



Symposium Synopsis





## 2017 Symposium Focuses on Energizing the Future

This year marked the 15<sup>th</sup> anniversary of Utility Perspectives. Quanta Services was pleased to, once again, host this interactive and inspiring day-and-a-half event. We are grateful and honored by the level of participation from leaders across the North American electric power and pipeline industries. They are the heart of this event.

Utility Perspectives is an annual, invitation-only, senior-level executive symposium that brings together energy industry leaders to share their distinctive viewpoints and discuss industry topics of critical importance that we collectively face. An advisory committee of past participants and industry leaders formulate each year's programing. Utility Perspectives is the only symposium that brings together executives, regulators, system operators and investors from both the electric power and pipeline industries at one, defining event. As a result, the symposium offers executive leaders a unique opportunity to broaden their perspective and expand their vision.

Quanta Services founded Utility Perspectives to further its commitment to the future of the energy industry, and it has come a long way since the inaugural event. Over the years, Utility Perspectives has been hosted across North America, from coast to coast and in Canada. It only seemed fitting, in its 15<sup>th</sup> year, to bring it "home" to Texas.

While the speakers and panel discussions formed the core of the symposium schedule, various activities and receptions provided additional opportunities for conversation, networking and entertainment. This included tours of Quanta's world-class 2,200-acre training facility, which provides next-generation, state-of-the-art education and hands-on field training. Evening events featured a cocktail reception and dinner at The Bullock Texas State History Museum, which included a private performance by country music legend, Martina McBride.

This synopsis includes highlights from the distinguished speakers and executive panel discussions, while providing a glimpse of the 2017 symposium perspectives.





## Speaker and Panel Discussion Highlights

**Featured Speaker: Bill Magness**, President and Chief Executive Officer, Electric Reliability Council of Texas

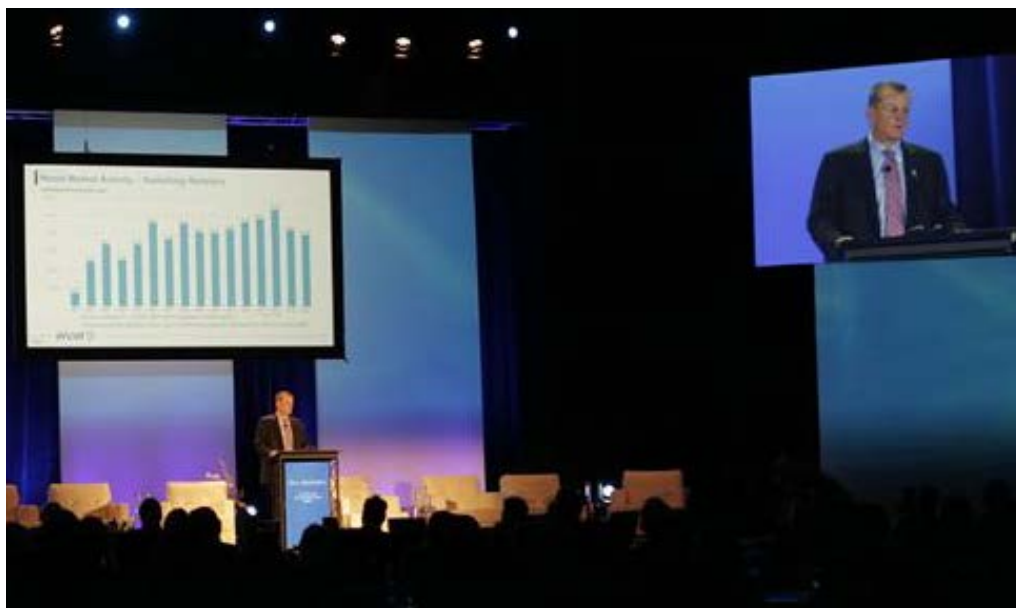
Bill Magness shared his perspective on how ERCOT is facing the future of increasing complexity in network modeling, load and intermittent resource forecasting and visualization and situational awareness. A few of the key points he shared are outlined below.

