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AMERICAN ENERGY SECURITY AND INNOVATION: THE ROLE OF REGULATORS AND GRID OPERATORS IN MEETING NATURAL GAS AND ELECTRIC COORDINATION CHALLENGES

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY AND POWER

OF THE

COMMITTEE ON ENERGY AND COMMERCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

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AMERICAN ENERGY SECURITY AND INNOVATION: THE ROLE OF REGULATORS AND GRID OPERATORS IN MEETING NATURAL GAS AND ELECTRIC COORDINATION CHALLENGES

TUESDAY, MARCH 19, 2013

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND POWER,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 10:04 a.m., in room 2322 of the Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Present: Representatives Whitfield, Scalise, Shimkus, Pitts, Terry, Burgess, Latta, Cassidy, Olson, Gardner, Pompeo, Griffith, Barton, Rush, McNerney, Tonko, Green, Barrow, Christensen, Dingell, and Waxman (ex officio).

Staff present: Nick Abraham, Legislative Clerk; Charlotte Baker, Press Secretary; Allison Busbee, Policy Coordinator, Energy & Power; Patrick Currier, Counsel, Energy & Power; Tom Hassenboehler, Chief Counsel, Energy & Power; Mary Neumayr, Senior Energy Counsel; Andrew Powaleny, Deputy Press Secretary; Chris Sarley, Policy Coordinator, Environment & Economy; Jeff Baran, Democratic Senior Counsel; Kristina Friedman, EPA Detailee; and Caitlin Haberman, Democratic Policy Analyst.

OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY

Mr. WHITFIELD. I would like to call the hearing to order this morning, and we certainly appreciate our witnesses that will be with us today. I think we have two panels and I will introduce the first panel in just a minute. But the title of today's hearing is "American Energy Security and Innovation: The Role of Regulators and Grid Operators in Meeting Natural Gas and Electric Coordination Challenges. And I noticed the clock says 20 until 10:00; it is actually 10 o'clock so that is why we are starting right now. But I want to welcome all of you here today.

As you know, EPA recently announced that they were going to delay the finalizing of the rule on greenhouse gas regulations of the nuke power plants, and I am delighted that they made that decision. I know that one of the reasons they are doing it is that they wanted to buttress their legal case. And we have many witnesses

that will be testifying today about the increased use of natural gas, which is coming about for a number of different reasons. One, of course, gas prices are very low right now, and the second reason is that the regulatory decisions coming out of EPA makes it extremely difficult to use coal. And if they do finalize that greenhouse gas regulation for new coal power plants, you will not be able to build a new coal power plant in America.

And those kinds of decisions, whether they are price decisions or regulatory decisions, have tremendous impact on the way we produce electricity in America. And it is certainly true that generating power from natural gas has many benefits, especially given that domestic supplies are increasing and our current prices are relatively low. But we are learning that there are some very real challenges to integrating more natural gas into the power sector.

We are pleased, as I said, to have an excellent slate of witnesses today who will discuss some of these challenges and describe for us how they are meeting them to ensure the continued supply of affordable and reliable electricity. At the heart of the issue is the fact that electricity is a 24-hour-a-day, 7-day-a-week, 365-day-a-year business with daily and hourly changes in supply and demand. This complexity poses challenges to grid owners and operators incorporating more natural gas-fired generation into their system. Greater coordination among the natural gas and electric industries is needed to ensure that these challenges can be met.

One challenge is there are certain physical constraints, such as whether current natural gas pipeline and storage infrastructure will be adequate to deliver increasing amounts of natural gas to power plants. But there also are market and regulatory challenges in some regions such as scheduling natural gas supplies to match up with electricity needs. Many of these challenges are state and regional issues as well as federal ones, which is why we will hear from those representing these levels of government today.

The challenges of heavier reliance on natural gas-fired generation have been highlighted by recent cold spells. Electricity demand goes up when the temperature goes down, but so does demand for natural gas to meet the heating needs of residential customers. As a result, regions with a high proportion of natural gas-fired generation see a dual burden on supplies during periods of unusually cold weather. We need to take steps to ensure that the lights stay on at an affordable rate through cold snaps, as well as other occasional but inevitable events that put a strain on the system.

