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POWERING AMERICA: EXAMINING THE STATE OF THE ELECTRIC INDUSTRY THROUGH MARKET PARTICIPANT PERSPECTIVES

TUESDAY, JULY 18, 2017

House of Representatives

Subcommittee on Energy,

Committee on Energy and Commerce

Washington, D.C.

The Subcommittee met, pursuant to call, at 10:00 a.m., in Room 2123 Rayburn House Office Building, Hon. Fred Upton [Chairman of the Subcommittee] presiding.

Present: Representatives Upton, Olson, Barton, Shimkus, Murphy, Latta, McKinley, Kinzinger, Griffith, Johnson, Long, Bucshon, Flores, Mullin, Hudson, Cramer, Walberg, Walden (ex officio), Rush, McNerney, Peters, Green, Castor, Sarbanes, Tonko, Loebsack, Schrader, Kennedy, Butterfield, and Pallone (ex

officio).

Staff present: Elena Brennan, Legislative Clerk, Energy/Environment; Adam Buckalew, Professional Staff Member, Health; Karen Christian, General Counsel; Kelly Collins, Staff Assistant; Wyatt Ellertson, Research Associate, Energy/Environment; Adam Fromm, Director of Outreach and Coalitions; Tom Hassenboehler, Chief Counsel, Energy/Environment; A. T. Johnston, Senior Policy Advisor, Energy; Alex Miller, Video Production Aide and Press Assistant; Mark Ratner, Policy Coordinator; Annelise Rickert, Counsel, Energy; Dan Schneider, Press Secretary; Sam Spector, Policy Coordinator, Oversight and Investigations; Jason Stanek, Senior Counsel, Energy; Madeline Vey, Policy Coordinator, Digital Commerce and Consumer Protection; Priscilla Barbour, Minority Energy Fellow; Jeff Carroll, Minority Staff Director; David Cwiertny, Minority Energy/Environment Fellow; Rick Kessler, Minority Senior Advisor and Staff Director, Energy and Environment; Alexander Ratner, Minority Policy Analyst; and Tuley Wright, Minority Energy and Environment Policy Advisor.

The Chairman. It is my understanding that Mr. Rush is coming in the door, so we will now come to order at the Subcommittee and the Chair will recognize himself for an opening statement.

So I am certainly pleased to be here today to kick off this first of many hearings focused on America's electricity system. And as many in this room are aware, this committee has had an extensive history overseeing the nation's power sector. In fact, the namesake of this very building, Speaker Rayburn, worked as the chairman of the Energy and Commerce Committee to pass the Federal Power Act back in 1935, a law which continues to serve as the legal foundation of America's electricity system.

More recently, the committee was instrumental in the discussion and actions resulting in the creation of organized wholesale electricity markets and other power marketing reforms ensuring that rates continue to be just and reasonable. I can confidently say that this committee's efforts to oversee the nation's power sector must remain ongoing, as the ever-changing nature of the U.S. electricity system guarantees that there will always be new challenges to solve and new opportunities to seize.

With that in mind, I am excited to launch a new set of Energy and Commerce hearings today titled Powering America series. This series of hearings is going to take a comprehensive look at recent developments and challenges in the way that we generate, transmit,

and consume electricity in the U.S. and today's hearing will give us the opportunity to examine the state of the electric industry through the perspective of various market participants.

After hearing from each of these marketing participants this morning, we are going to be holding a second Powering America series hearing next week where we are going to be receiving testimony from each of the RTOs and ISOs who are responsible for operating America's regional wholesale electricity markets. It should also be said that in the coming months we are going to be announcing additional hearings in this series which will focus on more in-depth topics and issues related to the U.S. electricity system. Joining us in today's discussion we have a full range of experts representing a wide range of stakeholders from across the electric sector and I would like to welcome them and thank them for being here.

As I am sure that each of our witnesses will attest to, the nation's electricity industry and system is undergoing a significant period of transformation. This transformation is affecting the composition of the country's electricity generation mix, the way that industry and regulators are approaching grid reliability, and how federal energy policies are interacting with state policies. Many of the recent developments and changes within the electricity sector are creating tremendous benefits for American consumers.

U.S. electricity prices are low, employment within the energy sector continues to rise, and advanced technologies are giving consumers more control over how they interact with the grid. And it is safe to say that the American electricity industry is a world leader and deserves more credit for the amazing work that they do.

With that being said, I know that the U.S. electricity system is not perfect nor will it ever be. The electricity industry is facing dynamic challenges in an uncertain future. The witnesses before us today have serious ideas on how electricity markets and energy policies can be improved, and this committee welcomes those ideas and is eager to engage in a meaningful discussion as to how we can strengthen the grid and how to provide greater value to consumers.

No one here is under the illusion that these issues will be understood and addressed in one or two hearings. The U.S. electricity system is the largest, most complex collection of machines and computers in the world and are influenced by a staggering number of stakeholders.

These electricity systems issue are complicated and in order to address them it will require an extended effort by this committee and by the Congress. Moreover, tackling these issues will require a bipartisan effort, which is why we have worked with our colleagues on both sides of the aisle in planning and

conducting this hearing.

Reliable, affordable, clean energy is a vital component of every American's life. Going forward, we have got to strive to enhance the generation, delivery, and marketing of electricity in a way that continues to enrich the lives of all. And with that in mind, I look forward to the hearing and future hearings and would yield 5 minutes to the ranking member of the subcommittee, my friend from Illinois, Mr. Rush.

[The opening statement of Mr. Upton follows:]

**********COMMITTEE INSERT 1**********

Mr. Rush. I want to thank you, Mr. Chairman. Mr. Chairman, this hearing is important because it is examining the state of the electric industry through market participant perspectives.

Mr. Chairman, we know that the electricity grid of the 21st century will look significantly different than the grid of the last century, and rightfully so. Even as the Trump administration attempts to weaken federal environmental regulations and Congress fails to act in any meaningful way to address climate change, we see businesses, municipalities, states, and individual consumers step up their own campaigns to address this critical issue.

As consumers become more aware of their carbon footprint and how their behavior impacts their environment, they are also more demanding in terms of information, they are more demanding in terms of control over how energy is produced and consumed.

Indeed, Mr. Chairman, while many changes in our electric grid are spurred by state and federal policy and marketing forces, it is important to understand that consumers are also driving many of the trends we see taking place in the electricity market. From an increase in smart meters such as the ones being installed throughout my home city of Chicago to smarter appliances, consumers want the tools to more responsibly use energy both as a way to save money and as a way to save the environment. Other current trends include greater demand for cleaner, renewable

sources of energy to compete with the traditional fossil fuels as well as increase in discriminate generation and demand response resources. Mr. Chairman, the result of these trends as a DOE draft report suggests does not make the grid less reliable but rather the opposite. The DOE study indicates that having fuel diversity has in fact improved grid stability. I want to quote, Mr. Chairman, that very same report.

"The power system is more reliable today due to better planning, market discipline, and better operating rules and standards," is the remarks from that report.

Mr. Chairman, with the federal government abdicating its responsibility in enacting comprehensive energy policy that addresses one of the world's most pressing challenges, it is even more vital that we provide the resources and guidance for states to take more of a permanent role in advancing smart and sustainable energy policies.

Congress should not stand in the way of states like my own Illinois, Mr. Chairman, that choose to enact renewable energy portfolios that provide credit to reliable zero or zero-carbon baseload sources of energy, including nuclear power, but rather Congress should ensure that FERC has the necessary mechanisms to meet the challenges and take advantage of the opportunities found in today's electric grid.

By almost all accounts, Mr. Chairman, for the foreseeable

future, the nation's energy mix will continue to include sources from all of the above portfolios including cleaner burning fossil fuels, nuclear, and renewables. So Mr. Chairman, we must make sure that regulators have the tools, have the authority that they need to effectively and efficiently manage this portfolio.

So Mr. Chairman, I look forward to engaging today's panel of distinguished industry insiders and hearing from them regarding the opportunities and the challenges that we face in terms of electric infrastructure. I want to thank you, Mr. Chairman. With that I yield back.

[The prepared statement of Mr. Rush follows:]

**********COMMITTEE INSERT 2**********

The Chairman. Thank you. The Chair now recognizes the Chair of the full committee, the gentleman from Oregon, Mr. Walden, for 5 minutes for an opening statement.

Mr. Walden. Thank you very much, Mr. Chairman. And welcome to all of our witnesses and guests today. Last fall, this subcommittee held a hearing where a distinguished panel of witnesses described the origins of the Federal Power Act and how it has withstood the test of time. That testimony provided us with an historical context of how the federal government regulates the electricity sector.

Having explored those historical perspectives, today we begin examining the current state of the electricity industry. As we embark on the Powering America series of hearings, I would also like to welcome our witnesses again who are leaders representing a diverse set of utilities and market participants. We greatly value your input and counsel.

American consumers have come to expect safe, reliable, and affordable supplies of power regardless of how they receive their electricity. You know, my district in Oregon, we receive electricity from just about every source both renewable, we get coal, we get natural gas, we get hydro, we get solar, we get wind. We also receive it from cooperatives and public utility districts and municipalities and IOUs. In fact, we have just about everything out there.

In all these situations though, we expect to have power when we flip the switch and we expect to be at 60 cycles and 120 or 240 or whatever, but we expect it to work, and yet we know it is becoming more and more complex to provide that energy especially as we integrate and go up and down the grid.

New market participants offering advanced technologies and innovative services are changing the face of the industry faster than many have expected and that pace of change will only increase over time. At the same time, wholesale electricity prices are at near record lows around the United States.

While this is largely a result of cheap and plentiful natural gas supplies, the emergence of renewable resources are also affecting the composition of power being generated as well as market-clearing prices. As a result, in regions with competitive markets that dispatch generation based solely on lowest cost, we are seeing that some traditional baseload units, such as nuclear and coal-fired plants, cannot compete because they are too expensive to operate within their markets causing some plants to retire before the end of their useful life.

While on its face low electricity prices are a boon for consumers and businesses, we are now hearing from some segments of the industry that the loss of nuclear and coal units from the generation fleet could have longer term impacts on grid reliability. While this is an issue that the DOE is examining

in its baseload study, this is also an issue that this committee is exploring. Additionally, recent proposals by states to advance certain public policies in the organized electricity markets have added yet another layer of complexity to an already complicated system.

So my hope is that there is a path forward to achieve these state policies while also maintaining the integrity of the wholesale markets. I recognize this is not an easy task. Next week, we will continue our examination of the electricity system with executives from the RTOs and the ISOs who operate the transmission systems, but today I am interested in hearing directly from market participants regarding their experiences working in the electric sector and their thoughts on areas of potential improvement.

I would note that our panel includes representatives that participate in both the non-restructured markets as well as all seven organized markets. So as Chairman Upton noted, today is just the first in our Powering America series of hearings examining this industry.

So I look forward to learning more about the state of the vital industry and hearing your thoughts regarding what, if any, reforms could help to achieve greater efficiencies, reliability, and competition in the wholesale markets while also continuing to deliver value to customers. As I have said previously, at

the end of the day, our goal is to serve the interests of consumers and I look forward to your ideas to further that mission.

And I will say at the outset, we have another subcommittee hearing going on, on 340B hospital issues, so I have to pop up to that one as well, but with that I would yield the balance of my time to the chairman of the Environment Subcommittee, Mr. Shimkus.

[The prepared statement of the Chairman follows:]

**********COMMITTEE INSERT 3**********

Mr. Shimkus. Thank you, Mr. Chairman, and I will be brief. First of all, I want to welcome Joe for being at the panel, former committee staff. That shows you how old I am and how old you are starting to look there.

Secondly, for my colleagues on both sides, I just want to -- we are asking, soliciting co-sponsors for our nuclear waste bill, the one we passed out of the full committee, 49-4. We are going to keep gathering names for the next 2 weeks, so check with your staff and make sure you get on that bill and I would appreciate.

With that, Mr. Chairman, I yield back. Oh, that is H.R. 3053 is the bill number. Thank you, Mr. Chairman.

The Chairman. As a co-sponsor of that bill I am glad to see that that is the case. And I would yield to the ranking member of the full committee, the gentleman from New Jersey, for an opening statement, Mr. Pallone.

Mr. Pallone. Thank you, Mr. Chairman. And thanks for holding the hearing to provide us with a market participant perspective in our system of electricity regulation. Today's hearing picks up on the issue that you started to focus on last Congress, Mr. Chairman, with our insightful hearing on the Federal Power Act.

Like that hearing, today's hearing was developed in partnership between you and Chairman Walden and me and Ranking

Member Rush, and this set up to be a completely non-partisan hearing with the goal of providing us important background for future decisions. I also want to welcome our witnesses, particularly Tammy Linde from New Jersey's PSEG, and I would like to welcome back to the committee a former counsel to the subcommittee and FERC chair, Joe Kelliher.

As I said previously, while our attention to electricity issues has been sporadic since the passage of the Energy Policy Act of 2005, there was a time when it seemed like this committee held hearings on the electric sector almost weekly. Now, developments in the electricity sector and the regional markets, both promising and concerning, require us to return again to a serious assessment of the state of the electric sector and how it is regulated.

Technology has dramatically transformed the possibilities for cost effectively generating and efficiently delivering electric energy to homes, businesses, and manufacturing facilities from a variety of sources. Distributed generation both fossil- and renewable-based along with improving storage options, smart meters, microgrids, and other technologies, have altered the possibilities for effectively and economically ensuring reliability.

These technologies have also called into question the most basic tenets of rate making and have challenged the longstanding

financial model for utilities. These are enormous and complex matters that require careful examination by this committee. At the end of the day, we may decide that we need to make changes to the Federal Power Act or we may conclude that we should make no changes and continue to allow developments in the states and the courts to drive policy. It is critical that our committee, at a minimum, take the time we need to examine these matters so that we arrive at decisions that are informed by fact and that serve the interests of our districts, our states, and the nation as a whole.

And at this time I would like to yield the balance of my time to Mr. McNerney.