- **Texas is one of the few states with continued growth in electricity load and sales.** In addition to shale-related growth, Texas is experiencing a petrochemical industry revolution. Retail sales to industrial customers (110.2 million MWh) were more than twice as high in Texas as in the next highest state, California (52.6 million MWh). Each year ERCOT continues to break various peak demand records. ERCOT is tracking 321 active generation interconnection requests totaling 66,842 MW (includes 28,605 MW of wind). Projects in engineering, routing, licensing and construction total about \$7 billion.
- **Data transparency and security is critical for markets.** ERCOT makes data and information products available through several distribution channels. The two primary channels are ERCOT.com and the Market Information System (MIS). ERCOT.com provides data and information to all stakeholders, including the general public. MIS and associated Web services provide a secure channel for consuming sensitive market data. In all, ERCOT creates and posts more than 100,000 data products per day, and those are consumed at an average rate of more than 27 million downloads monthly.
- **Evolution from dispatching resources to forecasting resources has become increasingly important.** As Texas has rapidly added more wind and solar, forecasting load and intermittent resource output has become increasingly complex and important. ERCOT has developed neural network models to determine sophisticated relationships between numerous, predictive variables for renewable resource output forecasting. While these models have significantly improved forecast accuracy, ERCOT continues to make refinements to improve results.
- **System resilience is about managing amidst increasing complexity and resisting fragile environments.** ERCOT is facilitating development and testing of increasingly complex and inter-related IT systems and training operators for a more unpredictable system. We must develop systems with adverse conditions in mind and we must be prepared to operate if our existing grid or market systems become unavailable.
- **Must continue to get smarter and learn to improve system visibility, power markets and cybersecurity.** We have to adapt to a changing resource mix and continue to operate reliably with increasing penetrations of inverter-based technologies. This involves establishing visibility, integrating and responding to potentially millions of new distributed energy resources that are not currently visible. We must continue to improve the processing of dynamic grid simulations, which allows comprehensive real-time stability assessments to enable flexible responses to system conditions. And, we must leverage industry and government collaboration to improve recognition and mitigation of increased cybersecurity risks.

### Featured Speakers:

**Bill Magness** – President and Chief Executive Officer, Electric Reliability Council of Texas (ERCOT)

**Robert Shane Kimbrough** – Commander of the International Space Station for Expedition 50



## Featured Speaker: Shane Kimbrough, Commander of the International Space Station for Expedition 50

Shane Kimbrough, (Col., U.S. Army, Ret.) NASA Astronaut, launched on October 19, 2016, as part of Expedition 49/50 and became the Commander of the International Space Station (ISS) a week after he reached the ISS and remained so until he departed almost six months later. Former Commander Kimbrough shared his perspectives on some key aspects of ISS power supply and safety along with some amazing pictures and videos from his mission. A few of his key points are outlined below.

- **Electric power vital for ISS mission.** The ISS electric power system is critical for maintaining the crew's living environment, powering communication, control, and computer equipment, and, in particular, performing scientific experiments. Numerous experiments are conducted, including growing lettuce, cultivating human stem cells and sequencing DNA. Problems with the ISS electric power supply could endanger the crew and ruin months of experimental work.
- **Extreme conditions present unique operating challenges.** Providing power to the ISS is no easy task. The ISS orbits Earth at an altitude of about 250 miles. Its orbital speed is approximately 17,500 mph. Temperatures outside of the ISS range from -200 °C to 200 °C. Orbital space debris, including man-made material and natural micrometeoroids are a significant threat that could harm ISS astronauts, force an evacuation or even destroy the station. The ISS uses 200-foot photovoltaic array wings to convert sunlight to electricity. Rechargeable batteries provide continuous power during the "eclipse" part of each orbit (35 minutes of each 90-minute orbit). Periodic replacement of the rechargeable batteries, as well as some repairs, requires crew spacewalks, which can last six or seven hours and are particularly dangerous.
- **Safety is essential.** ISS Commander top priorities are first: the safety of the crew and, second: the safety of the vehicle. There is careful and extensive analysis, tracking and mitigation of hazards. Safe, reliable and redundant technology are a big part of mission safety. Highly structured safety training, procedures, processes and checklists are fundamental to mission success.



