the upstream power supply side, that have integrated these former disparate little mini industries into a bigger industry.

This goes also back to the heart of AESP. AESP has always been focused on the people in the business, so there's a part where competitors are really educators at the conference.

Most of the people here are a lot smarter than I am. I learn a lot from them. That's what keeps individuals coming all the time. The companies see their employees becoming better employees, more knowledgeable, and brighter regarding all these formerly disparate things that they're trying to get their arms around as well.

PUF's Steve Mitnick: What's the next conference going to be like?

John Hargrove: Raegan is one of the planning committee chairs for our national conference, which will be in February in New Orleans.

Raegan Bond: I believe the title is The Big E - Easy.

John Hargrove: We'll have, I'm guessing, nine hundred people or so, maybe we'll shoot for that magical one thousand members to be at the conference. New Orleans is a fabulous city.

There's a lot of interesting work in the South right now, especially in the Southeast. We've already had a lot of interest from our Canadian members talking about making the trip down. New Orleans in February is a lot better than New Orleans in August. We're looking forward to being there at the right time of year. ❖

Public Utilities Fortnightly Quant Services

Monthly Summary Report: September 2017

BY STEVE MITNICK
Editor-in-Chief, Public Utilities Fortnightly
Author, "Lines Down: How We Pay, Use, Value Grid Electricity Amid the Storm"

Sections:
I. PUF QS Electricity Value Index
II. PUF QS Zero-Carbon Scorecard
III. PUF QS Distributed Intermittent Metric

Public data from the U.S. Departments of Commerce, Energy, Housing and Urban Development, and Labor are available to anyone. But quant Steve Mitnick has been compiling components of these data that few noticed or used, years before he became PUF Editor-in-Chief, for unique insightful analyses about utility regulation and policy.

Now, with PUF QS, we provide these analyses to members of the PUF community with site licenses.

For further information, reach out to Joe Paparello, paparello@fortnightly.com.

I. PUF QS Electricity Value Index, September 2017

Electric rates and bills generally increase over time. Sure. But the price of most goods and services, and what we pay for most goods and services over a month or year, generally increases.

Electricity in this regard is no different from any other good or service. There's inflation in our economy. There's growing income, averaged. And with growing income, there are growing consumer expenditures.

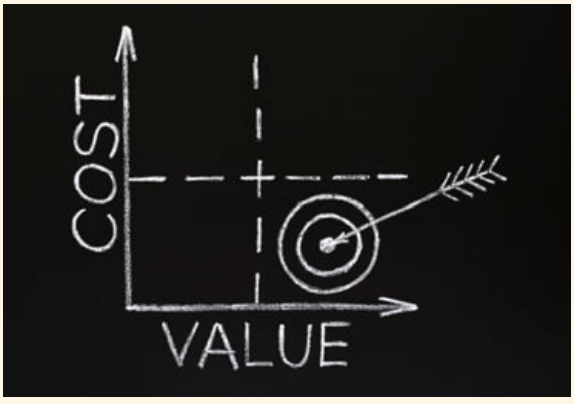
What counts to consumers, or should count, is the horse race. Which horse (good or service) is gaining ground on the others? Which is falling further behind?

Those goods and services that are gaining ground, in their consumer prices or payments, are becoming more expensive. Those falling further behind are becoming less expensive.

Some consumer costs have increased rapidly. Health care and college tuition are prime examples. Some costs have increased but at a slower pace, like housing. Or have decreased, like clothing.

In an economy like ours, with inflation, something becomes more expensive if its price increases faster than the price of everything, averaged. And with growing income and consumer expenditures, something becomes more expensive if what we pay over a month or year increases faster than what we pay for everything.

Let's see how electricity is doing in this horse race of prices and payments over time.



CPI Electric Rates vs. CPI Inflation

To track the average price of the goods and service that American consumers buy, the U.S. Department of Labor calculates the Consumer Price Index.

There's a CPI for all the goods and services that consumers buy. And there's a CPI for categories of goods and services, including residential electric rates.

Compare the CPI for electric rates with the CPI for all goods and services. Doing so shows if electric rates are increasing faster or slower than the price of other things. And, therefore, it shows if electricity is becoming costlier or less costly to consumers.

The following percentages are easy to understand. 100% means the CPI for electric rates and the CPI for all goods and services increased at the same pace since the Labor Department's base period (the years 1982 through 1984). At 100%, electric rates aren't becoming costlier, and they aren't becoming less costly.

The lower that these percentages are, the slower the CPI for electric rates has risen as compared to the CPI for all goods and services. So, the lower these percentages are, the less costly electricity has become.

Source: Bureau of Labor Statistics, U.S. Department of Labor. Public Utilities Fortnightly maintains a comprehensive historical and updated data base of the CPI for electric rates, the CPI for all goods and services, and our own analyses of these indices. Sixty-five years of monthly U.S. data. Forty years of monthly regional data.