[The prepared statement of Mr. Pallone follows:]

**********COMMITTEE INSERT 4**********

Mr. McNerney. Well, I thank the Ranking Member, and I thank the Chair for holding this hearing. I want to welcome the witnesses, in particular Mr. Schleimer from Calpine.

The electric grid has long provided Americans with reliable and affordable power upon which our economy depends. Today we see big changes though in our electric grid such as the challenge of reducing carbon emissions, distributed generation, cyber and physical threats, as well as rapidly developing technology.

Our nation depends on laws and regulations that encourages and allows utility companies to adapt and thrive. I look at this series of hearings as an opportunity to be informed in our legislative process which should be both bipartisan and productive, so I thank the witnesses and I yield back to the ranking member.

[The prepared statement of Mr. McNerney follows:]

**********COMMITTEE INSERT 5**********

Mr. Pallone. And I yield back also, Mr. Chairman.

The Chairman. The gentleman yields back. With that we are ready to hear the testimony and do our normal Q & A. Thank you, panel, for being here.

And we are going to start with the senior guy, the guy who spent a lot of hours here, a lot of weeks and months, so over the years, Joe Kelliher. Joe, welcome back. Thank you.

It is a new mic so you have got to push the button, still.

STATEMENTS OF JOSEPH T. KELLIHER, EXECUTIVE VICE PRESIDENT, FEDERAL REGULATORY AFFAIRS, NEXTERA ENERGY, INC.; LISA G. McALISTER, SENIOR VICE PRESIDENT AND GENERAL COUNSEL FOR REGULATORY AFFAIRS, AMERICAN MUNICIPAL POWER, INC.; STEVEN SCHLEIMER, SENIOR VICE PRESIDENT OF GOVERNMENT & REGULATORY AFFAIRS, CALPINE; JACKSON REASOR, CHIEF EXECUTIVE OFFICER, OLD DOMINION ELECTRIC COOPERATIVE; TAMARA LINDE, EXECUTIVE VICE PRESIDENT AND GENERAL COUNSEL, PUBLIC SERVICE ENTERPRISE GROUP, INC.; KENNETH D. SCHISLER, VICE PRESIDENT OF REGULATORY AND GOVERNMENT AFFAIRS, ENERNOC; AND ALEX GLENN, SENIOR VICE PRESIDENT OF STATE AND FEDERAL REGULATORY LEGAL SUPPORT, DUKE ENERGY

STATEMENT OF JOSEPH T. KELLIHER

Mr. Kelliher. Inexperience with the new system.

Mr. Chairman, Mr. Upton, Mr. Rush, members of the subcommittee, I appreciate the opportunity to testify today on the state of the U.S. electricity industry. My name is Joe Kelliher. I am executive vice president for Federal Regulatory Affairs for NextEra Energy.

NextEra Energy is one of the largest generators in the United States. We have nearly 40,000 megawatts in the United States and Canada, and of the larger generators NextEra has perhaps the most diverse electricity supply. We are also one of the

relatively few numbers of truly national electricity companies. We operate in every regional power market in the United States and I offer the perspective of a competitor in those markets as well as the perspective of a former energy regulator. I was chairman of FERC for a number of years and a commissioner at FERC and a former counsel of this committee.

Since the 1980s and 1990s, the federal government has promoted competition in the wholesale power markets in order to lower rates to customers based on the belief that competitive markets provide greater efficiencies than traditional cost-of-service rate regulation and the goal of competition policy is lowering cost and shifting risk from customers to competitors.

The U.S. electricity industry, as members have noted in opening comments, is undergoing a major transition. The market fundamentals driving this transition include a dramatic increase in U.S. natural gas production, the resulting sharp and sustained decline in natural gas prices, significant declines in wholesale power prices, lower than expected electricity demand, and improvements in the efficiency and cost of new wind and solar generation.

Low wholesale power prices have led to sizable retirement of inefficient and uneconomic older coal and natural gas generation facilities, some retirement of uneconomic nuclear

units, and large additions of modern, efficient natural gas and renewable energy generation. As a result, the U.S. electricity supply today has changed significantly and is now more diverse than our electricity supply has ever been up to this point.

These changes have been so significant as to raise concerns about whether these generation retirements are being driven by market fundamentals or by federal and state policy and whether the retirement of uneconomic generation poses a threat to electric system reliability. The evidence strongly suggests that the primary factor driving retirements has been market fundamentals not regulatory policy, and there is no evidence to suggest that the retirement of uneconomic generation poses a threat to electric reliability.

A number of states have proposed programs designed to prevent the retirement of uneconomic generation for a mix of policy rationales. To be clear, the market failure addressed by these state programs is low wholesale power prices, and the solution to this problem is to raise prices charged by a select few which would tend to suppress the prices for everyone else and discourage the entry of new, more efficient generation.

These proposals shift risk away from competitors back to consumers which is contrary to a central goal of competition policy itself. These state programs are controversial and they have been challenged in both federal and state courts. Some have

been overturned, one was recently upheld, and other challenges remain pending. Because these state programs threaten the integrity of wholesale power markets, FERC is presented with some hard decisions on how to balance respect for state policy choices with its legal duty to assure just and reasonable prices.

This balancing though necessarily involves placing a lesser priority on efficiency and low cost, and in my view FERC has a legal duty to protect market integrity.

I believe our electricity markets are working well and are workably competitive. U.S. electricity markets are undergoing a major transition driven by market fundamentals, the result of low natural gas produced by the shale gas revolution combined with increased efficiency, low demand, and low wholesale power prices. This transition has been marked by major changes in our electricity supply mix. We are seeing tremendous diversity in technology change. This transition is likely to continue, producing an increasingly diverse and more reliable electricity supply.

As someone who bears the scars of the California crisis of 2000-2001, I admit that it feels strange to testify at a congressional hearing on the problem of low wholesale power prices and possible solutions to that problem. And I have to wonder if wholesale power prices were much higher we might not be having this hearing or we would have a completely different focus.

But that is just a point that we should keep the consumers in mind as we discuss these issues. While it is painful for many competitors, the transition electricity markets has delivered significant benefits to consumers in the form of lower prices, and we have to accept the fact that while low wholesale prices can be painful for the owners of uneconomic generation facilities they are ultimately good for consumers and great for America.

And with that, I thank you for inviting me, and I look forward to questions.

[The prepared statement of Joseph T. Kelliher follows:]

**********INSERT 6**********

Mr. Upton. Thank you very much.

Next, we are joined by Lisa McAlister, senior VP and general counsel for Regulatory Affairs at American Municipal Power, Inc. Welcome.

STATEMENT OF LISA G. McALISTER

Ms. McAlister. Thank you and good morning, Chairman Upton, Vice Chairman Olson, Ranking Member Rush and distinguished members of the subcommittee. My name is Lisa McAlister, and I am the Senior Vice President and General Counsel for Regulatory Affairs for American Municipal Power.

AMP is a nonprofit wholesale power supplier and service provider for 135 members across nine states with the majority of AMP's members in the PJM region. AMP is one of the largest public power, joint action organizations in the country and has generating facilities and/or members located in the districts of the following subcommittee members: Congressman Griffith, Johnson, Latta, McKinley, Shimkus, and Walberg.

At the outside I want to make clear that AMP supports competitive electric markets. They offer opportunities for our members to serve their customers at the lower cost. AMP also strongly supports reliability, but as a member-focused organization we work hard to ensure that the benefits of regulatory changes made to improve reliability justify the costs to consumers. While the energy portion of wholesale bills is the most substantial portion, capacity and transmission are quickly becoming more significant and growing.

AMP has serious concerns about PJM's capacity construct and

also the growing transmission costs. My written testimony provides more details and examples of the challenges that AMP and our members have faced in these areas. PJM's current administrative capacity construct called the reliability pricing model, or RPM, is not a market in any meaningful sense. Rather, RPM is a complex, rules-driven, administrative mechanism for pricing and procuring capacity that relies on distinctly non-market features. PJM's capacity construct requires constant modifications to achieve the desired outcomes and is becoming increasingly complicated bringing increased volatility and so much rules churn that long-term planning is extremely difficult. We are moving away from markets.

One alternative solution is for local utilities known as load serving entities, or LSEs, to satisfy most or all of their capacity needs through bilateral arrangements in a real marketplace where there are willing buyers and sellers and they negotiate arrangements to meet their needs. Under an approach like this, each local utility or LSE would secure capacity to meet its peak load obligation plus a predetermined reserve margin bilaterally on a long-term portfolio basis. The RTOs would still have a significant role in determining the peak load obligations, identifying constraints on the system, and conducting a residual action. And this alternative has numerous advantages over the current capacity constructs including fewer moving parts and

administrative judgments, harmonization between states and local policies, avoidance of jurisdictional disputes, and also flexibility for both states and generators.

It is important also for us to touch on transmission. Nationally, transmission costs have increased dramatically. For example, in four of AMP members' transmission zones annual revenue requirements have increased by a range of 99 to 214 percent from 2009 through 2016. AMP understands that there are many drivers increasing transmission costs and AMP's members are willing to pay their fair share of the cost. But AMP has to work very hard to make sure these costs lead to the most cost effective and efficient grid expansion. The transmission planning process must be open and transparent, must provide equitable treatment, and take into account the changing resource mix and configuration of the future, rather than a piecemeal replacement of the grid of the past. While it is essential for developers to earn a fair return on their investment, these rates should reflect current economic conditions and risks.

AMP supports Congress playing a more active role and encouraging FERC to refocus on its statutory mandate to ensure just and reasonable rates. Enhanced congressional oversight is critical to ensure that FERC is responsive to the real needs of customers.

Congress can be helpful by insisting that keeping costs to

consumers as low as possible is a central part of the RTO mission; reiterating that load serving entities have a right to make generation choices that are not subject to rejection by the RTOs or FERC; insisting that resource adequacy constructs must accommodate state and public policy decisions; ensuring that RTO governing boards are representative, open, transparent, and independent from RTO management; requiring RTOs to demonstrate the proposed market changes benefit customers; directing FERC and the RTOs to develop robust and consistent transmission planning criteria; and encouraging FERC to ensure that return on equity rates for transmission investments reflect current economic conditions and risk levels.

Thank you for the opportunity to appear before you today, and I would be happy to answer questions.

[The prepared statement of Lisa G. McAlister follows:]

**********INSERT 7**********

The Chairman. Thank you. Thanks very much.

Next, we are joined by Steven Schleimer, senior VP of Government & Regulatory Affairs at Calpine. Welcome, nice to see you.

STATEMENT OF STEVEN SCHLEIMER

Mr. Schleimer. Good morning, Chairman Upton, Ranking Member Rush, and members of the subcommittee. Thank you for inviting me to testify today. Calpine is not a regulated utility receiving a guaranteed payment from customers. Rather, we compete head to head with other suppliers to sell power directly to wholesale and retail customers in the competitive markets across the country.

We have 26,000 megawatts of mostly natural gas-fired combined cycles and that is enough to power 25 to 30 million homes. We also own the Geysers plant in California which is the largest geothermal facility in the United States.

The first key takeaway I would like to impress upon you is that the competitive markets and particularly in the East Coast and Texas have been phenomenally successful. Over the last decade, there has been over 50,000 megawatts of new generation either committed or entering operations, representing 70 to $80 billion of new investment.

At the same time, as has been noted, wholesale prices are at historic lows, commissions rates are down significantly as well. The reserve margin, which is a measure of grid reliability, is significantly higher in each of these regions as well. All of this is clearly a win for consumers and the environment.

However, due to various policy goals and pressure from nuclear and coal generators, state policy makers have been increasingly intervening in competitive markets to bail out or subsidize specific plants. Examples include the New York and Illinois ZEC program along with current attempts to create subsidies in Ohio and Connecticut and nascent attempts in Pennsylvania and New Jersey, which were expected. If left unchecked, these efforts threaten the continued viability of competition in these regions. Investors are simply not going to invest in new infrastructure if they believe their direct competitors will receive out of market subsidy payments.

So now we get to the second key takeaway I would like to impress upon you, the half-in/half-out hybrid market where the state relies on the competitive market for some resource needs but then target subsidies to select power plants does not work. Once the subsidies start, competitive investment stops.

And how do we know that? We have seen exactly this result in California which decided to move away from competition and towards this hybrid half in/half out model more than a decade ago. And now new investment only occurs with long-term contracts from utilities and their captive customers. This is not necessarily a bad thing that is just a policy decision California made.

In addition, a growing problem is that virtually all the

existing generation left over from the competitive era is barely covering its costs or is losing money, yet some of these resources are absolutely critical for keeping the lights on in specific locations, for example in the San Francisco Bay Area. If one of these remaining competitive units suffers a major mechanical breakdown, it is unclear whether any investment would make sense without a guaranteed long-term payment from the utilities or the customers just to bring the unit back.

So the lesson learned from California is that half in/half out of competitive electricity markets doesn't work. Once the subsidies and bailouts really take hold it kills the competitive part. Investment dries up and long-term ratepayer guarantees are required to fund any new infrastructure or even to maintain existing infrastructure. Subsidies beget subsidies would beget more subsidies. So this is exactly what we are concerned about happening in the eastern market if we do not address the targeted subsidy issue now.

The good news is that both PJM and ISO in New England are actively engaged on these issues and have developed innovative proposals that are intended to allow a state to meet its public policy goals, but act as a firewall to protect the integrity of the wholesale competitive market. Both proposals have significant promise and may well result in workable solutions.

So let me just wrap up by reiterating that competitive

wholesale markets have produced phenomenal results for benefits for consumers. On the one hand, investment is up and reliability is up. On the other hand, prices are down and emissions rates are down. So these achievements, however, are in jeopardy due to the desire to subsidize or bail out certain generation units.

The half in/half out competitive market model is unsustainable if you move towards the hybrid, so a coordinated effort is needed between all the states, FERC, and system operators to develop solutions that allows the states to pursue their public policy goals but is done in a way that allows the impact of that to be firewalled off from the rest of the wholesale market. Thank you.

[The prepared statement of Steven Schleimer follows:]

**********INSERT 8**********

The Chairman. Thank you.