## Morning Roundtable: Global Trends and Impacts

This panel brought together North American energy industry executives to share perspectives on the critical challenges and issues affecting their companies. The panel discussed a range of topics including energy infrastructure investment drivers, workforce needs and collaborative solutions. Some of the highlights from this discussion are outlined below.

- **Huge infrastructure investment needs.** Panelists outlined a long list of huge investment needs, including replacing “baby boomer” assets, improving system resilience to weather/natural events, physical and cyber threats and improving energy resource visibility and control. Much of the planned investment is focused on transforming the grid to a platform of the future that is more dispersed and incorporates more distributed resources and microgrids while lessening the criticality of certain units or assets. Unlike the original post-war energy infrastructure boom, renewing and modernizing existing, energized resources is much more of a challenge than building green-field infrastructure.
- **Affordability and grid defection a prime consideration.** Grid renewal and modernization investments must be cost effective and affordable to customers. Decoupling may provide revenue certainty for approved investments, but could become a constraint if “the denominator” (i.e. kWh sales) remains flat or shrinks. Rapidly dropping costs of distributed energy resources are expected to significantly impact and shape what customers will pay for electricity. The affordability of electricity as well as the value of the grid and grid resources will be increasingly critical as the industry transforms.
- **Changing skillset needs and resource availability are growing challenges.** Planning, building, maintaining and operating the grid of the future is going to take people that understand and can integrate all areas of the business. Canada experiencing decline in population and trend away from trades and toward university degrees. There are major technical challenges in making the increasing number and varied grid components work together. Co-operative education programs have been a great avenue to change student engineers’ perception of a stodgy, old utility industry, and to get experienced engineering resources.
- **Collaborative solutions and economic impacts resonating with stakeholders.** Justifying and planning energy infrastructure investments must become a more collaborative process. Collaboration on defining objectives, determining investment needs, timing and evaluating options and cost effectiveness are critical and often prerequisites for project acceptance by stakeholders. Renewal of aging assets must be integrated with grid modernization strategies and planning to keep the transformation affordable. SAIDI and SAIFI will remain important, but properly defining and valuing resilience will require going beyond these traditional reliability metrics. Some states have enacted major energy infrastructure investment legislation focused on renewing and modernizing the grid as well as increased jobs and economic growth. Illinois has seen significant grid reliability improvements since passage of its Energy Infrastructure Modernization Act.

### Moderator:

**Pat Wood, III** – Former FERC Chairman and Principal, Wood3 Resources

### Panelists:

**Terry Donnelly** – EVP and COO, ComEd

**Siegfried Kiefer** – Chief Strategy Officer, ATCO Ltd. & Canadian Utilities Ltd. and President, Canadian Utilities Ltd.

**Wade Smith** – SVP, Grid Development, AEP Transmission, American Electric Power (AEP)





## Panel Discussion: Millennials and the New Workforce

This panel discusses a significant and growing portion of our workforce and customer base – millennials. Differences between the generations can present various challenges and opportunities. Understanding their general expectations, priorities and preferences can help companies more effectively engage their employees and customers. A few of the highlights from this interesting discussion are provided below.

- **Different work characteristics for the generations.** Baby boomers in general expected that if they worked hard for their division of the larger organization, were on time and didn't make waves, they'd have a job for life and then retire. Generation X was characterized as being less team or organization-oriented, seeking more flexibility and looking to change companies every five years. Millennials, however, can be more loyal to their employer as long as they have achievements, recognition and feel their work is meaningful and impactful to society.
- **Different preferences and priorities.** Millennial preferences and priorities seem to differ from prior generations in a number of ways. For one, millennials tend to be less inclined to accumulate things. Work/life balance is a priority, with millennials willing to take pay cuts to be more involved and closer with their families. This is especially true with young families, for example, pushing for paternity leave. Organizationally, millennials prefer fewer layers of management and expect more access to executives. Millennials are the first generation to not have experienced life before email and, as such, don't like dealing with paper and are much more comfortable with technology. As customers, millennials prefer being able to get information and deal with issues online vs. having to call.
- **Opportunities to more effectively engage a growing portion of employees and customers.** Understanding millennial preferences and priorities can provide some important opportunities. Organizations can take a fresh look at their "always done it that way" holiday, vacation and leave policies to better fit needs of a workforce with changing needs. Old-school classroom training programs can incorporate technology or online capabilities to be more interactive, engaging and flexible. Office "cube farm" layouts can be updated to facilitate more engagement and interaction. Seas of books, manuals and filing cabinets can be moved online. More aggressive digitization of many paper-based aspects of work will be easier and expected as the millennial portion of the workforce grows. However, while convenient to generalize, we have to be careful not to over stereotype individuals of any generation. What's important is to recognize that various generations of employees offer an important connection to what customers want and where their preferences are heading.