CPI Electric Latest Month – U.S. (August 2017)

89.2%

Record High (June, August 1955): 106.7%
Record Low (May, June 2000): 74.3%
Year Earlier (August 2016): 88.9%
Two Years Earlier (August 2015): 90.5%
Five Years Earlier (August 2012): 88.1%
Ten Years Earlier (August 2007): 88.5%

CPI Electric Latest Quarter – U.S. (Q2 2017): 86.6%

Record High (Q2, Q3 1955): 106.4%
Record Low (Q2 2000): 74.4%
Year Earlier (Q2 2016): 86.1%
Two Years Earlier (Q2 2015): 88.5%
Five Years Earlier (Q2 2012): 86.1%
Ten Years Earlier (Q2 2007): 84.4%

CPI Electric Latest Year – U.S. (2016): 86.2%

Record High (1955): 106.2%
Record Low (2000): 74.6%
Year Earlier (2015): 88.3%
Two Years Earlier (2014): 87.9%
Five Years Earlier (2011): 87.5%
Ten Years Earlier (2006): 83.9%

CPI Electric Latest Month - Northeast (August 2017): 78.0%
CPI Electric Latest Month - South (August 2017): 82.8%
CPI Electric Latest Month - Midwest (August 2017): 95.6%
CPI Electric Latest Month - West (August 2017): 112.5%

Electric Bills' Share of Consumer Expenditures

The U.S. Department of Commerce calculates the Gross Domestic Product. Since consumer expenditures are around seventy percent of the GDP, the Commerce Department tracks consumer expenditures in extraordinary detail.

The following percentages are easy to understand. 2% means that one-fiftieth of consumer expenditures goes to pay electric bills. 1% means that one-hundredth of consumer expenditures goes to pay electric bills.

The lower these percentages are, the smaller is electricity's share of consumers' budgets. And the larger is the share of consumers' budgets for all other goods and services.

So, the lower these percentages are, the less costly electricity has become. And the wealthier that consumers have become.

Electricity Share Latest Month – U.S. (July 2017)

1.35%

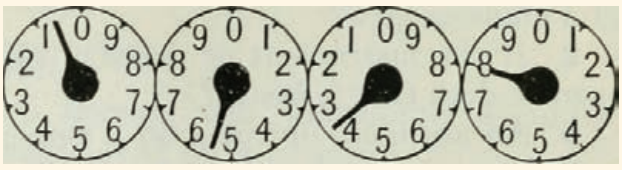
Record High (June 1981): 2.53%
Record Low (February 2017): 1.22%
Year Earlier (July 2016): 1.40%
Two Years Earlier (July 2015): 1.38%
Five Years Earlier (July 2012): 1.53%
Ten Years Earlier (July 2007): 1.48%

Electricity Share Latest Quarter – U.S. (Q2 2017): 1.35%

Record High (Q3 1983): 2.37%
Record Low (Q1 2017): 1.28%
Year Earlier (Q2 2016): 1.37%
Two Years Earlier (Q2 2015): 1.43%
Five Years Earlier (Q2 2012): 1.52%
Ten Years Earlier (Q2 2007): 1.51%

Electricity Share Latest Year – U.S. (2016): 1.38%

Record High (1982): 2.27%
Record Low (2016): 1.39%
Year Earlier (2015): 1.44%
Two Years Earlier (2014): 1.49%
Five Years Earlier (2011): 1.56%
Ten Years Earlier (2006): 1.51%



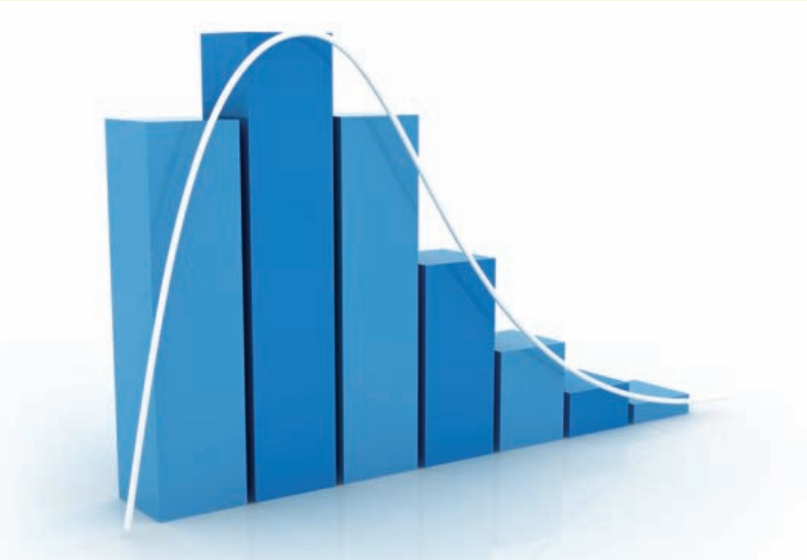
Source: Bureau of Economic Analysis, U.S. Department of Commerce. Public Utilities Fortnightly maintains a comprehensive historical and updated data base of consumer expenditures, and our own analyses of the data. Fifty-eight years of monthly data.

II. PUF QS Zero-Carbon Scorecard, September 2017

Many Americans want their electricity to be low-carbon (emitting little carbon dioxide when the electricity is produced). Some go further; they want their electricity to be zero-carbon.

The industry, responding, is moving to the green grid. It's growing the zero-carbon share of the total. From hydro, nuclear, solar, wind, and other methods of manufacturing electricity that don't emit carbon dioxide. And it's pruning back the high-carbon share of generation, from coal.

How's it going, this gardening of the green grid? Let's see.



Zero-Carbon's Share of Grid Generation

The U.S. Department of Energy tracks in extraordinary detail the origin of the grid's electricity. Each month, it publishes total electric generation and the breakdown by manufacturing method.

Some of these methods emit carbon dioxide. Coal, natural gas, other gases, petroleum. Some don't. Net. Geothermal, hydro, nuclear, solar, waste, wind, wood.

The Scorecard adds the amount of the grid's electricity produced by the zero-carbon methods. And then calculates their share of all grid electricity.