America's newfound abundance of natural gas is a blessing and should play an important role in contributing to our energy needs. But we need to take steps to properly integrate, and I think the fact that FERC has had five technical hearings on these kinds of issues within the last year illustrates the importance of the issue, and I know they have more conferences scheduled on this as well.

[The prepared statement of Mr. Whitfield follows:]

PREPARED STATEMENT OF HON. ED WHITFIELD

Two weeks ago, we held a hearing exploring the importance of a diverse electricity generation portfolio, one that includes coal, natural gas, nuclear, and renewables. One of the lessons from our recent fuel diversity hearing is that we need to avoid an overreliance on any one source of fuel for electricity. In my view, natural gas

complements coal, but should not serve as a replacement for it. Today, we will focus on the biggest change in the generation mix in the U.S., which is the rapid growth in the use of natural gas to generate electricity.

I might add that the flip side of our discussion about the challenges of ramping up natural gas-fired generation is that coal has a number of advantages that have not been fully appreciated by this Administration. To take one example, having an extra supply of coal on hand to deal with any contingency is as simple as keeping a pile of it on site, a convenience that often seems to be taken for granted. Coal remains one of the lowest cost options for electricity generation and is the fastest growing energy source worldwide, yet we have allowed EPA to engage in regulations on coal-fired power plants without thinking through all of the consequences.

I do not think it's realistic to meet the electricity needs of America without the use of fossil fuels, nuclear power, and those fuels that provide our base load needs. And I hope that maintaining a future role for coal, including new, advanced coal-fired power plants, is also a part of today's discussion.

It is certainly true that generating power from natural gas has many benefits as well, especially given that domestic supplies are increasing and current prices are relatively low. But, we are learning that there are some very real challenges to integrating more natural gas into the power sector. We are pleased to have an excellent slate of witnesses today who will discuss some of these challenges and describe for us how they are meeting them to ensure the continued supply of affordable and reliable electricity.

At the heart of the issue is the fact that electricity is a 24 hours-a-day, 7 days-a-week, 365 days-a-year business with daily—and hourly—changes in supply and demand. This complexity poses challenges to grid owners and operators incorporating more natural gas-fired generation into their systems. Greater coordination among the natural gas and electric industries is needed to ensure that these challenges can be met.

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America's newfound abundance of natural gas is a blessing and should play an important role in contributing to our energy needs. But we need to take steps to properly integrate it into the electricity portfolio. I look forward to learning about the best ideas for doing so. Thank you.

Mr. WHITFIELD. So with that, I yield back the balance of my time and recognize the gentleman from Illinois, Mr. Rush, for a 5-minute opening statement.

OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. RUSH. I want to thank you, Mr. Chairman, for holding today's hearing which is part two on the diversification of the Nation's electricity supply, and we will focus on the role of regulators and grid operators in meeting natural gas and electric coordination challenges.

As we discussed in the first hearing on electric diversification, we know that in 1993 coal was responsible for 50 percent of the electric generation in the U.S. while natural gas accounted for less than 15 percent. However, the Energy Information Administration reports that in 2012 there was a shift in electricity generation

away from coal-fired generation, which declined by 12.5 percent and caused a cleaner source of electricity including natural gas, which increased by 21 percent.

In today's hearing, we will hear from federal and state regulators, as well as the electric grid operators about the challenges resulting from this shift to natural gas from coal-fired plants in electricity generation. We will also hear from two of the FERC commissioners on whether grid operators are prepared for reliability issues stemming from the power sector shift from coal to natural gas. And we will discuss solutions to better coordinate between the two industries through communication and scheduling alignments to make sure the grid operators have enough backup generating capacity when gas supplies are tight. Last August, FERC held five regional technical conferences where natural gas and electric interdependence issues such as better communications, infrastructure concerns, rules, and reliability issues were discussed.

I understand Commissioners Moeller and LaFleur also participated in a technical conference last month to discuss more regional and national issues as they relate to natural gas and electricity markets. While there were regional differences in regards to gas and electric coordination issues that was brought up in these conferences, work is now being done by regional grid operators to improve information-sharing among the grid operators, natural gas pipelines, and electricity generators.