Next, we are joined by Jackson Reasor, CEO of Old Dominion Electric. Thank you and welcome.

STATEMENT OF JACKSON REASOR

Mr. Reasor. Chairman Upton, Ranking Member Rush, and members of the Energy Subcommittee, my name is Jack Reasor. I am president and CEO of Old Dominion Electric Cooperative in Glen Allen, Virginia. Old Dominion is pleased that the Energy Subcommittee is holding this hearing and that we have been invited to present our perspective as a wholesale market participant. And I must say, Mr. Chairman, I am very proud and pleased to find myself literally in the center of this presentation.

Old Dominion is a not-for-profit power electric cooperative that owns and operates electric generation facilities to provide capacity and energy to 11 electric distribution cooperatives throughout Virginia, Maryland, and Delaware. Old Dominion's members provide retail service to end-use consumers and as a result Old Dominion has an obligation to serve its consumer owners.

All of Old Dominion's members are located within the PJM interconnection. In addition, Old Dominion is a network transmission customer of PJM as well as a PJM transmission owner. As mentioned earlier, we have an obligation to serve our consumer members. That means we have to ensure there is enough electricity to meet their current and future needs. As a participant in PJM, we also have to pay PJM for our share of PJM's cost in

procuring capacity to ensure that there is enough electricity to satisfy their future energy needs. Unfortunately, our experience with PJM's capacity procurement policies has been mixed at best, and let me explain why.

PJM originally established that we could satisfy the obligation to procure capacity by building generation sources or using bilateral contracts to obtain capacity at competitive market prices. In other words, we could self-supply the capacity obligation. If additional capacity was needed, PJM would procure that capacity and allocate the cost to us and the other members and participants within PJM.

The self-supply, the first option in the PJM procured capacity second option, worked well for us. Unfortunately, PJM changed the rules and FERC approved the changes. Now our self-supplied capacity might fail to satisfy PJM's capacity market requirements. As a result, we might be required to obtain all of our capacity from PJM and pay those associated costs. We could be forced to pay twice for capacity, the significant investments and costs associated with our self-supplied capacity, plus our share of PJM's capacity costs. We believe that federal policy should ensure that long-term investments in generation are honored and encouraged. Specifically, we should be allowed to self-supply the capacity procurement obligation as a first option and then turn to PJM's administered capacity

in energy markets as a second option. Federal policy should also focus on reliable wholesale service at just and reasonable rates to provide the right price signals needed for new generation resource development. It would be a mistake for PJM to artificially inflate capacity prices above competitive just and reasonable levels. In addition, federal policies should foster stability in market designs. The change in PJM's administered capacity market from its original function as a second choice option, a residual market to a mandatory market that threatens our first choice option has introduced unnecessary uncertainty which makes long-term planning very difficult.

Finally, federal policy should ensure that choices of generation resources are encouraged. PJM's administered capacity market is not a substitute of the wholesale market where we can determine the amount, the kind, and the location of generation resources we need to meet our consumers' and customers' needs.

Nothing in the law prevents FERC from adopting these needed federal policies. Therefore, at this time we do not believe there is a need for Congress to enact new legislation giving FERC additional authority or duties. However, the Energy and Commerce Committee should continue to use its oversight function and to monitor the manner in which the wholesale market operates.

Thank you, Mr. Chairman. I look forward to answering any

questions.

[The prepared statement of Jackson Reasor follows:]

**********INSERT 9**********

The Chairman. Thank you very much.

Tamara Linde, who is the exec VP and general counsel for Public Service Enterprise Group, Inc., thank you and welcome.

STATEMENT OF TAMARA LINDE

Ms. Linde. Good morning, Mr. Chairman and Ranking Member. Thank you for having me here and thank you to Congressman Pallone for the kind words. My name is Tamara Linde and I am executive vice president and general counsel for Public Service Enterprise Group, or PSEG.

Thank you for the opportunity to present PSEG's views on a critical issue facing the electric industry and, by extension, the nation's electricity customers. The issue is the urgent need to assure fuel diversity and resiliency in the nation's electric generation resource mix and to correct a flaw in the wholesale market design that is leading to premature retirement of nuclear baseload generation in our region.

Let me take a moment to describe PSEG. We are a large diversified energy company headquartered in New Jersey. We employ approximately 13,000 people and our New Jersey utility serves around 2.2 million electric customers and 1.8 million gas customers across the state. When people talk about an all-of-the-above energy portfolio, PSEG is that example.

Our generation fleet consists of nuclear, natural gas, coal, solar, and even some hydro. However, while most of our plants now operate in competitive markets, most were built as part of a state-regulated utility before wholesale markets were created.

Nuclear baseload is at risk because the wholesale market has a flaw and does not value fuel diversity. In fact, markets were never designed to value fuel diversity because they didn't need to.

Diversity in generation resources was the status quo when markets were initially designed. The market was designed to drive to another important objective which is to deliver the lowest cost resource needed to meet demand. For years, while different fuel costs were roughly comparable, markets could drive towards the lowest cost without sacrificing fuel security and diversity. Now the shale gas revolution has brought opportunity, but it has also revealed this serious market design flaw.

Today, after more than 30 years of operation, the 3,500 megawatt Salem and Hope Creek Nuclear Generating Stations in New Jersey turned a dramatic corner last year and they failed to earn enough to cover their cost of capital. While we have not announced their closure, we have made it clear that they are on an unsustainable path.

Absent a change or intervention, these baseload resources will permanently close. In fact, the timeframe for many at-risk plants is so short that states are moving forward to address the problem before it is too late. We believe that it is our duty to have honest discussions with leadership in New Jersey to ensure that the stakes are clearly understood and that the state is given

an opportunity to take action if it chooses to.

We believe that state action may be critical if these resources are to survive. We believe that these actions can be done in a way that does not undermine the integrity of the wholesale market and can serve as a bridge until a regional or federal solution takes hold. Ultimately, we do see potential for a market solution. Fuel diversity has a value and the loss of fuel diversity has a cost. This needs to be factored into the wholesale design.

Mr. Chairman, this committee has presided over many fights within the electric industry over which fuel is better, which fuel is subsidized, and which business or regulatory model is best. We understand that you must look beyond winners and losers in the industry and focus on customers, communities, and the nation as a whole.

These closures will impact the reliability and resiliency of our electric system, our economy, our competitiveness, our environment, and even our national security. Nuclear energy contributes 10 billion in federal taxes and 2.2 billion in state taxes each year. Our global leadership on nuclear energy drives the adoption of U.S. nuclear safety and security standards across the world. A vibrant American nuclear industry supports the nuclear supply chain and provides the workforce necessary for the defense nuclear industry.

On a more basic level, it is never a good idea to have all of your eggs in one basket. That is true for retirement savings and it is equally true for the life-giving electric supply our customers depend on. In the past few years, our region has seen a polar vortex, Superstorm Sandy, a derecho, an earthquake, and a freak October snowstorm. Add to this the prospect for a physical or cyber intrusion or a fuel supply interruption and it is clear that the customer interest is better served by not being overly reliant on one fuel source.

Again I want to thank the Subcommittee for inviting me today, and I will be happy to answer any questions.

[The prepared statement of Tamara Linde follows:]

**********INSERT 10**********

The Chairman. Thank you.

Next, Kenneth Schisler, VP of Regulatory and Government Affairs from EnerNOC, welcome.

STATEMENT OF KENNETH D. SCHISLER

Mr. Schisler. Thank you, Mr. Chairman and members of the committee, for this opportunity to testify. My employer, EnerNOC, is an incredible American innovation success story. We were among a small group of technology startups right after the turn of the century that pioneered digital applications in U.S. electricity markets, and these innovations today are in commercial operation and are indeed a vital part of the American economy.

We do several innovative things at EnerNOC, but today I am here to talk about our primary business line and that is known as Demand Response. Demand Response is a homegrown American technology. It is an innovation that found success here first and has quickly spread throughout the developed and developing world.

The purpose of Demand Response is to engage customers, users, and users of electricity to manage consumption of electricity at critical periods when the electricity grid is under stress, to serve as a balancing resource on the grid, or to respond to signals when prices are high. Demand Response empowers energy users to become more flexible with their consumption and to monetize that flexibility providing grid services.

Companies like EnerNOC are known as aggregators. We

aggregate the Demand Response capability of thousands of customers and manage them as a portfolio of resources in order to participate in electricity markets. Demand Response resources are dispatchable in a manner similar to traditional generation resources that receive and respond to dispatch signals from utilities and grid operators. In fact, most often Demand Response is actually treated on the supply side of the market, which sounds a bit like a non sequitur but it does work.

We operate in several FERC jurisdictional markets in the U.S. as well as several programs under the jurisdiction of state utility regulators. Demand Response enjoys broad bipartisan support. In fact, Chairman Kelliher seated at the end of the table, as chairman of FERC, the seminal order that enabled this latent capability of customers to improve the power grid through Demand Response and his legacy was carried forward by his successor Chairman Wellinghoff.

Demand Response is a win-win. It is unequivocally a win-win for the U.S. economy. We contribute to the U.S. energy resource diversity and security supply. It gives system operators one additional useful tool to reliably operate the nation's electricity grid, the users of electricity. Demand Response has been credited as helping to prevent major grid emergencies, many major grid emergencies in recent years including many of those my colleague acknowledged, the polar vortex, wildfires in

California, and many other.

Customers who participate in Demand Response receive compensation for participation. We pay customers from the market revenues that we receive by bidding their resources again in this portfolio into the wholesale markets. These customer payments of course bring down their total cost of energy which makes them more competitive in the U.S. and global economy.

Demand Response is a domestic energy resource, by definition, supporting energy independence. Our fuel source, if you will, is leveraging the flexibility of our customers to manage their demand for the benefit of the grid. Demand Response receives no subsidies, no special tax treatment under the federal tax code. It does not negatively impact the federal budget and does not require any subsidies from states or ratepayers in order to participate because it is cost effective on its own.

Demand Response improves efficiency of the grid and brings down energy costs for all consumers. In fact, in the PJM region Demand Response participation reduced wholesale market costs by nearly $10 billion in the current delivery year alone, and this is according to a report prepared by the PJM Independent Market Monitor. These benefits are going to increase as new technologies such as energy storage are increasingly adopted as part of a Demand Response strategy. From a federal policy standpoint, the only prerequisite for Demand Response to thrive

is to have nondiscriminatory, open access in wholesale electricity markets and that those markets remain competitive without pricing distortions. We have come a long way in open access, in part thanks to Chairman Kelliher's order. We still have some progress to make.

As far as healthy competitive markets, we are pleased that FERC has recently sought comments on how to maintain competitive markets while respecting the rights of states to create their own energy policies. It is vital that we get this right.

In conclusion, Demand Response is a homegrown U.S. technology. Companies like EnerNOC have revolutionized and created tremendous value in U.S. energy markets and we are now exporting that technology all over the world. Our only ask here today is that you continue to recognize Demand Response and its importance to the national energy strategy. Thank you.

[The prepared statement of Kenneth D. Schisler follows:]

**********INSERT 11**********

The Chairman. Thank you.

Last, we are joined by Mr. Glenn, senior VP of State and Federal Regulatory Legal Support for Duke Energy, and I welcome and nice to see you.

STATEMENT OF ALEX GLENN

Mr. Glenn. As owners and operators of wind farms in Massachusetts, Rhode Island, Pennsylvania, Kansas, Oklahoma, Wisconsin, Wyoming, Colorado, Texas, solar farms in California, Arizona, Texas, North Carolina, Florida and New Jersey, and battery storage projects in Ohio and one of the nation's largest in Texas with one of our wind farms and in addition to integrated electric utilities across seven states, we touch customers across the country every single day.

So to give you a context, Duke Energy is one of the largest energy holding companies in the United States. We have about $130 billion in assets and we reinvest in our communities $10 billion a year, annually, on our electric grid and our gas infrastructure, and we provide service to electric and gas customers that represent roughly about nine percent of the nation's population.

So I would like to use my time today to talk about actions that will greatly benefit our customers, unleash innovation, and spur economic growth. Specifically, I want to address permitting, renewables policy, cybersecurity, and then too on FERC nominations and tax reform.

Duke Energy plans to invest about $35 billion in addition to that $10 billion a year, $35 billion a year over the next 10

years to modernize our system. This transition is underpinned in part by natural gas infrastructure, much of which requires federal permitting. Too often we see overlapping and conflicting regulatory requirements which result in higher costs to our customers.

Bottom line, most permitting regulations impose no timeframes within which an agency has to act. And without a reasonable what I call a shot clock for decisions, delays put many vital projects at risk of completion. So just as our energy system needs to be modernized, so too do our policies. They need to be modernized to reflect today's markets and encourage innovation.

As a Representative mentioned, the pace of change is increasing and so is that complexity, but our regulatory paradigm isn't. An example of this is PURPA. Today, renewable energy is booming, the cost of renewable energy technologies have dropped, and independent power producers are prolific and well financed. Many PURPA contracts though are significantly above the market cost of power and that is costing our customers money, so updating PURPA to reflect current market and technology needs will enable utilities to serve our customers at a lower cost.

Cyber, so hand in hand with critical infrastructure investment is the need to protect it. Protecting our infrastructure from cyberattacks is a top priority of Duke Energy.

The electric industry is the only industry, critical infrastructure, with mandatory enforceable cybersecurity standards. So Congress could aid our efforts, amending the SAFETY Act to expressly include cyberattacks so that in the event of such an attack we can focus on what we need to do, right, which is get the lights back on and get our economies back running.

Now we can make policy but we also need regulators to implement that policy, so that is where FERC nominations come in. As members of this committee are well aware, FERC has been without a quorum since February which has prevented action on crucial energy infrastructure projects. The President has now nominated three candidates, two of whom are awaiting votes before the full Senate and Duke Energy would urge this committee to do whatever it can to encourage your Senate colleagues to take up these nominees as quickly as possible so that a quorum can be established.

Finally, tax reform, although I understand tax reform falls outside the jurisdiction of this committee I mention it because you all have a deep understanding and are experts in our business and you understand that our industry is unique. Our rates and our returns on capital are set and regulated by state regulators. So because our electricity bills reflect our cost of service, including after-tax cost of capital, we need to preserve interest deductibility.