The following percentages are easy to understand. 25.0% would mean that a quarter of the grid's electricity is zero-carbon. The U.S. grid hit and surpassed 40.0% zero-carbon for the first time in March 2016. At 40.0%, four of every ten kilowatt-hours produced by the grid didn't emit carbon dioxide.

Zero-Carbon Latest Month (June 2017)

36.5%

Record High (March 2017): 41.6%
Record Low (September 1973): 16.2%
Year Earlier (June 2016): 31.7%
Two Years Earlier (June 2015): 30.8%
Five Years Earlier (June 2012): 30.9%
Ten Years Earlier (June 2007): 27.9%

Zero-Carbon Latest Quarter (Q2 2017): 39.2%

Record High (Q1 2017): 40.4%
Record Low (Q3 1973): 16.6%
Year Earlier (Q2 2016): 36.3%
Two Years Earlier (Q2 2015): 34.0%
Five Years Earlier (Q2 2012): 32.6%
Ten Years Earlier (Q2 2007): 29.4%

Zero-Carbon Latest Year (2016): 35.1%

Record High (2016): 35.1%
Record Low (1973): 19.5%
Year Earlier (2015): 33.1%
Two Years Earlier (2014): 32.8%
Five Years Earlier (2011): 31.8%
Ten Years Earlier (2006): 28.9%

Hydro's, Nuclear's, Solar's, Wind's Share of Grid Generation

Here we show the shares of the grid's electricity by four major zero-carbon methods: hydro, nuclear, solar, wind.

The grid's solar and wind are rapidly growing. And, so, their latest numbers are typically record highs or nearly so. Nuclear has maintained a share near its record high for over two decades. Hydro, on the other hand, has been well below its record high in recent decades.

Hydro Latest Month (June 2017): 8.6%

Record High (April 1974): 19.8%

Record Low (September 2007): 4.1%

Nuclear Latest Month (June 2017): 18.8%

Record High (January 1995): 22.6%

Record Low (January, May 1973): 3.9%

Solar Latest Month (June 2017): 1.8%

Record High (May, June 2017): 1.8%

Record Low (all but six months before March 2012): 0.0%

Wind Latest Month (June 2017): 5.5%

Record High (April 2017): 8.6%

Record Low (most months before January 1998): 0.0%

Coal's Share of Grid Generation

Here we show the share of the grid's electricity by the major high-carbon method, coal. Its share has been at or near a record low in recent years. And around half of its record high set in the 1980's.

Coal Latest Month (June 2017)

30.4%

Record High (January 1986): 59.8%

Record Low (March 2016): 23.7%

Source: Energy Information Administration, U.S. Department of Energy. Public Utilities Fortnightly maintains a comprehensive historical and updated data base of grid generation by method, and our own analyses of these indices. Forty-four years of monthly data.

III. PUF QS Distributed Intermittent Metric, September 2017

The pages of Public Utilities Fortnightly and discussions generally in the utilities industry often address the growth in distributed and intermittent electric generation and its implications. But how rapid is this growth? And is the pace increasing or decreasing? The answers to these questions can dictate utility strategies and regulatory policies.

The nation's electricity supply, particularly beyond the state of California, remains overwhelmingly grid-scale, more than ninety-nine percent. California distributed generation, alone, is over four-tenths of that narrow one-percent slice.

However, intermittent (weather-dictated) generation can be and is most frequently grid-scale. As a result, while the nation's electricity supply remains mostly dispatchable, nearly ten percent is now wind and solar photovoltaic, and intermittent.

Distributed Generation's Share of Grid and Distributed Generation

The U.S. Department of Energy tracks in extraordinary detail the origin of the grid's electricity, as stated earlier. Each month, it publishes total electric generation and the breakdown by manufacturing method. Recently, the Energy Department started publishing data on distributed generation to supplement its data on grid-scale generation.

This metric is the percentage of all electricity generation, grid-scale and distributed generation, that is attributable to distributed generation.

The following percentages are easy to understand. 0.5% means that one out of every two hundred kilowatt-hours of our nation's electricity are produced by distributed generation (mainly residential, commercial and industrial solar photovoltaic). When the percentage reaches 1.0% in the next few years, this would mean that one out of every one hundred kilowatt-hours are produced by distributed generation.

Distributed Latest Month (June 2017)

1.0%

Record High (June 2017): 1.0%
Year Earlier (June 2016): 0.5%
Two Years Earlier (June 2015): 0.4%

Distributed Latest Quarter (Q2 2017): 0.7%

Record High (Q2 2017): 0.7%
Year Earlier (Q2 2016): 0.6%
Two Years Earlier (Q2 2015): 0.4%

Distributed Latest Year (2016): 0.5%

Record High (2016): 0.5%
Year Earlier (2015): 0.3%
Two Years Earlier (2014): 0.3%

Residential Distributed Latest Month (June 2017): 0.4%
Commercial Distributed Latest Month (June 2017): 0.2%
Industrial Distributed Latest Month (June 2017): 0.1%

Intermittent Generation's Share of Grid and Distributed Generation

The U.S. Department of Energy tracks in extraordinary detail the origin of the grid's electricity, as stated earlier. Each month, it publishes total electric generation and the breakdown by manufacturing method. Recently, the Energy Department started publishing data on distributed intermittent generation to supplement its data on grid-scale generation.

This metric adds the generation from grid-scale wind and grid-scale solar photovoltaic and from distributed generation solar photovoltaic. Distributed generation wind is presently at a relatively insignificant level.