I understand that another technical conference is scheduled for next month in April, where the discussion will focus on whether there is going to be more coordination between the natural gas and electric industry market schedules in order to achieve greater efficiency for both industries.

Mr. Chairman, it is important to note that this shift from older, dirtier, coal-fired plants to natural gas and supplying the Nation's electricity demand is due more to marketing realities than to EPA rules such as the Mercury and Air Toxics rules and a new source performance schedule.

According to CRS, "the primary impact of many of the rules will largely be on coal-fired plants more than 40 years old that have not, until now, installed state-of-the-art pollution control. Many of these plants are inefficient and are being replaced by more efficient combined-cycle natural gas plants, a development likely to be encouraged if the price of competing fuel, natural gas, continues to be low almost regardless of the EPA's rule."

So Mr. Chairman, I look forward to today's hearing. I look forward to today's witnesses on the challenges and opportunities of shifting from coal to natural gas in the Nation's electricity generation. I yield back.

Mr. WHITFIELD. Thank you, Mr. Rush. At this time I recognize the gentleman from Texas, Mr. Barton, for 5 minutes.

Mr. BARTON. Thank you, Mr. Chairman. I won't use that 5 minutes.

I want to take a little bit of my time to welcome a witness from the second panel, Mr. Barry Smitherman. He is the chairman of the Texas Railroad Commission. That is an elected position in Texas, and I was proud to vote for him this past November. You remember that when I come to you for favor later on. But he is

going to testify about what is happening in Texas. We are very proud of our home State that alternative energy, wind power, and nuclear power—if you want to consider nuclear as an alternative—is about 20 percent of our supply for electricity. We have about 50 percent that is generated by natural gas, which is the main focus of your hearing today, Mr. Chairman.

And the rest of the country is beginning to come to where Texas has always been, you know, large on natural gas. But we also have about 30 percent of coal power, which I know you are very supportive of, Mr. Chairman.

This should be a good hearing and we are glad to have our FERC chairman and one of the FERC commissioners, and I hope that we have a productive hearing. I have still got a lot of time I would be happy to yield if somebody else wants to use some my time.

Mr. WHITFIELD. Does anyone want the balance of Mr. Barton's time?

Mr. BARTON. I believe Mr. Olson would like to say some nice things.

Mr. OLSON. I would really like to thank my colleagues from Texas. I would like to join his comments and I voted for you, too, Barry. Good, good vote. You are doing a great job for our State. Thank you very much, Joe.

Mr. BARTON. I will say that before Mr. Smitherman was elected chairman of the Railroad Commission, he was appointed chairman of the Public Utility Commission, so he has been double-hatted in Texas and is truly an expert. And with that, Mr. Chairman, I would be happy to yield back.

Mr. WHITFIELD. The gentleman yields back. At this time I recognize the gentleman from California, Mr. Waxman, for 5 minutes.

OPENING STATEMENT OF HON. HENRY A. WAXMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. WAXMAN. Thank you very much, Mr. Chairman.

And Mr. Smitherman, I just didn't have a chance to vote for you.

Today, the subcommittee hears from electricity regulators and grid operators about America's evolving electricity generation portfolio. There is no question that a significant transition is underway.

Renewable energy policies are paying off. We have doubled our capacity to generate renewable electricity from wind and solar in just 4 years. This has cut pollution and invigorated clean energy manufacturing. Last year, for the first time, wind power added more electricity generation capacity than any other resource. Nearly half of all new generation capacity came from wind.

Cheap natural gas is also helping to transform our electricity sector. This market reality is causing some utilities to retire their oldest, dirtiest, and least-efficient coal plants. And new coal plants are simply not cost-effective to build today.

These changes are positive developments. Until carbon-capture technologies are developed, burning coal will continue to emit dangerous pollution. We should avoid investments in infrastructure that will lock in the worst impacts of climate change or create stranded investments that must be shut down before they have served their useful life.

But these changes also create challenges for our electric grid. Clean renewable energy sources like wind and solar provide power when the wind is blowing or the sun is shining, but not at other times. We need dispatchable generation that can be integrated into the grid with these intermittent supplies. That is a planning, funding, and construction challenge.

We also need to be developing and deploying power storage systems that can accommodate increasing generation from renewable sources.