So our industry, as a number of the members have mentioned here today and our panelists have said, is undergoing remarkable transformation. We at Duke Energy stand ready to meet those challenges and those opportunities to power our economy to improve the quality of lives of the customers that we serve every day. Thank you.

[The prepared statement of Alex Glenn follows:]

**********INSERT 12**********

The Chairman. Well, thank you all. And at this point we will reach our 5 minutes of Q & A by members of the committee. Thank you very much for your testimony, and I would like to hit a couple of things in my 5 minutes if I can. One is to talk briefly about baseload closures, we see a lot of that all across the country, but I first want to just focus a little bit on the cybersecurity.

You know, as we visit different installations, whether they be in our districts or states or even around the country, often we are hearing that the internet connections of each of those facilities is independent as not, you know, it is hard to penetrate. It is not attached to a larger network. Yet at the same time, we read and we have had some briefings particularly about state-sponsored attacks that are trying to get in, whether it is a water system, whether it is a utility, recently some nuclear facilities in the last couple weeks.

What is it that we can do to make sure that in fact that does not happen? What additional tools do we need to put into the toolbox, whether it be FERC, whether it be, you know, the Homeland Security and others, to make sure that in fact that does not happen?

And Mr. Glenn, you referenced that just briefly in your testimony, but give us some ideas on where we need to proceed, knowing -- and I don't know if you have looked at our bill H.R.

3050, Enhancing State Energy Security Planning and Emergency Preparedness, but that is moving with strong bipartisan support. It came through this committee and will be on the floor very soon.

Mr. Glenn. Thank you, Mr. Chairman. And thank you for that bill. I think that is a very, very good start. And I think there is a couple of things. One is, we are the only industry with mandatory enforceable standards, so FERC and NERC, a delegation of FERC, has specifically prescribed standards that we must meet. How we meet those standards is a defense-in-depth way of meeting that.

So there is a couple things. One is, I think, streamlining the process by which our background checks for some of our employees can be done so that we can work more closely with other government agencies and heads of those agencies. I think that would be one thing that we could do that would be supportive. And we would be happy to work offline on certain other things that I think we can do.

The Chairman. I just want to assure you -- other ideas, other members of the panel, are there additional steps that we should take? It is important that we get a quorum on FERC. I think we have all been frustrated with the lack of the quorum. I hope the Senate acts before they adjourn for sure before their August break.

Let me talk a little bit about the baseload closures. So again we see this. In Michigan we have got a number of coal facilities that are beyond their use and they announced that they were closing. We have got issues on nuclear facilities around the country and for different reasons. We know that natural gas, we know that reliable, renewable energy costs have come down dramatically.

In a number of states like Michigan have actually imposed a new standard in terms of a minimum requirement and it is a good thing for all of us that support all of the above. But it does take a while to get that replacement piece on, whether it is a new gas facility or whatever it might be. We all care about diversity, but at the bottom line of course is, I think every one of you mentioned, the cost to the consumer of that kilowatt that goes to their home and to their business.

So how do we balance all of that in terms of looking at the future and the 21st century energy needs that we have? Ms. Linde, you talked a little bit about that and it seems like New Jersey has done a really good job.

Ms. Linde. Well, thank you. Fuel diversity is really important and we are concerned that at the wholesale market level the market design did not take that into consideration. So we do see that as something that needs to be addressed, but we recognize it can't be addressed quickly.

So we have states as was commented on by several of the other panelists that have nuclear plants that are suffering that are taking action and doing so as a bridge to a federal solution, it is important that we don't lose assets that have a long life ahead of them and that are providing a low-cost energy to our customers every day.

And I comment on that it is low cost because it is important to realize that while nuclear plants are suffering financially because they are not being fully valued in the market, we believe it would be more expensive for our customers in New Jersey if they were to be retired and replaced with something else. So we believe it is less expensive for customers to keep these nuclear plants in operation and to keep them through the rest of their permit life, which goes on quite far into the future.

Our three nuclear plants in New Jersey have licenses that go out until 2046, and each of the three plants have different license terms but they have long lives ahead of them and they are important for fuel diversity and important for the cost of energy in the state of New Jersey.

The Chairman. My time is expired, but let me, just a quick comment, maybe Mr. Schleimer and then Mr. Kelliher and then we will move on.

Mr. Schleimer. Just really quickly, not necessarily sure I agree that the nuclear plants aren't being fully valued. PJM

went through a process to revamp its capacity market to value reliability even more than it had been previously.

But putting that aside, I think we generally do agree that to the extent that there are issues like fuel diversity or other attributes like ramp rates and start-up times and shutdown times, et cetera that aren't being valued, that that is something perfectly fine and acceptable and great for PJM and FERC and the other markets to look at, you know, expanding what the value of the different services are.

The Chairman. Mr. Kelliher?

Mr. Kelliher. Just very quick. I mean we are really not at a point where we are losing diversity. I agree that the competitive markets are not designed to achieve diversity, but they have achieved it inadvertently almost. With the competitive markets focused completely on efficiency and cost that has resulted in the retirement of the uneconomic units, but in their place has come in very modern, advanced natural gas facilities, solar, and wind. And that result is we have more diversity in our electricity supply today than ever before, so there is not really a diversity crisis that we need to act on.

And the concept of baseload is becoming less useful over time. It used to be baseload unit was a unit that was cheaper to run. It also tended to have, it was operationally inflexible. But the principle characteristic, it was cheaper than everything

else so you ran that first. That has switched. It used to be that coal was cheaper than natural gas. That is no longer the case. That is why gas is displacing coal.

It is not policy, it is just this -- it used to be that the most inefficient coal plant could produce electricity cheaper than the most efficient natural gas facility, but the fuel prices have switched to the point where that doesn't happen and it probably won't ever be restored.

The Chairman. Thank you. The chair would recognize the ranking member of the subcommittee, Mr. Rush.

Mr. Rush. Well, thank you, Mr. Chairman.

Ms. Linde, there are many energy consumers who believe that climate change is real and must be addressed and that includes the overwhelming majority of respected scientists and climatologists, the majority of the American people, and the leaders of every country in the world except Nicaragua, Syria, and our own illustrious President, Mr. Trump.

To address this issue especially in absence of federal action, many states have developed renewable energy portfolios, including Illinois, as I mentioned in my earlier statement, with the objective of reducing carbon emissions. In your opinion, would states like Illinois and others who have the objective of reducing carbon emissions be able to hit their targets without nuclear power, and why is it important that nuclear plants be

valued appropriately as safe, reliable, zero-carbon sources of energy?

Ms. Linde. Thank you. And you bring up another very important attribute of nuclear power. Nuclear power does not emit carbon and it is air emission free, so it is very important for an environmental policy considering reducing carbon or not increasing the amount of carbon.

I want to comment on something that Joe Kelliher said. We do have different opinions on the urgency of this situation, and Illinois is one of those states who saw the urgency and the need to take action so nuclear plants wouldn't shut down. In New Jersey, our nuclear plants that operate in New Jersey are a large percentage of the energy supply. If they shut down we will most likely move to predominantly natural gas as the single fuel source with some limited renewables.

New Jersey like Illinois has a renewable portfolio standard and has made significant steps to increase renewables in the state, and my company has been developing a lot of solar in the state as well. And we believe that is important. The important message I want to leave with you today is that these nuclear plants play a role in fuel diversity, they play an important role in keeping prices down, and they play an important environmental role and they need to be maintained for the future and they are at risk.

Mr. Rush. Diversity, how important is fuel diversity in ensuring a reliable and resilient grid?

Ms. Linde. I could comment on that. NERC issued a study this year that highlighted the importance of fuel diversity to a resilient grid. I think that report that was issued, I believe, in March of this year, does spell out the importance of fuel diversity to resiliency and the ability of a system, an electric grid system, to respond to a variety of different situations whether weather or physical or cyberattacks.

So we think that fuel diversity as NERC indicated is critical to resiliency and long-term reliability.

Mr. Rush. Mr. Schisler, I only have a few more seconds here, but in your written testimony you state that from a federal policy viewpoint the only prerequisite for Demand Response to thrive is to have nondiscriminatory, open access in wholesale electricity market and that those markets remain competitive without pricing distortions.

Moving forward, are you confident that FERC will enact policies that will maintain competitive markets while respecting the rights of states to create their own energy policy?

Mr. Schisler. When the FERC gets a quorum we will hope that that will be the case. I do know that the RTOs and ISOs that you will be hearing from next week are taking this issue very seriously. We certainly don't want to stand in the way of states

enacting their own energy policies, creating their own energy destiny, but market participants like EnerNOC, like independent power producers, rely upon market revenues and those prices are very important to sending long-term investment signals and that is why they have to be -- having fair, competitive wholesale markets have to be sacrosanct. So, you know, FERC has enjoyed a long history, regardless of leadership, of trying to trend toward making wholesale markets more competitive and I certainly hope that will continue, but that really does need to be the guiding principle.

The Chairman. Thank you.

Mr. Olson?

Mr. Olson. I thank the chair for holding this important hearing and welcome to our seven witnesses. It should be no surprise to anybody in this room, but my home state of Texas rode down a different trail in terms of our electric grid. Ninety percent is fully competitive run by a group called ERCOT. Two cities, San Antonio and Austin, control their local grids. The Panhandle of West Texas and East Texas has their grids. They are interlocked.

As like other states, our source of power changing rapidly, we are shifting from coal power to natural gas power fairly quickly. We have two nuclear reactors, nuclear sites, no more coming. That is it. We are number one for wind, number one in

America with a rapidly growing solar industry. My question is for you, Mr. Schleimer of Calpine. Your company has operations all across the country, many of those in Texas. As you mentioned in your opening statement, you said of ERCOT saying they are, quote, phenomenal, end quote. What does that mean and why is that such -- and could our markets learn from the Texas example? Could they be phenomenal as well?

Mr. Schleimer. Thank you, Mr. Vice Chairman.

So yeah, Texas indeed did choose a different path. They have almost completely gone complete competition on both the wholesale and the retail side. And, you know, I would say that you know so far the distinguishing characteristic that you find in Texas versus some of the other markets is so far there hasn't been as much temptation to intervene in the competitive markets.

And so in fact over the last 5 or 6 years or so you have seen 14- or 15,000 megawatts of new resource being built, both natural gas but a tremendous amount of renewable resources. And those renewable resources actually were not done under long-term contracts with utilities, but really based on confidence in the market.

You know, we do have some concerns about the structure of the ERCOT market just like some of the -- you know, it is very different. You know, the U.S. regional markets each have their own concerns associated with them because of different policy

drivers and dynamics and all that. But, you know, I would say so far, you know, Texas is, you know, their market remains probably the most competitive market with confidence in the rules going forward.

Mr. Olson. And how do investment decisions in markets like ERCOT that are competitive or like the Mid-Atlantic differ from those in more traditional regions? Could you build, a company build a new power plant in Texas with the same sorts of return on investment like they can in Georgia, for example, any competition issues there?

Mr. Schleimer. So a company like ours really builds off of, you know, what the future market looks like and what our expectations of the future market looks like. So in regions where there is a known set of rules and we are confident in the set of rules and, you know, we can look out, obviously we are going to be wrong about what the future looks like, but at least we have, you know, forecastable future, we will make competitive investment decisions, you know, if we think we have a fair shot of getting our money back.

In other regions of the country that haven't deregulated or are still vertically integrated where the utilities still dominate, we will only make those investments over with the long-term contract or with the long-term ratepayer guarantee.

Mr. Olson. Thank you.

Ms. McAlister, ma'am, a new source of energy like wind and solar only means something if we can get those to market. In Texas we have what is called competitive renewable energy zones, CREZ zones, to get resources all across the state. As plants continue to close and energy sources shift, new lines will be needed.

Can you share thoughts about the state of new transmission construction? Is the process working? Is it transparent enough? Are there bureaucratic roadblocks? What improvements can be made?

Ms. McAlister. I can speak to the PJM area where most of our customers are sited and where we have most of our resources. And I think that FERC has orders in place, Order 890, that allow it to provide infrastructure through an open and transparent process and we think that PJM is doing a pretty good job with the long-term transmission planning for those lines that are needed for reliability.

But what we are very concerned about is a different category of transmission and that is called supplemental transmission. Those are projects that are not needed for reliability and essentially the transmission owners make those calls whether those lines are needed or not and they really don't have the same transparency and open process as what the baseline transmission projects have. And so I think probably the best way to balance

grid reliability is to make sure that the transmission process whether it is for baseline or supplemental is for it to be open and transparent and for those Order 890 obligations to apply to all types of transmission projects.

Mr. Olson. Thank you. And on behalf of the best team in baseball, the best record, the Houston Astros, I yield back.

The Chairman. Just wait, the Tigers are on a roll.

The chair would recognize the gentleman from California, Mr. McNerney.

Mr. McNerney. Yeah, what about basketball? At any rate, gentlemen.

Ms. Linde, do you believe that the RTOs and ISOs could charge a carbon adder and dispatch in order to adapt to state carbon reduction policies?

Ms. Linde. I want to make sure I understand your question. Do I think they should or --

Mr. McNerney. Could they do that successfully, what effect would it have on the market?

Ms. Linde. I think the answer is it depends. If the price that is added to the market for the carbon adder is an appropriate price, then yes, it would make a significant difference and it would enable both renewable generation and nuclear generation, their environmental attributes to be valued in the market.

I caution, however, though, it is important that the details

are appropriate because we have something else in the region of East Coast where it is called the Regional Greenhouse Gas Initiative and it was an effort by a group of states to add a carbon value and it was too low of a carbon value.

And in New Jersey we have a gubernatorial election coming up this year and both candidates have said that they will rejoin RGGI. And I want to be clear to explain that that will not be enough to address the nuclear challenge because the price on carbon is just far too low.

Mr. McNerney. Thank you.

Mr. Glenn, how would increased transmission benefit both clean energy development and customers, and what are the biggest challenges to increasing transmission?