The following percentages are easy to understand. 10.0% means that one out of every ten kilowatt-hours of our nation's electricity are produced by intermittent generation (mainly residential, commercial and industrial solar photovoltaic). When the percentage reaches 20.0% in the future, this would mean that one out of every one five kilowatt-hours are produced by distributed generation.

Intermittent Latest Month (June 2017)

7.9%

Record High (April 2017): 11.0%
Year Earlier (June 2016): 5.9%
Two Years Earlier (June 2015): 4.8%

Intermittent Latest Quarter (Q2 2017): 9.3%

Record High (Q2 2017): 9.3%
Year Earlier (Q2 2016): 7.3%
Two Years Earlier (Q2 2015): 6.1%

Intermittent Latest Year (2016): 6.8%

Record High (2016): 6.8%
Year Earlier (2015): 5.5%
Two Years Earlier (2014): 5.1%

Source: Energy Information Administration, U.S. Department of Energy. Public Utilities Fortnightly maintains a comprehensive historical and updated data base of generation by method, and our own analyses of these indices. Forty-four years of monthly data for grid generation and three years for distributed generation. The Energy Department started collecting distributed generation data in 2014.

sponsored by

energy API
AMERICAN PETROLEUM INSTITUTE

FRI
FINANCIAL RESEARCH INSTITUTE

CRYSTAL AWARD for Distinguished Contribution

The FRI Crystal Award for Distinguished Contribution recognizes an individual who has made recent outstanding and significant contributions to the design, implementation or analysis of public utility regulatory policy. It provides an opportunity to recognize excellence and achievement across regulated industries and further promotes the mission and purpose of the FRI - to serve as a neutral environment for the comprehensive examination of sound regulatory policy.

Congratulations

KENNETH COSTELLO

2017 Crystal Award Recipient

Nominations for the 2018 FRI Crystal Award open October 15, 2017.

Follow us **@fri_news** and visit **www.fri.missouri.edu**

Robert J. Trulaske, Sr.
College of Business
University of Missouri

A Day at American Water

PUF's Steve Mitnick spent the day at American Water, both its headquarters in New Jersey and a major water treatment plant nearby, on August 21. Check out these nine short videos of American Water CEO Susan Story, and New Jersey American Water's production manager Eric Hahn and operations specialist Jane Hanuszczyk. The full interview of Story and an extensive article on our day at American Water can be found in the forthcoming October issue of Public Utilities Fortnightly.

Susan Story: Technology is critically important, not just for the quality of water, but also the affordability and the ability to be more efficient.

Susan Story: We no longer have the traditional IT department. We have groups that are looking at how technology will transform how we do our business, how we deliver the clean, safe, affordable, and reliable water.

Susan Story: There are four major issues facing the water industry in the United States today. Water supply, water infrastructure, water quality, as well as customer connectedness.

Eric Hahn: We have wells on site, four filters, a ground storage tank, and then, high service pumps, which pump it to an elevated storage tank.

Eric Hahn: Now it's all done from the control room with the push of a button, or a timer, and it'll just automate, the valves start doing what they're supposed to do automatically.

Eric Hahn: This is associated with the southwest operating center, which is shown here in the orange and the gray. The orange is our service area. The gray are some of our bulk sale customers.

Eric Hahn: Each pump is a different flow rating, how much water he wants going out the door here.

Jane Hanuszczyk: This is where we can actually see what the water looks like after having gone through about 3/4 of the treatment process.

Jane Hanuszczyk: Even though our system demonstrated for a number of years, 1995, I believe, that we were optimized in our treatment process.

AESP Summer Conference

The keynote speaker for the Summer Conference of the Association of Energy Services Professionals, on August 29 - 31 in Toronto, was Patrick Schwerdtfeger, a business futurist specializing in technology trends including artificial intelligence, Fintech, blockchain and social media. Schwerdtfeger has lectured at Purdue and Stanford Universities, is a regular speaker for Bloomberg TV, and hosts a video blog with over twenty thousand subscribers and four million views on YouTube.

Dena Wiggins, CEO, Natural Gas Supply Association

PUF's Pat McMurray interviewed Wiggins on September 5. She's a compelling advocate for the societal value of natural gas. The full interview can be found in the forthcoming October issue of Public Utilities Fortnightly.

NARUC Innovation Awards

ICC Chair Sheahan on Innovation Taskforce

BY NARUC INNOVATION TASKFORCE

In an era of fast and profound change to technology and regulatory approaches in all utility sectors, the National Association of Regulatory Utility Commissioners and its members must be adaptable and resilient to spot new trends and opportunities.

The technology and structures of the telecommunications, transportation, water, and energy sectors have been at the center of a maelstrom of systemic changes in regard to what NARUC members do and how they do it.

Therefore, on January 17, 2017, NARUC President Robert F. Powelson and the Executive Committee established a Presidential Task Force on Innovation. The task force, led by Illinois Commerce Commission Chairman Brien Sheahan, was charged with spearheading the 2017 Innovation Awards, which recognize both state and utility innovators.

CHAIR SHEAHAN

It is important for people to participate and nominate their peers.

Chairman Sheahan provided his insights on the value of recognizing and embracing innovation.

Is the award a recognition that the utility regulatory space can keep pace with and adapt to changing technologies?

Commissioner Powelson's leadership in establishing the Task Force on Innovation and these awards has been unprecedented. He has provided a gateway for NARUC members to embrace innovation and encourage members to find ways to leverage new technologies in each sector.

The purpose of these awards is to highlight those propelling the energy industry into the future and leading the adaptation of the many technological and regulatory changes we are seeing today.