EPA, the Department of Energy, and the Federal Energy Regulatory Commission are working to answer these challenges. But we in Congress could help by crafting sensible energy legislation. Two weeks ago, we heard from executives from some of the biggest utilities in the country. Entergy, AEP, and Xcel operate in different parts of the country with different fuel portfolios. But they all agreed that the best way to respond to climate change is through legislation from Congress.

When utilities tell us they are looking for regulatory certainty, they are not talking about bills that delay action. They are looking for real action and thoughtful policies. They want Congress to establish the rules of the road so that they can plan and invest for the future.

Ideally, this committee will enact a responsible energy policy that recognizes the reality of climate change. But as the President said in his State of the Union Address, he will act if we don't. And I think he better act, before we fail. Because, chances are we won't act, even though I hope we will. EPA's proposed carbon pollution standard for new power plants is a good first step. It is a standard that requires new power plants, whether they use coal or natural gas, to keep their pollution below a specified level. The proposed standard provides incentives for the deployment of carbon-capture and sequestration technologies. And it creates a level playing field for fossil fuel-fired generation.

It was valuable to hear from electric utilities at the last hearing. And I am glad that we are hearing from grid operators and regulators today. They have important perspectives.

But since policies that respond to climate change are a major focus of the statements and questions at these hearings, we also need to hear from the scientists and technical experts who can inform the subcommittee about the dangers of manmade climate change and the closing window for effective action. Two weeks ago, I made that request at the last hearing. Last week, Mr. Rush and I sent a letter reiterating that request for an additional hearing. Mr. Chairman, I urge you to respect this moral imperative and listen to all sides of the issue.

I thank the witnesses for being here and I look forward to today's testimony. And I yield back the balance of my time.

[The prepared statement of Mr. Waxman follows:]

PREPARED STATEMENT OF HON. HENRY A. WAXMAN

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I thank the witnesses for being here and look forward to today's testimony.

Mr. WHITFIELD. Thank you, Mr. Waxman.

That concludes today's opening statements, and so at this time I will introduce our first panel of witnesses.

We have with us this morning Mr. Philip Moeller, who is the Commissioner of the Federal Energy Regulatory Commission. Mr. Moeller, we are delighted to have you back with us again. And we have also Hon. Cheryl LaFleur, Commissioner, Federal Energy Regulatory Commission. I thank both of you for being here. We do look forward to your testimony and your expertise in this area. And I am going to call on each one of you, recognize you for 5 minutes. And there is a little box on the table that, if it works, it will turn red when your 5 minutes is up. And I am sure I won't cut you off, but at least you will notice that the red light is on.

So at this time, Mr. Moeller, I will recognize you for 5 minutes and we look forward to your opening statement.

STATEMENTS OF PHILIP D. MOELLER, COMMISSIONER, FEDERAL ENERGY REGULATORY COMMISSION; AND CHERYL A. LAFLEUR, COMMISSIONER, FEDERAL ENERGY REGULATORY COMMISSION

STATEMENT OF PHILIP D. MOELLER

Mr. PHILIP MOELLER. Mr. Chairman, thank you very much. Ranking Member Rush, Chairman Emeritus Waxman, and Barton, thank you for the chance to testify today.

My name is Phil Moeller. I am one of five sitting commissioners. And I thank you for your attention to this issue because I think it is one of the more pressing issues in our country.

The convergence of the electric industry and the natural gas industry is a result of several factors. It is kind of a good problem to have. It just has to be managed as two very different industries converge in a way that we want to make sure that we maintain the reliability of the natural gas supply and production and of course the electricity supply and production as well.

I always have to point out the most efficient use of natural gas of course is direct usage, space heat, and water heat. But the fact remains that we are in a major trend pattern right now where we are using more gas to make electricity. I ascribe five reasons for it.

First, it is usually easier to site, build, and finance a gas plant than other alternatives. Secondly, oftentimes, electric transmission is a cheaper alternative for consumers but it is so hard to build electric transmission in this country that oftentimes utilities build a generating plant instead. The third reason alluded to earlier, we have an abundance of renewable power that has been entering the grid but it is intermittent nature. It is not always there. You need something to back it up, to firm it up. That is almost always a gas plant because of its ability to respond quickly.