Mr. Glenn. The biggest challenges that we face in increasing transmission is the siting, frankly, and that can be at a state level. Also if we look at other projects across the nation that go through several states, the permitting process, the eminent domain process, those are our biggest challenges in getting projects on time, on budget, and getting renewable energy resources that have low, very, very low energy costs to markets in which we serve.

Mr. McNerney. So in your opinion that would benefit the customers and the market to have increased transmission?

Mr. Glenn. Yes.

Mr. McNerney. Thank you.

Mr. Schisler, you know, I have been to a distributed generation facility and it is a very interesting process. There is a boom in distributed energy resources, renewables, policies of the Demand Response be brought up, and these are coming up pretty quickly.

Do you believe that the states have been able to make policies looking toward long-term effects or have they had to be more reactive? In other words, are states implementing policies proactively or are they being reactive to this technology?

Mr. Schisler. I think it has come so quick that they have had, they are forced to be more reactive. The changing landscape is almost occurring almost at a geometric rate when you look at the cost of storage has come down, the cost of renewables has come down. We are seeing vehicle-to-grid technologies and what is that going to do? Have we reached peak demand?

Utilities face a degree of radical uncertainty in their planning paradigm that they have never had to encounter throughout the history of distributed electricity service. And I don't know that any utility or any state commission has really wrapped their arms around what does integrated resource planning look like in the future. There is a lot to do in terms of thinking about how do we actually embrace the opportunity with these new technologies while addressing this radical uncertainty and still delivering

safe, affordable, clean energy to consumers.

Mr. McNerney. I agree.

Mr. Schleimer, I believe that you recommended a firewall between subsidized and nonsubsidized generation. Is that the correct interpretation?

Mr. Schleimer. Yes, sir.

Mr. McNerney. So could you describe what that firewall means? What would that look like?

Mr. Schleimer. Sure. And there is a lot of different variations of this, but it basically boils down to running the capacity market two times. You run the capacity market once for competitive generators that are not receiving subsidies and that is basically the price that they get and so it retains the competitive market price and aspect to it, then you run the capacity market again and the subsidized units or the units that are getting out of market contracts get the prices out of that second run.

And so, you know, instead of the subsidization deteriorating prices for the entire market, you know, you are basically keeping the competitive market prices as they were assuming you didn't have the subsidization coming in. And like I said, there is a handful of different variations of that but that is the basic structure.

Mr. McNerney. Thank you, Mr. Chairman.

The Chairman. Mr. Walden?

Mr. Walden. Thank you very much, Mr. Chairman. And thanks again to our panelists and to the members for participating in this important hearing.

There seems to be some consensus among all the energy stakeholders that the electricity industry is undergoing a period of significant transformation, I don't think anybody denies that. And if just quickly we could go one end to the other, from your individual perspectives what do you think are the main drivers of that change that are transforming the industry? What are the main drivers just in a -- is this consumers? Is it consumer demand, is it state laws, what is it that is from your perspective driving it?

Mr. Kelliher. Low natural gas prices, lower than expected demand for electricity, and the sharply declining cost of renewables both wind and solar.

Mr. Walden. All right.

Ms. McAlister. I would agree it is basic market forces with the low natural gas, but I think it is also consumers demanding more and wanting different choices in their supply needs.

Mr. Schleimer. I would agree with that list, cheap gas and wind and solar prices coming down. But I would also add that a significant driver is cheap money. I mean there is a lot of private investment occurring in the mid-Atlantic and the

Northeast and elsewhere just because, you know, borrowing money is cheap and investors are looking for a place to put their dollars.

Mr. Walden. Get a return. Yes, all right.

Mr. Reasor. Technology.

Mr. Walden. Expand on that.

Mr. Reasor. What is brought as lower gas prices, technology, changes in the technologies of how we get that gas.

Mr. Walden. Fracking.

Mr. Reasor. So I would suggest technology has had the largest impact and going forward in at least the foreseeable future new technologies will continue to have the greatest impact.

Mr. Walden. All right.

Ms. Linde. It is a very good question. And the most significant impacts that I see are from technology impacting the ability to get lower cost gas and that exposing the design flaw that I commented on in the wholesale market and also states. States are really driving towards policies that are encouraging and enabling investment in renewables and without that I don't think we would see the level of renewable investment that we have at least in my area of the country.

Mr. Walden. Okay. All right.

Mr. Schisler. I would say technology. Technology has created an unprecedented democratization of the grid by users

of electricity. They can now use energy in different ways and interact with electricity markets and interact with electricity suppliers in ways that were not possible even a decade ago and that is going to continue.

Mr. Walden. All right.

Mr. Glenn. June 19th, 2007, the introduction of the iPhone. That has completely changed our business and our business model. Customers want convenience, choice, and control over how they use and how they reduce our energy. I completely agree with Mr. Schisler. That combined with energy storage are the two things that have transformed our industry.

Mr. Walden. All right, thank you.

Mr. Kelliher, you testified that competition has been good for consumers as the markets have delivered benefits in the form of lower prices. And while competition in the electricity markets always intended to weed out high cost or inefficient generators, we now have states favoring policies that would potentially retain older, less economically competitive generation for a number of different reasons such as zero-emission benefits, job retention, tax base preservation. So were the wholesale electricity markets, were they ever intended to incorporate these state and local policies, can they and should they? And then I have one other question if we have time.

Mr. Kelliher. To me, sir?

Mr. Walden. Yes.

Mr. Kelliher. They don't and some critics of competition policy fault them for not delivering things they were never intended to deliver, which I think is a little unfair. But your other question is, well, can they? That is what RTOs are looking at right now and FERC is looking at right now. Is there a way to accommodate, accept state public policy choices with minimal harm to the markets?

And harm to the markets is going to occur either in the form of suppressed prices or the exit of economic generation in lieu of uneconomic generation, so I think there is no way to completely protect the market. It is either going to hurt price or force the retirement of economic units.

Mr. Walden. Well, and as you know, I think it is next week, Mr. Chairman, you are going to have the hearing on RTOs and ISOs and look at all of that side of this as well. Our goal is to make sure we stay ahead of the dynamic changes in the electricity market so that the grid works, so you get electricity where you need it when you need it. And obviously we have security issues that we will get into here and other places, but adequacy is a big part of that and the time to build out to make sure we have got the ability to transmit the power where we need it is something this committee is very concerned about as well.

My time has expired, Mr. Chairman. Thank you again. And

to our panelists, thank you very much for your participation.

The Chairman. Thank you.

Mr. Peters?

Mr. Peters. Thank you, Mr. Chairman. I want to follow up on the Chairman's questions. But before I let it get away, Ms. Linde, what was the price that RGGI charged that you said was too low?

Ms. Linde. I am not sure if I have it right here, but it is in the -- oh, it is $2.67 per ton of carbon.

Mr. Peters. Okay, thank you.

Ms. Linde. As compared to much higher numbers that are --

Mr. Peters. 30-40 is other. So my question had to do of just putting aside some very important issues for the minute which is cybersecurity, which we talked about, putting aside the pricing in the markets, we have seen a phenomenon of this distributed generation. You say it is sometimes driven by consumers who want solar panels on their rooves, sometimes it is driven by state policies. I am concerned. What I hear about is that that creates an issue for delivering electricity, to making sure that when you turn on the lights from a systemic -- systems point of view that they will come on.

And Mr. Schisler, I think you said something like we haven't started planning for that. What would that plan look like? What kind of concerns would you like to raise for us to consider as

we see these technologies get deployed?

Mr. Schisler. So I think we are talking about two slightly different things. One is sort of a long-term planning paradigm, where do we need to transition and what transmission resources and what types of resources are we going to need? Are we going to need ramping resources or baseload, how much of it? That is more of a long view question that regulators have to face.

It is a fact that we know more today, both grid operators and distribution utilities today know what is happening downstream at the grid than they ever have in the past. We have better outage management response times. We have better information at what is happening at customer sites. And that is, I think that is where there has been innovation on that side. Not just innovation on the consumer side, it has been innovation on the utility side that has made the grid more resilient and I think some of the investments that made in recent years in grid resiliency in response to some of the storms have helped do that.

But ultimately I think there is like a real-time component to managing real-time operations and then there is the long-term view.

Mr. Peters. Is that something that the private sector -- anyone can answer this -- the private sector is going to handle or is that something that governments need to be involved in?

Mr. Schisler. Clearly, the real-time operations, I

believe, is largely a utility function. So it is the distribution utility and it is the wholesale market and that is a regulated function.

Mr. Peters. Anyone else have a comment on that?

Mr. Glenn. Congressman, Alex Glenn. Just to piggyback on what Mr. Schisler said, I think, two things. One is, as we invest that $35 billion in the grid it is going to make it smarter. It is going to deploy new technologies, but it is also going to use data analytics. So the last four people that we have hired at our company have been Ph.D.s in data analytics.

And I think those two things combined are going to help significantly the business that Mr. Schisler is in as well as the ability of customers and the ability of distributed generation to propagate across our systems in a way that is smartly done. And that is going to be the critical aspect of that.

Mr. Peters. And I think it has got to be a partnership. So we, in San Diego, I think STG needs that 40 percent renewable now, and I don't -- that is obviously not rooftop, but that is pretty good. But I think that now there is a clamoring among consumers to do more rooftop and community choice aggregation and all these things. We can't get so far out in front of it that we are not talking to the utilities about making sure that the grid is reliable from a supply standpoint.

And so maybe, Ms. Linde, if you had a question or a comment

on that I think it is really important to have that conversation and to be in partnership.

Ms. Linde. Thank you. And I agree with Mr. Schisler that Demand Response is a really critical component of our overall system. We want customers to respond to the cost and not use power and identify what price they are willing to not use the power. But when customers want power, when their rooftop solar is not working because the sun is out, the utilities are the ones who have to able to meet that demand. And it is not just having enough as far as numbers, it is having the right mix, the right mix that can respond at the right time in the right combination. And the NERC report that came out this March addresses that and it identifies all of the different characteristics of different types of supply and how they work together. And it is important that we have experts and transmission planners and generation planners looking at making sure that when the flip, you know, someone flips the switch and they want their power that the right mix is standing behind it and ready and able to respond.

Mr. Peters. Right. We want to do that in my perspective in a way that moves us towards renewables, but we have to do that together.

So thank you, Mr. Chairman.

The Chairman. Mr. Shimkus?

Mr. Shimkus. Thank you, Mr. Chairman. It is great to have the panel. I think the bigger question now is do we get to the process of rewriting the Federal Power Act, really, last codified in 1935. We had testimony last year that said well, it was so vague that FERC was able to run and help create these regional markets.

And isn't the constitutional debate of what is interstate commerce and if you excite an electron and it is going across state boundaries that caused the question even maybe the federal regulation of the interstate commerce, which would be the transmission portion, and states' involvement is still in the distribution.

So I think that is the bigger question, because we are trying to -- and I am not afraid to be involved in that debate, because as was quoted by Mr. Schisler, we have democratized this electricity use to the individual. And the iPhone was, Mr. Glenn, you used the iPhone as an example. So, and Joe was here when we did competition, when we used to have state regulated markets and we moved to the regions.

But I want to spend my time -- and the RTOs will be here next week, but the people who have complaints about the RTOs will not be here next week. And so I really want to focus on two comments that are really the same, Mr. Reasor and Ms. McAlister, on -- Mr. Reasor, you have a beef with PJM and you are wholly

contained, okay, you are the rural cooperative, a different model evolved over time and some would say obviously it is a not-for-profit entity.

So briefly can you say, what is your beef? Because then I am going to go to Ms. McAlister, who her -- at least Illinois Municipal Electric Association has a beef because they are in two RTOs which causes problems. So first of all, what beef do you have with PJM because you are wholly contained, and then I am going to move to Ms. McAlister to explain the separation.

Mr. Reasor. Thank you, Congressman. Our big issue is the ability and having the first option that we can self-supply.

Mr. Shimkus. And you said that about 15 times in your opening statement.

Mr. Reasor. I did. I hope you remember that.

Mr. Shimkus. So what do you mean by self-supply?

Mr. Reasor. We are a load serving entity. That is what makes us a little bit different than some other parties.

Mr. Shimkus. So you are owners and the Federal Power Act gives you the authority, in fact it is in the statute that you can self-supply.

Mr. Reasor. Basically that is what we would argue.

Mr. Shimkus. Under 217(b).

Mr. Reasor. That is correct. Because we are a load serving entity we have an obligation to meet the needs of the consumers

that own us, which we would suggest, I realize it is a different model, but we would suggest is the ideal model of a nonprofit entity that the consumer owns and that is where they get their electricity.

We should have the opportunity to self-supply that load to --

Mr. Shimkus. You should have the opportunity, it is in the statute.

Mr. Reasor. Well, but PJM in the way that --

Mr. Shimkus. Well, that is my point.

Mr. Reasor. Yes. And as you said, I have a little bit of a beef with PJM. However, I would say to you that when PJM started their first option for us to meet their capacity obligations, which are legitimate, was that we could look first to our self-supply.

Mr. Shimkus. Okay, let me go to Ms. McAlister. I am running out of time. Because I hope, we haven't scheduled this out but I hope you know where I am going with this question.

Ms. McAlister. I think I do. And thank you for the question and just a quick point. We are also into RTOs and we also serve load in non-RTO areas, so we have kind of got the whole scheme of things. So we have got the same kind of beef that Old Dominion has and, really, the crux of the problem from our perspective is that the capacity market and PJM over time has evolved and

become overly complex.

It also reduces the amount of resources, the types of resources that can participate because they no longer meet the definition of a capacity resource and it is has just become so unduly complicated that it makes long-term planning for entities like us very difficult. And we are at risk with what is called the minimum offer price rule which is essentially a floor price that is administratively set by PJM that makes --

Mr. Shimkus. And let me hold you because my time is running out and I want to get this point out --

Ms. McAlister. Yes.