In addition to recognizing leaders in regulatory policy innovation at multiple levels of government, including federal, state, municipal, and local levels, the awards will recognize energy-industry innovators in the various utility sectors, such as water and sewer, electricity, gas, and telecom.

It is critical that NARUC members have access to spot new trends and opportunities in the public utility sector, and be able to adapt to those coming changes.

Why is it important for people to participate – to nominate a utility or regulator?

It is important for people to participate and nominate their peers because NARUC is a forum to share best practices and foster innovative solutions to improve regulation. It is essential that we recognize those that have dedicated their time, energy, and expertise to furthering innovation.

This is a great opportunity to put a spotlight on those groups and individuals who are paving the way to a more customer-focused, resilient, reliable, cost-effective, and efficient future for the utility industry.

What are the biggest challenges or obstacles faced by regulators as they try to be innovative? Are they hindered by staffing issues? Financial resources?

The biggest challenge for regulators is navigating change in an industry that provides critical services to customers twenty-four hours a day, seven days a week. Regulators have a duty to balance the interests of consumers and utilities to ensure adequate, efficient, reliable, safe, and least-cost public utility services.

There is understandable hesitation as we move toward a future full of new

(Cont. on page 41)

Energy Efficiency for Small and Medium Utilities

What's in It for Them?

BY JOHN HARGROVE AND JEFF IHNEN

There's an old line in the energy efficiency industry – there's nothing like a law to make you want to do something. It may not be an attributable quote, but it is certainly true.

Investor-owned utilities often develop and offer energy efficiency programs primarily because their legislators and regulators told them to. It's not odd that a company that sells a product, in this case electricity, would push back on a mandatory program that will reduce sales.

It goes against everything we ever learned in economics class. For years, utilities have been compensated for building things: power plants, transmission and distribution systems, substations, curbside and ground-mounted transformers, to name a few.

The utilities had to demonstrate need, prudency, and cost effectiveness. The more regulators approved utilities adding assets to rate base through the regulatory processes, the more the utilities built and the more money they made.

In reality, though, utilities have a variety of reasons for implementing energy efficiency programs. That list is growing longer every day in this era of competing distributed photovoltaic generation. The issue is integration of those assets with the utility's distribution system.

Energy efficiency zealots like us have made the case for years that energy efficiency should be the first option that utilities choose. It will reduce demand, enabling them to delay or avoid the construction of new capacity and delivery assets to meet that demand. It will also reduce pollution, reduce consumption of fossil fuels, improve the environment, and reduce costs for customers. If there was ever a no-brainer, this is it.

To provide some support for that brash statement, we talked with a couple of our friends at two small utilities: Otter Tail Power Company and Cedar Falls Utilities. We asked them what their primary drivers are for implementing energy efficiency-related programs.

Otter Tail embraces energy efficiency for three overarching reasons: maintaining low energy costs, customer satisfaction, and economic development and sustainability. Energy efficiency is the lowest-cost, fastest and cleanest resource they can deploy to meet the energy needs of customers.

Cedar Falls Utilities is a municipally owned public utility company serving nineteen thousand customers in and around Cedar Falls, Iowa. The company provides water, electricity, natural gas, high speed internet and cable television to its customers, not to mention proudly posting the Chicago Cubs schedule on their website.

Everyone knows everyone else. Community engagement with local Otter Tail personnel is a vital part of program success.

With a relatively small service territory of ninety square miles, being directly involved with their customers is easy for the company. It's also mandatory, according to their way of doing business.

"We offer a variety of programs to our customers because it is the right thing to do and our customers like having support in controlling their energy costs. From a

John Hargrove is CEO of the Association of Energy Services Professionals. **Jeff Ihnen** is CEO of Michaels Energy.

supply perspective, it helps us avoid the need to procure additional generation and transmission capacity," said Steve Bernard, Assistant General Manager of Cedar Falls Utilities.

Over the past thirty years, some of CFU's unique programs have included the enforcement of local building energy codes, on-bill financing, the sizing of air conditioning units under the residential A/C rebate program, and smart thermostat pilot programs. CFU also became one of the first utility sponsors of the Energy Star Verified Installation program.

To offer these types of programs, CFU takes a very hands-on, partnership-style approach to working with their customers. The company spends about 2-3 percent of its revenues on energy efficiency, achieving an average annual savings level of 0.75 percent of electric sales and 0.55 percent of natural gas sales.

Otter Tail serves 131,500 customers in 422 communities with a service area spanning seventy thousand square miles in western Minnesota and the eastern Dakotas. With a vast footprint of sparsely populated service territory, anyone in the energy efficiency business would think this a very challenging scenario in terms of cost-effective efficiency delivery.

Not so. Otter Tail has consistently exceeded Minnesota's aggressive energy savings target of 1.5 percent of sales. "We partnered with customers to surpass our target and achieved savings of 2.75 percent in 2016," said Jason Grenier, manager, market planning.

For the current triennial energy efficiency plan, Otter Tail will target 2.26 percent of sales from energy efficiency. Why would a company set a goal higher than that mandated by the state legislature? The answer: good policy that rewards great energy efficiency portfolios.

Minnesota statutes allow for performance incentives when utilities surpass their goals. Investors like that.

It may seem that achieving these savings is expensive, especially over the sprawling tundra of the north-central Midwest. Again, not so. Otter Tail's programs are so cost effective they achieve the unthinkable: they pass the vaunted ratepayer impact measure, aka the RIM test. Passing the RIM test decreases prices for all customers, including those who do not participate in Otter Tail's portfolio of programs.