### Moderator:

**Brad Gammons** – Global Managing Director, IBM Energy, Environment and Utilities Industry

### Panelists:

**William (Bill) Herdegen III** – COO, Innovari

**Jon Jipping** – EVP and COO, ITC Holdings

**Christie Miree** – GM of Power Delivery Construction, Georgia Power Company



## Panel Discussion: Regulatory Reform Under the New Administration

With a new administration, there are many promises and many questions. This panel shared their take on initial decisions made by the White House, discussed what regulatory changes are most likely and which would have the biggest impact. Highlights from the discussion are outlined below.

- **Administration moves indicate potential new direction on regulation of wholesale electric markets.** The Department of Energy's Notice of Proposed Rulemaking (NOPR), which proposed full-cost recovery for merchant plants with 90 days of fuel supply on-site, favors a shift in policy of how resources are valued and compensated. It's still early in the rulemaking process of FERC and other regulatory agencies, but they are still working on baseload compensation changes. A general, shared concern seems to be that misaligned rules and intents could result in unintended consequences.
- **Assumptions and basis of old models for market policy have changed.** Today's wholesale electric markets were designed based on modeling assumptions that inputs/fuel costs and load are always increasing. The focus was on managing reliability and costs, not on managing carbon, jobs or preferred resources. Policy was largely electron neutral.
- **Likely that the ship has already sailed on changing market direction due to Clean Power Plan rollback.** The strategic direction of power supply for companies is heavily driven by what customers want. And, in a large part of the country, they want more renewables. Discussions about preserving nuclear and coal generation vs. what customers want are getting further and further apart. Moreover, the economics of low-cost natural gas and newer, more efficient plants vs. older coal and nuclear plants are a major driver of market direction.
- **Push for asset renewal and grid modernization reflects different state personalities.** Some states are pushing for grid modernization to support aggressive renewable goals. Others are focused on aging infrastructure renewal to improve reliability and support economic growth and jobs. While still, others are focused on hardening their system to better withstand severe weather events. The various state legislative and regulatory efforts reflect these differing priorities. Common among most states is an increased emphasis on affordability as infrastructure investment needs continue to grow.
- **What's likely to change under the current administration?** Clearly there is a focus on changing baseload security valuation. However, there is a strong greening trend for customers of all sizes that's not likely to change. The opportunity to invest in renewing, modernizing and hardening transmission and distribution infrastructure should continue to increase – particularly for distribution. Increasing adoption of particular technologies such as storage, AMI and remote sensors will continue to be heavily dependent on costs and customer willingness to pay. Other technologies, such as drones, are advancing so rapidly it's hard for regulators to keep pace.

### Moderator:

**Alison Silverstein** – Consultant,  
Alison Silverstein Consulting

### Panelists:

**Scott Moore** – VP Transmission  
Engineering and Project Services,  
American Electric Power (AEP)

**Steve Strah** – SVP and President,  
FirstEnergy Utilities

**Christine Tezak** – Managing  
Director, Research, ClearView  
Energy Partners, LLC





## Panel Discussion: Renewable Energy Growth Prospects Post 2020

Utilities face pendulum swings in energy subsidies and market mandates in the U.S. for renewable energy. Looking forward, there are many questions about how renewable energy sources will compete without subsidies and the prospects for continuing renewable energy technology improvements and cost reductions. This panel discussed how drivers of renewable energy growth are changing and how utilities and system operators are dealing with integration and operational challenges. Some of the main discussion points are summarized below.