Mr. Shimkus. -- is that so in Illinois we have PJM and we have MISO. Most of our generation is in the south from our Illinois municipal or even our co-ops. They should by federal law be able to provide to part of their ownership up to the PJM. But because of these regions, they have -- part of that load is sold to PJM who sells it back into their market at a premium versus the original clearing price in MISO, which means that those people who are owners of the generation can't get the real price of the generation.

And I think that needs to be looked at and I yield back, thank you.

Ms. McAlister. Do I get to respond?

The Chairman. The gentleman's time has expired.

Mr. Green?

Mr. Green. Thank you, Mr. Chairman. I want to welcome our panel and thank the chair and the ranking member for calling it.

I was just kind of reminiscing because I have been on the Energy Subcommittee and I look back in 2001 and '02 when we had so many different problems that are -- in the day we have some problems that we can actually deal with, back then it was almost intractable. But again coming from Texas we don't want anybody messing with us and we will fix our own problems through our regulatory commission. So we have a different problem today, obviously availability and cost and that is affecting everyone.

Mr. Kelliher, you touched on how significant changes in the breakdown of our nation's electricity markets have led to questions about the driving force behind the retirement of certain types of electricity generation, market fundamentals or policy on the state or federal level. You stated the preponderance of the evidence suggests that market factors are the primary driving force behind the retirement of uneconomic generation methods.

Can you elaborate on the evidence you reference when stating that the market forces rather than a regulatory process has been the primary driving force behind the retirement, and again both your experience on this committee as a staff member but also in the industry.

Mr. Kelliher. Let me address the -- there have been

arguments from time to time that negative pricing by wind is causing retirements of nuclear and coal plants, and there is pretty, I think very persuasive evidence that that is not true. There is PJM analysis that shows that first of all, negative pricing is when you bid below zero, but wind projects do bid negative from time to time, so do nuclear plants, so do hydro projects. So negative pricing is not something that is particular to wind projects.

But if you look at, well, when does negative pricing by wind projects set the market price in one of the RTOs, PJM analysis shows that it occurs 0.1 percent of the time, so that is 1 hour out of every 1,000 hours. I think it is hard to say that therefore that wind is the villain.

Mr. Green. Right, they are not driving the train.

Mr. Kelliher. Right. And then even in Texas, your state of Texas where there is much more wind penetration in Texas than in PJM, negative pricing by wind projects in Texas occurs less than one percent of ours. So I think that shows that federal policies that encourage wind development are not causing those retirements.

And then many of the -- and then the coal plant retirements, that is driven by in most cases just pure cost factors. As I said earlier, an uneconomic, an inefficient coal project used to be able to deliver power cheaper than the most efficient gas

project. Those fuels have reversed themselves and now efficient gas projects will always be able to produce cheaper than even more efficient coal projects. So I think coal retirements are really driven primarily by economics not by environmental regulation. There are some that environmental regulation has been the tipping point where the cost of complying with new requirements, arguably, is the tipping point for some coal projects.

Mr. Green. Thank you.

Mr. Chairman, well, again I have welcomed Calpine to Texas over the last 15 or 20 years, and I joked at one ribbon cutting for a cogen facility in our district and said, when are you going to change your name to Texpine because so much of your investments are in Texas? But I appreciate you being part of our market -- my Californians love that.

I am pleased that you discussed committed method of the energy market in Texas spurring increased investment and renewal in natural gas resources. You mentioned how these investments not only lead to lower prices for consumers but also increase in the electrical system reliability and decrease emission rates.

And let me point out in your statement where you talk about the Texas market, over the last 5 years electricity prices declined by over 13 percent in Texas and historic lows. Emissions are down also. Between 2010 and '16, the emissions per million

kilowatt CO2s were down five percent, NOx emission and CO2, SO2 emissions were down. NOx was down 24 percent and SO2 were down 40 percent.

I can't remember in my history of being an elected official, whether it be in the Texas in the legislature or here, I have seen that kind of result in the electricity market. Can you share any other information outside of what your testimony was?

Mr. Schleimer. Well, I mean that has really been driven by, you know, like we talked about earlier, the low gas price environment and a tremendous amount of investment that has been spurred in the Texas market in both highly efficient natural gas-fired combined cycles as well as, you know, as you know there is a tremendous amount of wind in West Texas and that has largely displaced a lot of the coal and, you know, old steam facilities that the utilities used. I mean those coal plants in Texas, a lot of them are in financial difficulties now as a result of the change-out in the technologies.

Mr. Green. Well, Mr. Chairman, thank you for calling the hearing. Again, thank all our witnesses, because again it is good for us to look at where we are at today as compared to where we were 5, 10, even 15, 20 years ago. Thank you.

The Chairman. The chair would recognize in perfect segue the gentleman from Texas, Mr. Barton.

Mr. Barton. Thank you, Mr. Chairman, and I will be brief.

I have to go to a lunch meeting.

This is an important hearing, but I don't think it will make the front pages. There is a probably a better probability of the latest Trump tweet being on the front page tomorrow than anything we discover here.

But this is an important hearing, Mr. Chairman, because of a small thing called reliability. I will tell you what reliability is. I want out to my car this morning to attend Chairman Walden's breakfast meeting with the subcommittee co-chairman, subcommittee chairman. When I turned the key nothing happened. I had no reliability. As it turns out my alternator had conked out. It worked yesterday, but it didn't work this morning. By the same token, when the people that are putting this hearing together, the staff getting ready for the hearing, when they came in this morning they turned the switch, the lights came on.

Our electric grid has got about 100 percent reliability. But that is not a given that it will always be so, and as we retire more and more plants and more and more of our generation is from renewables, there is nothing wrong with renewables except sometimes the wind doesn't blow and of course sometimes there is no sunshine. Water power is pretty much there all the time.

So we need to really think about better ways to continue to maintain and if possible improve reliability. One of the ideas

that has been circulating is this idea of using artificial intelligence. Of course I know most people think that is what the Congress has is artificial intelligence, but this is a different definition.

So I would like the panel to comment on if they think that this concept of artificial intelligence can be used to more predict where the demand is going to be and help allocate the supply to the demand so that we maintain as close as possibly 100 percent reliability, so any comments from anybody about artificial intelligence used in the electricity grid? It is not a trick question.

Mr. Glenn. Congressman Barton, this is Alex Glenn from Duke Energy. I think that is going to be your next significant plateau then in technology improvements.

Mr. Barton. So you think it can be used?

Mr. Glenn. I think it can be used and I think it ultimately will be used, the question is how and when. And I think what you are going to see is baby steps to look at it. And you might see it in call centers first, so that there is artificial intelligence in all of our call centers, and you may see that ramped up in different aspects.

Mr. Barton. Is your company working on --

Mr. Glenn. We are working on that now to do that. So I think as you see technology and the pace and rapidity of that

technology improvements you are going to see that continue to be more ubiquitous as the years progress.

Mr. Barton. That is a nice word, ubiquitous. I will look that up. Sounds good though.

Yes, ma'am?

Ms. Linde. I would also add at PSEG we are constantly adding new technology to a variety of our facilities, generation facilities, to project what piece of equipment in that generation facility might have a fault. We just actually upgraded some of our technology to have more predictive information, because the lights need to be on when people flip the switch. So our focus is making sure that our facilities, there are no surprises.

Also in understanding the transmission system, there is greater and greater intelligence being added to the transmission system to tell us information before it becomes a problem. And I agree with Mr. Glenn that I think we are going to be seeing more and more of this and utilities are paying attention. The industry is paying attention to this. We also have to manage cost, so it is a balance between adding the right amount of technology but not doing it in a way that burdens customers if there is not a tremendous value. So it constantly has to be weighed to make sure we are putting the right intelligence into the --

Mr. Barton. My time is about to expire. Is there anybody

that doesn't think artificial intelligence is an option as we try to maintain reliability?

Mr. Reasor. Congressman, I would just say that I am not going to say it isn't. I think it is important for these reasons that have been stated to help us better understand where the needs are and the equipment and technology. But remember, the old non-artificial intelligence tells you that for good reliability you have to have the generation and you have to have the transmission to get it there.

The artificial intelligence maybe can tell us where it is lacking and maybe can tell us what equipment is failing, but it doesn't generate electricity. And ultimately for real reliability, true reliability you have to have the generation and you have to have the transmission to get it there.

Mr. Barton. I eat a lot of health food but I also eat a lot of meat and potatoes, so I understand. With that I yield back, Mr. Chairman.

Mr. Olson. [Presiding.] The gentleman yields back. The chair calls upon the gentlelady from Florida, Ms. Castor, for 5 minutes.

Ms. Castor. Thank you, Mr. Chairman. And thank you to all the witnesses that are here today. Congress doesn't do a very good job thinking decades ahead and planning ahead, it is always the next budget battle or the next bill on the horizon.

But coming from Florida, I am very attuned to the rising costs for consumers and all of us due to the changing climate, a/c bills and flood insurance, and Mr. Glenn knows in our neck of the woods, beach renourishment to keep our tourism economy going, what we have to do with property taxes to retrofit a lot of water and waste water infrastructure, property insurance.

So it seems to me we have reached a point where the old business model of selling electricity needs some updating and some places in the country are doing that better than others. The old business model was sell as much power and generate as much as possible to make your profit build plants and there are incentives for that.

But that doesn't really match up with what we need to do to promote a better mix. Yes, the baseload and reliability are fundamental, but we have got to do a better job in planning for the future and incentivizing the demand response, energy efficiency, conservation, and the transition to renewables.

Tell me what is working best out there across the country when it comes to those kind of incentives for you all, what you all believe can be the answer. Now realizing that we have had a change and the Clean Power Plan isn't going to be pushing everyone in all of the states, but what is working? What are the best incentives for our utilities to help us with the future?

Ms. McAlister. Thank you for the question. I think largely

what you are talking about the shifts in resources are really being driven by consumer demand. And part of what we think would be a good incentive is allowing those resources to actually participate in the market without restrictions and be on par with some of the other types of supply, so that --

Ms. Castor. What do you mean?

Ms. McAlister. Well, for example, in the PJM capacity construct it has become more rigid and it has become less flexible and it doesn't incorporate some of the renewables because they can't operate 24/7 the way that some of the old coal-fired units can participate.

Ms. Castor. Is there a particular state or region in the country that is doing that better than others? Is there something specific you can point to?

Ms. McAlister. I know at AMP in the Midwest we are at 21 percent renewable resources, which for a Midwest utility is rather high, and that is because we are responsive to the consumer demands. We are a member --

Ms. Castor. Is it consumer demand or has the states set energy efficiency goals, conservation goals, or renewable goals?

Ms. McAlister. For us it is not the state because we are not regulated by the states, we are locally regulated. So it is the consumer driving the demand.

Ms. Castor. Mr. Peters and I were comparing notes. What

did you say the San Diego area or -- what is it?

Mr. Peters. 40.

Ms. Castor. With renewable, based on renewable power. And what is the state of California?

Mr. Peters. 33.

Ms. Castor. 33. And that is because -- will you be my witness, because the state has set those goals.

Mr. Peters. Well, certainly it is partly because the state has set renewable goals and it is partly because I think the consumers are clamoring for it as well.

Mr. Schisler. I would say one thing that is working well is many states -- California, Texas, and actually there is too many probably to list now -- are doing a good job of getting customer data to customers through their smart grid investments and that is empowering customers and opening up newer and more efficient ways to use energy. So that is one example of what is working well and should be replicated elsewhere.

Ms. Castor. I guess there was some discussion of cell phones earlier, and this, the Millennial generation they are ready, and I do hear too the consumers are clamoring for more control now. Person-to-person maybe that doesn't make a dent, but you empower consumers and work with your industrial users over time and use technology and it kind of highlights the need for greater infrastructure investment if we could ever get the Congress in

a bipartisan way to move on to energy or to infrastructure investments.

And I know, Mr. Glenn, you talked about this. We have got to make sure that energy resiliency and that we do an infrastructure bill it isn't just the bricks and mortar for transportation. It is very important, but it has got to be our energy future to help us control the costs that I see on the horizon decades ahead.

So thank you, Mr. Chairman. I have run out of time, I yield back.

Mr. Olson. The gentlelady yields back. The chair calls upon the gentleman from West Virginia, Mr. McKinley, for 5 minutes.

Mr. McKinley. Thank you, Mr. Chairman.

When we put two issues on the table, both the grid reliability and the greenhouse gases and climate change or all those combined, it is hard to extract good policy, good public policy and how we might be able to address that because there are consequences involved with those decisions and how that works out.

For me in West Virginia it is different than it is in California or Texas or elsewhere, is we have seen the impact of the regulatory impact over the last 8 years. Example, in West Virginia we used to have just in 2008, in 2008, we had the second lowest utility bills in the country for industrial consumption,

now we are 26th because our coal-fired power plants many of them were shut down or they were required to upgrade their facilities to such a level.

Now in conjunction with that at that same time, we had the seventh best rate of unemployment in the country, now West Virginia is 49th. So there are consequences to these. We have got to understand when we debate these issues we are all sensitive that there are consequences with it. And I don't understand yet, I have not been able to find a good response back for the coal miners across this country, but particularly in West Virginia, what did they do to cause this? Why is it they are losing their jobs? Why are there bankruptcies involving them? We have got to be more sensitive to the individuals when we set policy here that they are going to lose their jobs.

So Ms. Linde, if I could ask you a question. If we leveled the playing field and got rid of these tax subsidies that sweep all across our utilities could the traditional baseload power generators be better able to compete?

Ms. Linde. Thank you. The PSEG is not, certainly is not encouraging the extension of those credits, but I also want to be clear that the existence of those credits are not what is causing our nuclear plants to be at risk. It is an aggravating factor perhaps but certainly not the main driver. The main driver is that there are fuel diversity and there are environmental

attributes which some people also value are not being valued right now in the marketplace.

Mr. McKinley. And that is why I wanted to get to that point, because my next is you mentioned that several times, your main driver. So my question to you would be, you talked about the main driver or the economic stress on base plants and you mentioned nuclear in particular, because I think that is a solid baseload provider as is coal, is that the market fails to adequately value and compensate baseload.