JEFF IHNEN

Progressive utilities should make energy efficiency their first fuel when it comes to meeting growing demand.

How do they do it? Customer satisfaction and community engagement. Otter Tail communities are tiny by nearly any measure. Everyone knows everyone else in these communities and therefore, community engagement with the local Otter Tail personnel is a vital part of program success. Old fashioned word of mouth thrives.

Local decision making, unlike meeting regulatory requirements handed down by the legislature and regulators, allows utilities like CFU to focus on what is best for their specific customer base. Regardless of how it contributes towards CFU's annual electric or gas goals.

Steve Bernard of CFU states, "When you look at a program such as helping enforce the energy code locally, you aren't traditionally able to count savings towards your gas or electric regulatory goals. However, we often choose to do these types of programs anyway, because they do save energy. They offer many non-energy benefits like improved building construction and increased customer comfort and satisfaction."

Bernard continues, "We see these efforts as the best way to reduce energy consumption and save our customers money, all the while reducing the need for additional capacity to meet customer load growth."

Besides, making your customers more financially stable is a win-win economic development strategy. Low energy costs and customer satisfaction are vital ingredients for community economic development and sustainability.

Otter Tail Power Company understands this as well as anyone. Greiner says, "Our communities compete for jobs and residents against larger metro areas including Fargo-Moorhead and the Twin Cities." What is good for the customer is good for the utility serving the customer!

Perhaps we can call it the virtuous circle. Embrace energy efficiency; build customer satisfaction with local engagement; generate inexpensive savings to put downward pressure on energy prices. Leave more money in customer pockets to make the territory economically attractive; maintain happy customers who continuously improve their positions, create shareholder and stakeholder value.

Take a minute and look for the downside in that approach to your business. The energy world is changing. What it was twenty-five years ago, it is no longer. What it is now, it will not be twenty-five years from now. Forward-thinking companies such as Otter Tail and CFU are working to thrive in the new world, not be run over by it.

Progressive utilities should work to make energy efficiency their first fuel

(Cont. on page 41)

Electrification of Transportation Again?

Back to the Future

BY BRANKO TERZIC

Electric utilities may come full circle when it comes to electric transportation, if they move into providing infrastructure support for electric vehicles in a big way. Few people today know that the many early electric utilities based their business models not just on the future of electric lighting but also on expectations of growth in electric transportation.

This second revenue source was from new transportation services provided by the operation of urban electric street car systems. Thus, early electric industry investors were offered the twin opportunities of investing in the new electric transportation systems as well as in electric lighting.

The names of the new companies frequently reflected this duality of services. The Milwaukee Electric Railway and Light Company (established 1896), Greater Lynchburg Traction & Light Company (1901), and Portland Railway Light & Power Company (1906) are a few examples of the names from the beginning of the last century. The newly formed electric companies replaced existing municipal horse-drawn trolley systems with cheaper and cleaner electric-powered trolleys.

This early form of electric transportation was a success.

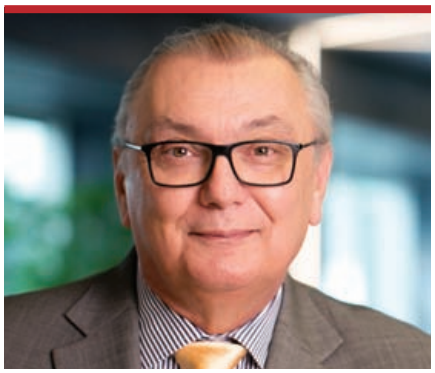
It lasted longer than electric automobiles, because electric trolleys avoided the problem of inadequate energy from batteries. Rather than relying on batteries, electric trolleys received their energy from the new electric grid.

The electric power was supplied to the trolleys using the new overhead lines. They were connected to the moving trolleys with an 1885 patented spring-connected pole system invented by Frank J. Sprague. The power flow was reliable and continuous as long as the spring-pole was in contact with the overhead conductor.

The new systems cost much less than the horse-drawn predecessor system. The speed of the new technology adaption was startling, even by today's standards. It was reported that most cities started replacing their horse-drawn systems within a year after the introduction of the spring-pole overhead conductor system.

The new, clean and convenient electric trolleys became a major mode of weekday commuter transportation in many cities. The trolleys also helped balance the load on the electric systems, because they were used during different hours from the dominant electric lighting load.

Branko Terzic is a managing director at Berkeley Research Group, and a nonresident senior fellow of Atlantic Council's Global Energy Center. He served as a commissioner at FERC and on the Wisconsin Public Service Commission. He also served as CEO of Yankee Energy System, Inc.



Rather than relying on batteries, electric trolleys received their energy from the new electric grid.

When a problem was caused by a drop in trolley passenger load during the weekends, electric system operators came up with ideas to build weekend load. For example, some electric companies would connect to a fairground. The old Milwaukee Electric Railway and Light Company (now WEC Energy Group Inc.) supported a lakeshore amusement park in the Village of Whitefish Bay at the northern end of the suburban line.

By the way, if you visit the headquarters Public Service Building of WEC Energy Group Inc. at 231 W. Michigan

(Cont. on page 41)

Two Nominees from SMUD and Osage Municipal

We received these two nominations for the Fortnightly Top Forty Innovators, for Lizette Miranda of Sacramento Municipal Utility District, and for Josh Byrnes of Osage Municipal Utilities:

"SMUD Career Ambassadors participate in a wide range of workforce-related activities in local schools and colleges. These activities include career fairs, career exploration events, classroom presentations, mock interviews, resume reviews, competition judging and student mentoring.