- **Drivers of renewable energy growth are shifting dramatically.** Some of the major growth drivers of the past, such as state renewable portfolio standards and federal production tax credits, are waning as customer and corporate greening and renewable cost competitiveness are major factors now. California is wrestling with whole communities and even large cities looking to procure their own renewable energy. Wind resources in Canada and parts of the U.S., for example, have become “competitively disruptive” in wholesale markets. Oil and gas companies are adding solar to their properties. And, as emphasized in other panels, regardless of what happens with the Clean Power Plan, the market is more of a driver than regulations at this point.
- **More areas facing renewable integration challenges/opportunities.** Seeing the “duck curve” in more and more places particularly as solar penetration increases. The challenge and opportunity is to shift load to routine or dynamic periods of abundant, renewable production and rapidly respond to intermittent renewable output to meet energy demands.
- **Will we need transmission lines in the future?** This is a question that some are asking given the declining load growth and the promise of distributed energy resources and microgrids. While transmission flows, drivers and planning are certainly changing, transmission is widely viewed as essential for integrating more renewable energy.
- **Where are we with storage?** Still considered to be “dabbling” with storage in most areas, even California. Canada looking to grow pumped storage and compressed air storage resources. Power purchase agreements for paired renewable and storage have reached grid parity in some areas. Storage growth is still a matter of cost, pricing and value of problem solved.
- **How does renewable and distributed energy resource growth fit with resilience objectives?**

Resilience is a different animal. In the past, we designed primarily to handle equipment failures and avoid cascading blackouts. Now we are looking at withstanding and more quickly restoring after various severe stress events, natural and manmade. Renewables and distributed energy

resources can provide challenges and opportunities for improved resilience. Redesigning and rebuilding for a more resilient and distributed energy resource future will be difficult, just as it was for engineers 50 years ago who believed they were designing the grid of the future.

### Moderator:

**Cristin Lyons** – Partner and Grid Transformation Practice Leader, ScottMadden

### Panelists:

**David L. Geier** – SVP, Electric Operations, San Diego Gas & Electric (SDG&E)

**Mike Marsh** – President and CEO, SaskPower

**Bryan Schueler** – EVP and Chief Development Officer, Invenergy



## Panel Discussion: North American Pipeline Infrastructure Session

This panel discussed issues related to new pipeline infrastructure and safety trends, including President Trump's reauthorization of critical pipeline infrastructure, other regulatory developments and local, political risks. Panelists also discussed how these developments might affect future pipeline construction and operation. Some of the highlights from this discussion are provided below.

- **Lack of FERC quorum has delayed anticipated impacts of pro-infrastructure administration.** The Federal Energy Regulatory Commission (FERC) needs at least three commissioners to make rulings. Due to retirements and resignations, FERC had been without a three-member quorum for six months this year—the first time FERC has been without a quorum in its 40-year history. Not having a quorum at FERC for six months this year has delayed pipeline projects worth billions of dollars. Unfilled vacancies in other key agencies in the project approval process, such as the Army Corp of Engineers, are further delaying some projects. The delays and dysfunction were unexpected and are adding costs to projects as they languish in a growing approval backlog. However, with the recent FERC commissioner appointments restoring the commission's quorum, the industry is optimistic about projects moving forward.
- **Pipeline development opposition continues to evolve tactics.** There continues to be a very vocal minority that doesn't believe we need energy infrastructure. Battles with these opposition groups over pipeline development used to be primarily in Washington, D.C. Now, opposition is increasingly focused on local efforts to find at least one town or one land owner along the proposed pipeline route to delay or change projects. Gas-generating plants are derailed or delayed by stopping the pipeline projects which supply power plants, or the transmission lines from them.
- **The focus of efforts to overcome opposition must evolve as well.**

While pipeline capacity and energy independence are still important issues, bringing good jobs back home is the benefit that's resonating most. Projects are already heavily incentivized to source material locally, but often domestic capacity is an issue. There's a big opportunity to invest in domestic manufacturing and tooling for local supply of pipe, particularly large-diameter pipe.