Ms. Linde. It does. There is --

Mr. McKinley. So shouldn't we do something about that? Shouldn't we -- again, my next -- is in the market value, reliability, and resiliency, but we are not.

Ms. Linde. We are not currently in the competitive marketplace. And it is not because there is an intention not to do it, it is just the market wasn't designed to do it. And we are pointing that out that -- and for policy makers to make decisions. And we are pointing it out to you today, and we hope that the policy direction given to FERC is that fuel diversity and resiliency is important and we hope that that direction will cause changes and fill that gap in the market. But we are also pointing it out to New Jersey, because states have an important role here. Some states like Illinois and New York have already taken action. They are not waiting because once these

plants shut down they are gone forever. They are closed permanently, and we don't think that is good public policy.

So our ask is to recognize that these plants without a change either from the state or the federal government or some change in the price of natural gas which is certainly outside all of our control, that without some change these plants, we will see a shutdown, a continued and regular shutdown of these plants until it is too late and we shouldn't let that happen without deciding that we want --

Mr. McKinley. And if I could, rather than allow this to go back up to 30,000 feet, what are specifics? Can you provide me or this committee some specifics of how we might be able to address the reliability and value that in our cost base?

Ms. Linde. Absolutely. And we can do that separately outside of this committee, but FERC has been looking at this issue. The DOE as was commented before is working on a report. I think both of those places, FERC through their proceeding and the DOE through their report, those are vehicles to identify fuel diversity and resiliency as an important public policy because it is a choice that is going to be made.

Mr. McKinley. Thank you. I yield back my time.

Mr. Olson. The gentleman's time has expired. The chair calls upon the gentleman from New York, Mr. Tonko, for 5 minutes.

Mr. Tonko. Thank you, Mr. Chair. There has been some talk

about that diversity that assists the whole equation here. And while I am sure there are differing views on how it should be done, do witnesses agree that it is important to maintain a diverse fuel supply for the sake of reliability? Maybe go across the board starting to our left here.

Mr. Kelliher. In general, yes, but we have diversity now not because it was a goal, it is a byproduct of building the next increment of supply is looking for the technology that is lowest cost at the time and these tend to be long-lived facilities, so it is not as if in 1960 we had a certain electricity supply pie we planned to. I would say in general, yes.

Mr. Tonko. Okay.

Mr. Kelliher. In general, yes.

Mr. Tonko. If we would just go across the board and just give us a specific yes or no. Thank you.

Ms. McAlister. Yes. Grid reliability is crucial and fuel diversity is one aspect of that.

Mr. Tonko. Okay.

Mr. Schleimer. I would agree with that that fuel diversity is crucial but it is not single dimensional. You also need to -- you can't say one fuel, you looked at one fuel versus another and it is more fuel diverse. You have to look at flexibility, startup times, shutdown times, ability to integrate renewables, so there is eight or nine dimensions to fuel diversity, but

absolutely.

Mr. Tonko. Okay.

Mr. Reasor. Diversity is always good. You just have to be careful that you start regulating and controlling diversity and create winners and losers. That is a very risky slope to go down.

Mr. Tonko. Ms. Linde?

Ms. Linde. I think you know my answer that fuel diversity is important.

Mr. Tonko. We heard you.

Ms. Linde. And it can be a public policy without creating winners and losers. A fuel diversity doesn't mean nuclear for everyone. In some places nuclear doesn't exist. In New Jersey, fuel diversity means nuclear continues at least for the life of the licenses that they have.

Mr. Tonko. Thank you.

Mr. Schisler?

Mr. Schisler. Of course fuel diversity is good, but I do worry that we go down a path of sort of central planning and picking winners and losers which is ultimately going to lead to inefficiency. So fuel diversity is good, but I think we need to use market forces to achieve it as far as possible.

Mr. Tonko. Okay.

And Mr. Glenn?

Mr. Glenn. Yes.

Mr. Tonko. Okay, thank you very much.

Ms. McAlister, do you believe the RTO operated markets have provided the proper signals for a diverse array of electricity resources?

Ms. McAlister. I do not. That is really not what they were designed for as we have talked about a number of times. They were really designed for least-cost dispatch and that is what they are achieving, but they are not providing incentives for diverse fuel sources.

Mr. Tonko. And again across the board, what would the reaction be to that about the RTOs?

Mr. Kelliher. They were not designed to achieve a certain level of fuel diversity, no.

Mr. Tonko. Mr. Schleimer?

Mr. Schleimer. PJM actually looked at fuel diversity in a report they released a couple months ago and they found that fuel diversity, I think Mr. Kelliher referred to this already, is actually increasing in PJM, not decreasing.

Mr. Tonko. Thank you.

Mr. Reasor?

Mr. Reasor. Again that wasn't their design.

Ms. Linde. Yes, I agree. It was not their design.

Mr. Schisler. It was not their primary design, no.

Mr. Tonko. And Mr. Glenn?

Mr. Glenn. Yes.

Mr. Tonko. Okay. And obviously state policy decisions can affect the fuel supply. Should state policies seek to promote or maintain fuel diversity anyone?

Mr. Glenn. Yes.

Mr. Tonko. Ms. Linde or Mr. Glenn?

Mr. Glenn. Yeah, just to put it in perspective, one dollar for MMBTU increase in the price of natural gas for our customers in Florida will increase a fuel bill by $200 million. So if you think about that, fuel diversity and overall diversity in your generation planning is critically important.

Mr. Tonko. And Ms. Linde, I believe you wanted to respond?

Ms. Linde. Yes. I do believe that states have a role in fuel diversity. Ideally, it should be handled on a regional or a federal basis because electricity markets are interconnected, but states have a legitimate role and the courts have been supporting that.

Mr. Tonko. Should the states give preference to reach environmental goals?

Ms. Linde. Our view at PSEG is that it depends on the state. States, that is a local issue. Some states have renewable portfolio standards, others do not, and it is up to the constituents in those states to decide what they believe is most

important. Ultimately, we have to do what is right for the customers and for our nation, and a state is going to respect what their customers and their citizens want.

Mr. Tonko. I believe my time is up, so Mr. Chair, I yield back.

Mr. Olson. The gentleman's time has expired. The chairman calls upon the gentleman from the Commonwealth of Virginia, Mr. Griffith, for 5 minutes.

Mr. Griffith. Thank you very much. I appreciate the chairman from Texas recognizing Virginia and do appreciate being with you all. I apologize that I have been in another committee hearing for part of the time, so I apologize in advance if I go over some previous territory.

I will say based on the opening statements and so forth that I recognize that we need fuel diversity, but I also recognize that I have some differing opinions with some of the members of the panel because while market forces certainly have played a role, the regulatory scheme in relationship to whether or not a utility continues to use an existing, or what was then an existing, coal-fired power plant has clearly been affected by regulation as well.

And some of those, because of the cost to their ratepayers, would have continued to use some of those coal-fired power plants for some time in the future if -- and I believe it will be a low-cost

natural gas supply for a number of years in the future -- as they went to replace those facilities they would have replaced them probably with some mixture including a higher amount of natural gas, but it was artificially moved forward, in my opinion, by regulation. So I do disagree there.

I do think though that we should let the market work it out, trying to keep a diversity including coal because coal still accounts for 30 percent of our power source and that if we eliminated subsidies in the marketplace for all of the different potentials that coal would be in a much better position to play a role in that marketplace.

Okay, so I got all that off my chest and I do believe that coal is going to need to be important when we look at high usage periods, because you may be able to build a lot of pipelines but you can't build enough pipelines to handle all the aspects of a polar vortex. And yet you can put coal in the back 40 and have it there ready to go in cases of emergency and when things don't work out quite the way, which is why in the eastern part of Virginia they just allowed two coal-fired power plants to fire back up because they haven't gotten the other supply there yet and they have got a transmission problem, so we are going to have to go back to coal in a place where it had already been eliminated.

So that being said, let me move on. I am going to call you Senator Reasor because that is how I knew you originally. It

is good to see you. We talked earlier today. But Mr. Reasor and I, Senator Reasor and I served at one point in time in our past in the Virginia legislature, he in the Senate and I in the House. It is good to have you here today.

Having missed some of it, I have got a question for you but I am also going to give you an opportunity right now, is there anything that you haven't had an opportunity to speak on that you desire to speak on here today?

Mr. Reasor. I think I am good, Congressman.

Mr. Griffith. All right.

Mr. Reasor. I appreciate the opportunity.

Mr. Griffith. All right, so my question deals with procuring capacity is necessary for a healthy wholesale market. As a PJM member, I understand you may be unable to self-supply the capacity that is required. Is this true and how would you resolve the situation? And I am really curious how the self-supply issue got turned on its head. But you can talk about that some more.

Mr. Reasor. Thank you, Congressman, for the opportunity and you are exactly right. And I would go back to basically just saying this. PJM under their original structure did allow utilities like us who are load serving entities to have the opportunity to first look to our self-supply, and then if there was not enough capacity within PJM they would obtain that capacity

and we would pay those costs as members of PJM. That worked fine. We liked that situation, we thought it worked well.

We are not sure -- well, we have some ideas as to why the changes were made because other parties and participants within PJM saw the markets differently and wanted to kind of move the system around a little bit and so they convinced PJM that they should maybe do away with the idea of looking first to self-supply, but look first to the capacity markets that PJM instituted.

Now I will say that after a period of time we were able to reach a compromise and they made some exceptions to that rule that did allow us to look first to our self-supply and as long as that was in place that worked, but the courts have now said that may not be exactly because of a FERC ruling the way it will be allowed, so we are a little concerned about the future.

Mr. Griffith. And would I be correct, and I am going to need a yes or no on this one because I am running out of time, but would I be correct if that makes it more difficult for you all to look for, say, investments in the coal fields where you might put a closed-loop hydro project inside of a coal mine that policy makes it more difficult for you to even consider that, doesn't it?

Mr. Reasor. It makes it more difficult for future planning and long-term planning and a facility like that would have to fit that category.

Mr. Griffith. I appreciate it.

Ms. McAlister, real quick. Public power utilities like the city of Salem and the town of Richlands are governed by their city councils. How is the role of these elected officials and local decision making respected within the capacity construct, and you have got 10 seconds. Oh, you can get a little more, got a little more.

Ms. McAlister. Thank you. I don't think it is in particular, because the construct as we have talked about was designed to do least-cost dispatch and it is not conducive with local decision making.

Mr. Griffith. I appreciate that.

And thank you for the extra time, Mr. Chairman, I yield back.

Mr. Olson. The gentleman's time has expired. The chair calls upon the gentleman from Ohio, Mr. Johnson, for 5 minutes.

Mr. Johnson. Well, thank you, Mr. Chairman.

And Ms. McAlister, thank you for being here today. As a public power producer owning generating units throughout my home state of Ohio and a few hydro sources as well along the Ohio River adjacent to my district, I have appreciated your thoughts and insights today.

In your testimony you state that we must not lose sight of improving our current price formation processes regarding transparency of operator decisions, modeling, all known

constraints, and more accurate price formation rules during periods of transmission congestion and volatile fuel prices. Can you elaborate just a little bit and explain what modeling all known constraints might entail?

Ms. McAlister. Thank you, Congressman Johnson. What we are really getting at there is that there actions that can be taken on the energy market and we have focused today on the capacity construct that we think needs a lot of work, but there is also work to be done on the energy market side of it. And FERC has been taking proactive actions to improve price formation through a series of technical conferences and we are very supportive of those actions and think that there is still more to be done as far as modeling and ensuring that during times of constraints we are getting the best least-cost energy.

Mr. Johnson. Okay, all right. You talked about churning of RTO rules. How frequent are these rules changed and what is the impact of this churning that you describe?

Ms. McAlister. Well, since 2010, in PJM there have been 27 significant changes that were filed at FERC that fundamentally have changed the nature of PJM's capacity construct. And the effect of those is that the construct has become increasingly complex and it also doesn't ensure transparent or stable prices and it makes long-term planning very difficult.

So we think that it is time to acknowledge the capacity

construct as designed might not be cutting it and we need to go back and do a comprehensive evaluation of whether we need to change.

Mr. Johnson. Okay, all right. Thank you, one more. You also mentioned in your testimony that new energy, and I quote, new energy products must also incentivize the retention of sufficient nonvariable resources to ensure load continues to be served at all times. Can you elaborate on this? What would that entail?

Ms. McAlister. Well, what we were talking about there is in PJM with the recent capacity performance changes the definition of what a capacity resource changed and in order to qualify as a capacity resource you have to be available 24/7/365. And what that does is it negatively impacts intermittent and renewable resources.

And so one idea that we have is through bilateral contracting it would value those resources on par with some of the other resources that do meet the capacity performance definition.

Mr. Johnson. Let me make sure I understood this. So you would say that alternative sources that are not necessarily available 24/7/365 would be evaluated on the same basis as other sources, or is it the opposite of that?

Ms. McAlister. No, no. Well, I think what we would do is if you allow bilateral contracting to have broader use then those

customers that value those attributes pay what they think it is worth. And then the other resources, for example, coal, the customers that value coal resources would pay through bilateral contracts the value of what they see coal being worth.

Not exactly on par, I mean they have different values. Some can't, if the wind isn't blowing it doesn't operate. So I am not saying that they are equivalent as resources, just that they should be allowed to be valued by the customers who want those particular attributes.

Mr. Johnson. Okay, all right.

Mr. Glenn, you mentioned most permitting regulations do not impose a timeframe for agency action. Can you elaborate on the reasonable shot clock for decisions that you mentioned in a project delay your company is facing?

Mr. Glenn. Thank you. To give you a little context, we had a hydro --

Mr. Johnson. You have about 25 seconds.

Mr. Glenn. We had a hydro relicensing matter. It started, we filed our application 2 years before the license was to be issued pursuant to the law. That was in 2005, I believe. 9 years later we receive that permit, so to me that is not a reasonable shot clock. It has to be something less than that and obviously it is a balance. But we need to have some type of deadlines imposed.

Mr. Johnson. Okay. All right, well, thank you.

Mr. Chairman, I yield back.