To date, about ten percent, more than two hundred and seventy SMUD employees have volunteered to be Career Ambassadors. In 2017, our Career Ambassadors participated in a hundred and twenty-two events, volunteered more than three hundred and seventy hours and reached more than thirty thousand students.

SMUD's Career Ambassador program was started six years ago by Susan Wheeler when she recognized that we needed a sustainable and scalable way to reach the more than three hundred and eighty schools in SMUD's service area. Career Ambassadors receive training in how to effectively tailor their message to different age groups.

The program is run by Lizette Miranda, a management analyst in SMUD's organization workforce development area, with support from Jennifer-Christine Madamba, SMUD's internship program coordinator in the human resource services department. Lizette has really taken the bones of the program and made

She's increased the number of Career Ambassadors from ninety to over two hundred and seventy.

significant improvements. She's increased the number of Career Ambassadors from ninety to over two hundred and seventy and developed tools and hands-on activities that help the Career Ambassadors be more effective in reaching students."

• • •

"Our main office for Osage Municipal has an upstairs community room. This community room has not been used for years and had a full-size kitchen space as well. Osage's general manager, Josh Byrnes, offered this space to our school district and it is now home to what is called Iowa Big North.

Iowa Big is a program for students of all academic and socioeconomic backgrounds. These students spend three class periods a day in that space and learn about creativity, entrepreneurship, business, communications, and perform project based learning activities. The students are juniors and seniors in high school and bring a variety of talents to the table.

The ultimate hope is that this creative work space generates a new business that can expand beyond the workspace and into the community. These students also work on special projects in partnership with Osage business and industry. This has been an amazing project that is gaining statewide attention."

• • •

Seems to us that Lizette Miranda and Josh Byrnes are contenders for the Top Forty Innovators. In November's PUF, we've announced, we'll publish our new annual list, the Fortnightly Top Forty Innovators.

As we've said, everyone making the Top Forty will have distinguished themselves during the last year, serving the public interest. Invented costless clean electricity generation? That would do it.

Or you could have developed or advanced the adoption of a technology, application, method, regulatory approach, or public policy that has the potential to serve the public interest. Understanding that such projects are predominantly the product of groups of people, rather than lone wolves like Nikola Tesla, a nominee can be an organizational or project leader that urged and stirred action and achievement.

The Top Forty issue in November will be a big deal. Interviews. Photos. Audio. Video. It will highlight some of the most outstanding leaders in our field. Like – perhaps – Lizette Miranda and Josh Byrnes. ❖

Shortest-Serving Commissioners

BY STEVE MITNICK, EDITOR-IN-CHIEF

Thirty-seven of the hundred ninety-one state utility commissioners have served around a year or less. That's twenty percent of the current commissioners.

I only counted commissioners from full members of NARUC. Sorry to my friends on the commissions of Guam, New Orleans, Puerto Rico, Virgin Islands, etc.

And I rounded up or down to the nearest number of years of service. Commissioners with one year of service started their terms March 2016 or later.

Here's the honor roll of shortest-serving commissioners:

Martha Guzman Aceves, California Public Utilities Commission
Jeffrey Ackerman, Colorado Public Utilities Commission
Jay Balasbas, Washington Utilities and Transportation Commission
Damon Baldone, Louisiana Public Service Commission
Richard Beverly, Public Service Commission of District of Columbia
Robert Cicero, Kentucky Public Service Commission
Daniel Conway, Public Utilities Commission of Ohio
Megan Decker, Oregon Public Utility Commission
Boyd Dunn, Arizona Corporation Commission
Katie Scharf Dykes, Connecticut Public Utilities Regulatory Authority
Rachel Eubanks, Michigan Public Service Commission
Mike Francis, Louisiana Public Service Commission
Sarah Freeman, Indiana Utility Regulatory Commission
Lawrence Friedeman, Public Utilities Commission of Ohio
Marion Gold, Rhode Island Public Utilities Commission
James Griffin, Hawaii Public Utilities Commission
Cynthia Hall, New Mexico Public Regulation Commission
Lisa Hardie, Oregon Public Utility Commission
Keith Jordan, Tennessee Public Utility Commission
Brian Kroshus, North Dakota Public Service Commission
Renee Larrick, Public Service Commission of West Virginia
Richard Lozier, Iowa Utilities Board
Wendy Moser, Colorado Public Utilities Commission
Anthony O' Donnell, Maryland Public Service Commission
Tony O'Donnell, Montana Public Service Commission
Kimberly O'Guinn, Arkansas Public Service Commission
Sadzi Martha Oliva, Illinois Commerce Commission
Rebecca Pauli, Regulatory Commission of Alaska
Donald Polmann, Florida Public Service Commission
Ann Pongracz, Nevada Public Utilities Commission
Clifford Rechtschaffen, California Public Utilities Commission
Joseph Reynolds, Nevada Public Utilities Commission
Mary Ridder, Nebraska Public Service Commission
Lon Roberts, Public Service Commission of Wisconsin
Anthony Roisman, Vermont Public Utility Commission
Michael Schmitt, Kentucky Public Service Commission
Katie Sieben, Minnesota Public Utilities Commission
David Sweet, Pennsylvania Public Utility Commission ❖

Ashley Nicholls

(Cont. from p. 13)

are the next generation who will be buying homes and investing in energy efficiency. They are trying to figure out how to outfit that kitchen renovation they're doing.