Arguments against infrastructure projects often claim that these jobs are only temporary. However, infrastructure project work has been the source of steady careers, supporting families and local economies for decades.

### Moderator:

**Donald Santa** – President and CEO, Interstate Natural Gas Association of America (INGAA)

### Panelists:

**Michael Dunn** – COO and EVP, Williams

**Phil Grigsby** – SVP, Natural Gas Ventures and Business Development, Duke Energy

**Matthew Sheehy** – Chief Commercial Officer, Tallgrass Energy

**Allan Schneider** – VP Project Execution, Enbridge



## Panel Discussion: The Aging Infrastructure Delivery System

This panel addressed a number of questions about aging infrastructure risks, costs, renewal/upgrade benefits and customer impacts. They also shared their perspectives on which messages are resonating with stakeholders. Highlights of the discussion are outlined below.

- **Poor agreement on what customers want and when they want it.** There is much more of a focus on what customers want and don't want, but little agreement on what that is and the desired pace of adoption. Whether it is grid reliability, resilience, modernization, customer choice, DER integration, greening, EVs, electricity affordability or something else, the definitions and solutions seem to be evolving state by state. Defining what customers actually want is not easy to begin with. Furthermore, in addressing defined customer needs, we've learned that political solutions to technical problems, however well intentioned, do not usually work out well. It's important that we do a better job of listening to what our customers want and collaborate with stakeholders on solutions.
- **Regulators focusing on measurable grid performance improvements and affordability.** Improving day-to-day reliability and renewing aging infrastructure has been a top priority and key investment area for a lot of companies. Many state regulators seem to be increasingly focused on measurable improvements from past years of investment to justify ongoing grid or reduced investment programs. If corrective replacements and O&M costs are not decreasing with increased capital investment, the case for ongoing investment plans is a much tougher one. For companies that have seen significant improvements in reliability, customers and regulators have become more concerned about affordability and the marginal value of ongoing reliability investments.
- **Grid investment focus and message is shifting for some companies.** The emphasis on infrastructure renewal investments is shifting to focus on grid modernization. Aging and problematic assets are not just being replaced like-for-like, in many cases, but upgraded to be smarter, more reliable and less costly to maintain. In other cases, aged and poor performing infrastructure must be replaced or upgraded as a foundational investment so that other modernization or green initiatives, such as increased DER hosting, can be successfully implemented.
- **Choosing the right innovation partners and pilots is important.** Electric utilities are not generally rewarded for taking risks. However, they are increasingly compared to high-tech companies on how they innovate. Who utilities partner with on innovation initiatives matters. Partnering with Google, Tesla or other innovative tech companies brings with it a "cool factor" for the utility that customers seem to like. But, utilities must be smart about innovation investments and avoid the too common "death by pilot" fate of many technology innovation partnerships. More smaller-bet pilots that fail or succeed faster may be a better way to learn more before making bigger bets at scale.

### Moderator:

**Nora Mead Brownell** – President, ESPY Energy Solutions, LLC

### Panelists:

**J. Tyler Anthony** – SVP and COO, Pepco Holdings

**Greg Kiraly** – COO, Hydro One Limited

**Teresa Mogensen** – SVP, Transmission, Xcel Energy





## Morning Roundtable: Utility – Energy Service Provider Relationship Trends

There are good examples of long-term, mutually-successful relationships between utilities and energy service providers. This panel described a few of these examples and shared their perspectives on the mutual benefits and prudence cases for productive utility-energy service provider relationships. Some of the highlights from this discussion are outlined below.