Mr. Walberg. [Presiding.] I thank the gentleman and now I am pleased to recognize the fully repaired and recuperating gentleman from Missouri, a man we respect and glad to have you back with us, Mr. Long.

Mr. Long. Thank you, Mr. Chairman.

And Mr. Glenn, you state in your testimony that the original principles and the needs-based application of PURPA have been overtaken by dramatic advances in the energy marketplace and many of the requirements of PURPA are unnecessary. Can you expand on why market changes have made much of PURPA unnecessary?

Mr. Glenn. Yes. As we look at it and I would use North Carolina as a good example of this, so when we look at 7 years ago, North Carolina had --

Mr. Long. You might want to stay on your mike. I know you can't see me through them, but it is fine. You are not missing much.

Mr. Glenn. So 7 years ago we had 20 megawatts of solar capacity in North Carolina. Today we have 2,000 megawatts and it is largely due to PURPA-mandated contracts that we have to take and pay for those contracts even though we may not need those resources. We have another 5,000 megawatts in the queue.

To put that in perspective that covers roughly

three-quarters to almost the entire square footage of Washington, D.C. with solar panels and that comes at a cost and that comes at a cost to our customers. And we currently believe right now that contracts that we signed not 2 or 3 years ago are out of the money and will be over the 10 to 15 years by about a billion dollars. That is a billion dollars that our customers are going to pay more than they otherwise would have.

Mr. Long. So that kind of explains my next question, how you tell these experience and operational challenges due to PURPA, correct?

Mr. Glenn. The operational challenges are significant and they are becoming more and more significant because there is no ground rules on where those utilities are placed. It placed it where the cheapest land may be and so our system wasn't designed to handle a significant concentration, for example, of PURPA solar contracts in one area of our state. That is starting to have operational impacts on the way our system can handle that type of influx that comes online just like that and goes away with cloud cover or a thunderstorm just like that.

Mr. Long. What are some of the recommendations for updating PURPA to reflect the changing marketplace you have?

Mr. Glenn. I think any updates to PURPA should be guided by, really, two principles and that is affordability to customers and reliability to the grid. And I think within that there are

ways in which I think PURPA could be amended that will get at and really be a benefit to all of our customers.

Mr. Long. Okay. You also highlight the need to address workforce readiness giving the changing industry and new investments and grid modernization. Can you discuss Duke Energy's efforts to close this workforce skills gap?

Mr. Glenn. Yes. Right now we have roughly 30 percent of our employee base is retirement-eligible and so we are going to need to replace that workforce and with the grid modernization investments that we are making that is going to require a whole new cadre of employees to come online.

So what we are doing in our various states in which we operate is working with community colleges, working with technical schools, and working with universities to turn out more relay technicians, more qualified people who can do this type of work, more engineers.

So this is, for example, in North Carolina alone, this is going to be a jobs driver of our $13 billion investments just in that state alone, about 14,000 jobs a year. And those are good wage, good quality jobs. And so we are working with the university systems all throughout and the high school systems to get a qualified good workforce who live and work in those communities.

Mr. Long. And so it is kind of a double whammy. You are

losing 30 percent, 30 percent of your people are retirement-eligible and you are going to add a whole new section to your company.

Mr. Glenn. So we have got to replenish the old and we have got to infuse it with new employees as well.

Mr. Long. And I appreciate your use of community colleges and such. I know they are very successful in my area. But what can you do to ensure workforce training programs reflect the changing industry needs?

Mr. Glenn. I think we have got to work hand in hand with our school systems, K-12 as well as high school as well as our community colleges in developing curriculums. And that is what we are doing, actually, in a lot of these community colleges is we develop curriculums. We find professors, so to speak, and we will donate money and resources, transformers, for example, that they can work on. So it needs to be hand in glove with, it is really a public-private partnership.

Mr. Long. Okay, thank you.

And I am out of time, Mr. Chairman. I yield back.

Mr. Walberg. I thank the gentleman and I recognize myself for my 5 minutes of questioning now.

I certainly appreciate the hearing, the context of the hearing today, and I would like to thank the panelists for what you brought to the table, literally, for us this morning.

Yesterday evening I saw a white paper by former FERC Commissioner Tony Clark that called for the reform of the outdated Public Utilities Regulatory Policies Act of 1978, otherwise known as PURPA, and I appreciate the gentleman from Missouri's questions on PURPA. It is an important issue I think we need to discuss today. I don't believe this committee has taken a comprehensive look at this policy since 2005, and I am very concerned about the negative impacts this law is having on Michigan ratepayers, my own included, and potentially on grid reliability.

Mr. Glenn, I appreciated your comments on PURPA and have a few questions for you as well. You stated in your testimony that PURPA's mandatory purchase obligation is directly increasing electricity prices for customers. Would you please elaborate further on this?

Mr. Glenn. Yes. As I responded to Congressman Long from Missouri, we are seeing in North Carolina alone about a billion dollar increase above what our customers otherwise would pay.

Mr. Walberg. A billion.

Mr. Glenn. A billion. And that is just in 2,000 megawatts of contracts that have been signed to date. There is another 5,000 megawatts of these contracts that are in the queue that have not yet been built or signed. So this we see as a growing issue and that is just one state in which we operate in.

Mr. Walberg. What are some other impacts PURPA mandatory

purchase obligation is having on utilities' ability to plan and deliver the lowest cost, reliable energy to America's electricity customers?

Mr. Glenn. What we are seeing now is an increase in what we believe we will continue to see in the future are some reliability issues. For example, next year we project with all of the PURPA contracts that are coming online in North Carolina, for example, that we are going to have to dump power generated by some of our nuclear plants to other consumers of power or we are going to have to ramp down a nuclear plant. And a nuclear plant is not made --

Mr. Walberg. To ramp down.

Mr. Glenn. -- to cycle and to ramp-run. And so those are significant reliability issues and a nuclear plant is our lowest cost operating plant for our customers.

Mr. Walberg. And this is because of outdated PURPA rules and standards?

Mr. Glenn. That is correct.

Mr. Walberg. Are traditional baseload resources such as nuclear energy that can operate 24/7 as you mentioned being undermined in any other ways? This is important to me. We have Fermi in my districts. We have Fermi 3 licensing already in place, a lot of uncertainty how we move forward.

Mr. Glenn. And it places, you know, the dispatch ability

of a nuclear plant that is a baseload that runs 24/7. So that has an adverse impact on our long-term ability to plan in how do we use and operate and maintain those resources.

Reliability and affordability and increasingly clean energy will always be our mission at our company and we will not compromise that at all. But we have to go in with open eyes at PURPA and really look at the facts and see what can be changed for the benefit of our customers.

Mr. Walberg. Along that line then let me ask you, I have heard that developers are taking advantage of PURPA to force you utilities to purchase increasing amounts of electricity from them more so than originally required by law, more specifically, the one-mile rule. Could you explain this and the impacts it is having on the utility industry, the one-mile rule?

Mr. Glenn. The one-mile rule what we are seeing is developers in some of their projects are gaming the system where you can place your systems just beyond one mile of each other to get under the PURPA requirements. So I think it would be well served for the committee to just review on a fact basis what does this look like and how might it be addressed in the future so that customers aren't paying more than they should otherwise.

Mr. Walberg. So the one-mile rule they are splitting up multiple parts of their grid responsibilities and capabilities to game the system?

Mr. Glenn. That is what it appears to be.

Mr. Walberg. Appears to be, yeah. Okay. Well, I appreciate that information. I would also, in lieu of the fact we are waiting for -- well, I would certainly yield to my friend from my own home district where I grew up in for additional question.

Mr. Rush. I want to thank you, Mr. Chairman.

Mr. Glenn, you said something that really kind of piqued my interest. Not that you said, but it is one thing. You were describing your job development approach at Duke Energy. Can you expound on that a little bit more and is that an approach that is shared by the industry in terms of utility companies, your approach in terms of job creation? I thought it was pretty invigorating.

Mr. Glenn. It is something that we have shared among our utility colleagues, but it is something that we have focused on in the last, particularly in the last 10 years as we have seen our workforce and the demographics of our workforce.

What we are also doing is, because we are in seven states in which we are vertically integrated electric utilities, our folks live and work and play and coach Little League in those communities and we want to represent and we want to be those communities and represent who they are and so that dictates how we hire as well.

And so we are very proud of the fact that we are -- and our last, 13 percent of our last new hires have been veterans, for example, and 30 percent have been women. In a traditionally male oriented industry, 30 percent of new hires is a phenomenal accomplishment, 31 percent minorities of all of our new hires through June of this year.

So we are taking a global approach not only K-12 and then in our community colleges with certain skill sectors, but we are making a concerted effort to try to broaden our pool of candidates who are coming in. And I think it helps that the energy industry right now is an incredibly dynamic and exciting place to be.

You know, maybe not everybody might think that but we hire people for careers and not jobs and then so that I think helps as well, so we are very proud of that fact.

Mr. Rush. I certainly want to commend you and do for this approach and I think that this approach probably should be duplicated across the industry. Thank you.

Thank you, Mr. Chairman.

Mr. Walberg. Reclaiming my time and I thank you. I thank the gentleman, and those are good points. These are good jobs we are talking about and they are worth affronting and getting people to understand that.

Now I am pleased to recognize the gentleman from Pennsylvania, the subcommittee chairman where I spent part of

my morning, I am glad that you have made it back here. I recognize you, Mr. Murphy, for 5 minutes.

Mr. Murphy. Thank you. Thank you, Mr. Chairman. I thank the panel and indulge me if I ask for some things you already answered. I have spent the last few hours delving into prescription drug costs and several organizations so we have to multitask and make these quantum leaps in our actions.

But I do want to ask about some jurisdictional boundaries. I was previously a state senator and so I am aware of a lot of things on those issues and also the wholesale and retail markets. But let's look at, do you think states and federal regulators are even on the same page sometimes, or are there some problems that occur when it comes to jurisdictional issues? Can anybody answer that for me, anybody have concerns?

Mr. Kelliher. I am happy to start.

Mr. Murphy. Thank you, Mr. Kelliher.

Mr. Kelliher. There is always some level of tension between federal and state electricity regulators and part from the structure of the industry and what the states and federal governments are regulating. It is different than, say, in the natural gas business where producers are not really regulated, the local gas utilities are regulated only by the states and then the pipelines are regulated only by FERC.

In the electric industry you have a lot of vertical

integration and parts of a vertical integrated utility's activities are regulated by the state, parts are regulated by FERC, and then the line is not clear. It is the point where there have been three Supreme Court decisions in the last 2 years trying to mark the line.

And this is, the core acts have been enacted in 1935, so since 1935 there is still not perfect clarity on the jurisdictional lines between the federal and state to the point where the Supreme Court had to parse through that three times.

Mr. Murphy. Do they share the same goals or are they different kind of goals when it even comes to such things as providing assistance to economically struggle generation, generating units? Do they have the same goals, federal, state?

Mr. Kelliher. They have different legal duties. I mean FERC regulates the wholesale power markets and its basic duty is to assure that prices are just and reasonable. Well, what does that mean? It means they have to be high enough to support continued investment in the generation that is needed to meet customers' needs but not so high that they reflect market power abuse.

But sometimes it can mean high prices. When natural gas prices were high, wholesale power prices were high. Those wholesale power prices weren't bad because they were driven by high natural gas prices. So the price can be high and still just

and reasonable, whereas the state utility it is charged with retail rates and in some cases states have maintained vertically integrated utilities. So you go through the classic cost of service regulation and what costs are prudent and not prudent.

In other cases, states have broken up their utilities and required them to divest so the utility is a pure wires entity and they are buying power, typically relying on some kind of RTO market and the state role there is different. The vertically integrated state role, they are involved in resource adequacy and what is the supply mix of each regulated utility.

A state role in a competitive market is different. It is, is there enough megawatts, is there enough capacity to meet their needs? So sometimes those duties clash, but I think many times they don't.

Mr. Murphy. Does anybody else want to weigh in on that issue? Yes, Ms. Linde?

Ms. Linde. I agree with the description that Mr. Kelliher provided about the legal structure, but to respond to your question about are their goals the same, I think the fundamental goals, from my experience, have been the same. The regulators that I deal with at the state level, and I have been at PSEG for 27 years so I have dealt with a lot of different regulators at the state level and at the federal level, their fundamental goal is to make sure that the power is there when needed and it is

a reasonable price. That is a very commonly shared goal among state regulators and federal regulators.

How to address different policy initiatives, sometimes there is a difference because there is a difference in timing on when the state has a particular initiative. We have seen a lot of states develop renewable portfolio standards to encourage development of renewables, and now we are seeing some states like New York and Illinois and some others take action to preserve baseload generating units.

The dialogue is occurring at the federal level and there is a dialogue about what is causing that premature retirement of baseload. PSEG believes that it is driven by a market flaw. And that dialogue needs to continue to occur because right now we have the federally regulated market that is not valuing fuel diversity and that lack of recognition of fuel diversity is causing a premature retirement of nuclear and some other baseload units and states reacting much more quickly in some cases as a bridge until the federal government and the federal regulators can solve that problem. So sometimes there are timing differences.

Mr. Murphy. I appreciate that.

Mr. Chairman, I reflect back on some of the fuel crises and energy crises we had in the 1970s and we were going to make all these great changes to the markets and we tried them for a while

and then dropped them suddenly.

So the issue of diversity is incredibly important because the sun sets, the wind dies. We lose coal plants. We can go for a surge for a while with natural gas and then we see prices go up in that and then companies say, okay, we have to raise the price now, but we also need natural gas to export for chemicals and lots of other things there.

So diversity is the way to go then to make the market more competitive, so thank you very much, Mr. Chairman.

Mr. Walberg. I thank the gentleman. Seeing there are no further members wishing to ask questions, I would like to thank our witnesses again for being here today and going through this process. You are very helpful to us.

In pursuant to committee rules, I remind members that they have 10 business days to submit additional questions for the record, and I ask that witnesses submit their response within 10 business days upon receipt of the questions.

Without objection, the Subcommittee stands adjourned.

[Whereupon, at 12:37 p.m., the Subcommittee was adjourned.]