If all we do is ignore them until we want something from them, that's not a way you would want to interact with a brand, or a person.

PUF's Steve Mitnick: What's one thing that CEOs can do that would move the needle with millennials?

Ashley Nicholls: We talked about the idea that the word millennials means a core set of beliefs.

One key thing that you could do is customer experience auditing. Understand what you are really asking for from customers. And, where are those friction moments, that don't feel good to them, where you can improve?

In fact, we were talking to a utility executive recently who had just done a customer experience audit for one of their programs. The utility found it was taking an inordinate amount of time between when a customer expressed interest and when they were able to participate in a program.

> **About six years ago we began to see an incredible gap between the innovation that was happening and the energy industry.**

They were able to cut that time in half just through some simple process improvements. But they didn't even know that was a problem that they needed to fix, until they did the customer experience audit.

PUF's Steve Mitnick: How did you get into this field?

Ashley Nicholls: My background is exclusively in advertising and I had the opportunity to join KSV almost ten years ago.

KSV has been in business for four decades. We've always had energy and sustainability clients. But about six years ago we began to see an incredible gap between the innovation that was happening and the energy industry. And the new appetite of customers to partake in it.

We felt that was an interesting thing to lean into.

Our focus on energy has given us the chance to be inside the walls of some of the biggest, most progressive utilities in the country, and some of the smallest, most fascinating energy startups. Because of the trust our clients have in us, we're able to be a part of exciting conversations about the future of energy. And right now, there just isn't much more important work you could be doing. ❖

PUBLIC UTILITIES FORTNIGHTLY
"In the Public Interest"

EXECUTIVE EDITOR
Bruce W. Radford
radford@fortnightly.com

EDITOR-IN-CHIEF
Steve Mitnick
mitnick@fortnightly.com

EDITOR-AT-LARGE
Pat McMurray
mcmurray@fortnightly.com

EDITOR
Angela Hawkinson
hawkinson@fortnightly.com

LEGAL EDITOR
Phillip S. Cross
pcross@fortnightly.com

PUBLISHER
Joseph D. Paparello
paparello@fortnightly.com

ART DIRECTOR
Michael Eacott
eacott@fortnightly.com

MARKETING & CUSTOMER RELATIONS
Alexandra Revel
arevel@fortnightly.com

CIRCULATION
Teela Wormley
twormley@fortnightly.com

EXECUTIVE MANAGEMENT
Bruce Radford, President; Phillip S. Cross, Vice President; Lewis Turner, Treasurer; James Norris, Secretary

Advertising Index

Clint Vince

(Cont. from p. 8)

is going to be increasingly impacted by what's happening in China, Korea, Europe and other locations. And large, global firms not only know what's happening in specific regions—from the competitive landscape to the impact of local economic conditions on prices worldwide—but also have a wide range of practices to tackle interdisciplinary challenges, from cyber threats to IP protection and commercialization, to energy infrastructure finance.

China will bring electric vehicles to scale in ways that we haven't seen before, and more quickly than people anticipate.

I also see exciting developments ahead that will keep the practice challenging. Such as electricity coming to sub-Saharan Africa, a region where more than six hundred million people are still without power. Such as China bringing electric vehicles and other technologies to scale in ways that we haven't seen before, and doing it more quickly than people anticipate. Such as advances in battery and energy storage technology, an exciting new field where there'll be a lot of innovation over the next five to ten years.

It's a great time to be practicing energy law. ❖

Brien Sheahan

(Cont. from p. 34)

technology and innovation, but this industry must keep up. We cannot be stagnant. We must embrace innovation in order to meet our obligations.

We believe that the utility industry will change more in the next ten years than it has in the last one hundred years. We have an aging workforce. The industry must hire the next generation of talented professionals from a wide range of backgrounds who are excited about the utility industry. We have to attract diverse new talent to join the industry quickly in order to retain the invaluable institutional knowledge from our retiring workforce.

Thoughts on leading the task force?

I am honored to lead the Task Force on Innovation, and hope that NARUC members will take advantage of the opportunity to award some deserving people these exciting awards. ❖

John Hargrove, Jeff Ihnen

(Cont. from p. 36)

when it comes to meeting growing demand. Energy efficiency as a resource is cheaper, cleaner, faster, and better for the environment.

Utility companies that don't have the flexibility to adapt to a changing market had better get it. Some investor-owned utilities need to change their legislative/regulatory environments to allow them to offer more products and services. Otherwise, someone else will.

Utilities need to make sure they can not only deal with but can thrive through market disruptions, including competition. They need to provide their customers or co-op members with choice relative to their energy use, ability to access renewables, control over their use and data, etc.

So, small and medium utilities, when it comes to offering energy efficiency programs, what's in it for you? Seems obvious to us, and to those who are doing it. ❖

Branko Terzic

(Cont. from p. 37)

Street in Milwaukee, Wisconsin, you will notice the large service doors and high ceilings of the first floor, demonstrating the dual service offerings of the original company.

When built in 1912, the building's large entrances allowed electric trolleys to enter on the street level for service and maintenance.

Even with two new services, electric industry investors and company executives were cognizant that the electric transportation business and even maybe the electric light service business were risky endeavors. There was the possibility that they might be replaced by newer technologies.

To partially hedge the risk that neither electric traction nor electric light service would survive, the founders of the Milwaukee Electric Railway and Light Company took an unusual step. In 1903, they directed that their new Public Service Building be designed with numerous extra doors and windows so that it could be easily converted to a hotel, just in case.

Who would do that today? ❖