- **ATCO teamed with Quanta Services on the first Alberta transmission project awarded through new competitive concession tender process.** Had a good history of working with Valard Construction, a Quanta Services company, in a traditional contracting relationship. ATCO and Quanta Services formed a limited partnership to provide a cost- and risk-efficient infrastructure solution for a 300-mi 500 kV Alberta Electric System Operator (AESO) transmission project. ATCO is obtaining necessary permits, rights of way and regulatory approvals. Quanta is providing turnkey engineering, procurement and construction (EPC) services for the entire project. Both ATCO and Quanta provided financing for the project.
- **Duke Energy evolves long-time Quanta Services contracting relationships to address work execution priorities.** Duke Energy had contracting relationships with Quanta Services' companies – some dating back 40 years. But these relationships were largely transactional and Duke Energy wanted to improve how they worked with Quanta given huge infrastructure renewal needs. Quanta companies are now involved earlier in the process, at the table with Duke Energy planning out work as far as two years in advance. This has greatly



- enhanced the partnership and is paying dividends in the form of lower costs and improved safety.
- **Ameren changed contracting relationship to take advantage of strengths.** Ameren also had a more traditional contract relationship with Quanta Services. Both parties saw opportunities to improve the process by allowing Quanta to jointly schedule work and handle material ordering. The improved efficiencies have led Ameren to expand the electric and gas infrastructure project work with Quanta Services. Ameren has also taken advantage of Quanta's national footprint and diversity of resources to play a much larger role in emergency response efforts.
- **CenterPoint Energy reaping benefits of long-term contractor relationship.** CenterPoint has a long history of significant contract work from Quanta Services' companies. CenterPoint, like other utilities, often used Quanta for some of its most difficult and challenging work. In taking on this type of work, Quanta developed advanced skills and unique expertise. The long-term contract work certainty allowed Quanta to invest in specialized equipment (e.g., directional boring) and hone their skills and work processes, which have paid off for CenterPoint in the form of lower construction costs, execution certainty and improved safety.
- **Companies leveraging service provider relationship to improve and diversify skills.** Quanta Services partnerships are providing valuable opportunities to learn from each other to improve skills, efficiencies and safety performance. One company is looking at having their apprentices work with Quanta Services' crews to round out and enhance parts of their training. These types of joint learning and improvement opportunities are made possible by the mutual trust and respect that has developed through long-term service provider partnerships.

### Moderator:

**Pat Wood, III** – Former FERC Chairman and Principal, Wood3 Resources

### Panelists:

**Paul Goguen** – SVP and GM, Transmission and Distribution, ATCO

**Kenny Mercado** – SVP, Electric Operations, CenterPoint Energy

**Ronald Pate** – SVP, Operations and Technical Services, Ameren Illinois

**John F. Smith III** – SVP of Grid Performance and Contractor Operations, Duke Energy

## Panel Discussion: Utility Convergence: Electricity and Pipelines

Consolidations, mergers and asset reorganizations continue in the North American power industries with electric companies buying pipeline companies, generators closing or selling fossil assets and a variety of other expansions and acquisitions. This panel discussed the benefits of recent merger and acquisition strategies, including how they affect customers and employees, whether promised synergy benefits are realized and whether mergers and acquisitions affect the resulting entities' strategies and success going forward. Some of the highlights from this discussion are outlined below.

- **Different strategic drivers for different electric and gas convergence deals.** All but three of the largest 20 U.S. utilities (by market cap) have both electric and gas assets. Electric and gas convergence deals are generally driven by three main strategic focuses: growth, financial synergies and/or operational synergies. Panelists noted that electric sides of the business have learned from how gas utilities and pipeline companies identify, understand and address risks. Combination electric and gas companies have been able to offer large, industrial customers tailored energy service packages that offer the best value.
- **Different carbon views driving challenges and opportunities in different regions.** The northeast U.S. has some of the highest natural gas prices in the world, and the nearby Marcellus shale has some of the cheapest natural gas supply in the world. Yet, there is strong opposition to building the pipeline capacity to connect the two regions. In the Midwest, there is still strong support for coal, natural gas and transmission infrastructure because of the jobs supported and regional economic impacts. In the western U.S., it's unlikely that California will build any new natural gas power plants as there is a strong push to completely decarbonize.
- **Fasten your seatbelts for future significant grid work necessary to support electrification of transportation.** Automakers are making huge investments and commitments to electric vehicles (EVs). California and Hawaii have considered legislation to decarbonize passenger transportation. EVs are equivalent to about half the load of an average residential house. As such, electrification of transportation could reenergize load growth and lead to a renaissance of grid investment. Based on initial experiences in some states to build charging infrastructure, utilities will likely be the key player in developing the charging infrastructure, in addition to making the necessary grid reinforcements. The pace of EV penetration will depend on a number of technological, economic and legislative factors.

### Moderator:

**Thomas Seitz** – Senior Partner,  
McKinsey & Company

### Panelists:

**Mike Hooper** – SVP, Electric  
Operations, Northern Indiana  
Public Service Company (NIPSCO)

**Leon Olivier** – EVP of Enterprise  
Energy Strategy and Business  
Development, Eversource Energy

**Jesus Soto, Jr.** – SVP, Gas  
Operations, Pacific Gas and  
Electric Company (PG&E)



## Panel Discussion: North American Transmission Session

New transmission lines are being built to access renewable power, less expensive power and new electricity sources. However, the drivers are shifting and there are questions and concerns about the right balance between interstate or inter-province transmission vs. local generation sources. This panel addressed these issues and some of the highlights from this discussion are outlined below.

- **Transmission investment drivers shifting.** Transmission development drivers of the “big build” focused on load growth in general, regional reliability, shale-related load and supporting renewable development and mandates. Seeing a bit of “transmission investment fatigue” for new lines. For now and the near-term, main drivers for transmission investment seem to be aging infrastructure replacement, renewable energy balancing and resilience related. Rooftop PV is flattening or decreasing transmission line load, which has led to the deferral or cancellation of many projects. The DER message, right or wrong, is currently resonating with customers and regulators as an alternative to transmission line dependence and vulnerability.
- **Transmission development likely driven more by states and provinces than by federal policy.** Support of renewable energy within states or provinces has driven intrastate and intra-provincial transmission line development. Past hurricanes in eastern and southeastern states have driven a lot of transmission system resilience-related investment. More recently, wildfires in California have highlighted transmission system vulnerabilities and the need for more resilience-related investment. However, state regulators and consumer advocates are pushing back on cost studies. They want to ensure that non-wires alternatives, such as DR and DERs, are considered as a means to defer, reduce the scope or cancel transmission line projects. At a federal level, it is still unclear whether campaign promises about rebuilding infrastructure includes transmission lines with roads, bridges, etc.
- **Inter-regional/cross-border transmission lines driven mainly by energy imbalances.** While cross-provincial transmission lines in Canada make sense, they are politically difficult—maybe more so than cross-state transmission lines in the U.S. Residents generally do not want transmission lines built to serve their own needs, much less the needs of residents outside their states and provinces. Furthermore, most elected officials want the economic, employment and tax benefits of having power generation in-state and in-province. The need to balance energy and load with increasing renewable generation is driving the development of several Inter-regional/cross-border transmission lines. These new lines take advantage of complementary wind, hydro and solar resources, which provide green energy balancing alternatives for integrating more renewables.

### Moderator:

**Rob Gramlich** – Founder and President, Grid Strategies LLC

### Panelists:

**Eoin Cooke** – VP, Security & Information Services, AltaLink

**Patrick M. Hogan** – SVP of Electric Operations, Pacific Gas and Electric (PG&E)

**Mark Mroczynski** – Executive Director, Transmission Programs, FirstEnergy

**Shawn E. Schukar** – Chairman and President, Ameren Transmission Company of Illinois (ATXI)







# UTILITY PERSPECTIVES

# 2017





## The 2018 Utility Perspectives Executive Leadership Symposium

We sincerely hope that the 2017 Utility Perspectives Executive Leadership Symposium was an enjoyable and rewarding experience for those who participated, and we welcome any comments or suggestions on improving the event. Thanks again to all who helped make this event a success.

Please save the date for the Utility Perspectives 2018 event, which will be in Toronto, Ontario, Canada, September 30 - October 2, 2018. Toronto is a vibrant, global center of business, finance, arts and culture, and is recognized as one of the most multicultural and cosmopolitan cities in the world. Quanta Services is excited about returning to Canada to host Utility Perspectives for its 16<sup>th</sup> year, and we look forward to seeing each of you in Toronto.



More information about Utility Perspectives can be found at [www.utilityperspectives.com](http://www.utilityperspectives.com).