The fourth reason, of course, also alluded to earlier, is a suite of environmental regulations, air regulations, by the EPA that is resulting in the shutdown and the retrofitting of thousands of megawatts of coal plants in this country.

And the fifth reason is that we appear to have a long-term period of moderate to low prices of natural gas. That is coming domestically, quite amazingly, only in the last 5 or 6 years because of the new technologies of horizontal drilling and hydrofracking that have allowed us to access these resources that we didn't really even know we had 5 or 6 years ago.

I was honored and privileged to sit on the coordinating subcommittee of the National Petroleum Council, and they put out a 2-year study about a year-and-a-half ago called "Prudent Development." I brought the summary along today. It outlines just the enormous resources we have in North America on oil and gas, again, ones that we didn't even realize we had a few years ago.

Now, we as a society may decide to restrict the use of some of these new technologies. That won't be our decision. But if we don't that or even if we do to some extent, technology will only allow us

to find more of these resources, perhaps extract them and, absent a big change, we appear to have a long-term period of stability of gas in this country. And that leads to the fact that we will probably have low to moderate prices for a relatively long time.

Well, even despite this, we have had some challenges in our country where, at times, there essentially hasn't been enough gas to go around, usually in a cold weather event. My colleague, Commissioner LaFleur, experienced it firsthand in 2004 in New England. A few other examples include some rolling blackouts around Denver in 2006, almost a near catastrophe in my home of the Pacific Northwest in December of 2009 when some quick action averted a lot of outages.

But the event that really brought my attention to this issue was the Southwest outage of February 2011, where over 3 million people in Texas, and over 50,000 gas consumers in Texas, New Mexico, and Arizona lost service. It was a cold weather event but it wasn't unprecedented. And we had problems essentially on the gas side to deliver electricity and then failure on the electricity side to deliver gas.

Again, our staff at FERC and also the North American Electric Reliability Corporation put out a great report on that outage that describes the industries in quite good detail as a primer, what happened, recommendations for it. So there was a failure to communicate, really, in that event. And I was concerned going into the last couple of winters, that because of those failures to communicate, we could have a repeat episode if we had some really cold weather. I mean, in reality we have had some pretty warm winters the last couple of years, but I am concerned that the system hasn't been stressed under this new regime of moving toward more gas to make electricity in addition to the traditional uses of gas.

So about a year ago, I put out a series of questions to the public asking where we should go on this. My colleague, Commissioner LaFleur added some, and our chairman gave it a docket number. It has been a public proceeding. Our chairman has dedicated enormous staff resources to try to deal with this issue. And as you eluded to, Mr. Chairman, we have had a series of five technical conferences regionally based in August, another one last month, another one next month, another one in May where we are looking at the short-term communication issues so that if we have another cold winter event next winter that people can talk to each other, medium-term issues of getting the markets aligned correctly and longer-term issues of making sure we have the right market rules, financial rules, and environmental rules to get more infrastructure built in this country to deal with the long-term issue of enough pipe and supply to customers.

Again, thank you for giving this issue the attention it is giving. That helps us along. We are not sure where we are going on this, but I would be happy to answer any questions when appropriate.

[The prepared statement of Mr. Moeller follows:]

Summary of Testimony of FERC Commissioner Philip D. Moeller

Before the U.S. House of Representatives
Committee on Energy and Commerce,
Subcommittee on Energy and Power

Regarding Coordination Between the Gas and Electric Industries

March 19, 2013

Coordination of the natural gas and electric industries is among the most pressing energy issues we face as a nation, and I have been concerned about our increased reliance on natural gas to produce electricity. This recent and dramatic shift to natural gas as the preferred fuel of electric generators is the result of several factors including: (1) the fact that it is easier to site and construct natural gas-fired generating plants; (2) there has been a shift away from building new coal-fired plants due to more stringent air quality regulations; and (3) there has been a substantial increase in supplies of less expensive natural gas supplies as a result of new supply sources such as shale gas.

After a several high-profile events involving disruptions to the electric and natural gas systems, the FERC has initiated a number of proceedings and has convened numerous conferences to determine the causes of communication problems as well as possible solutions to improve coordination between these two distinct, yet increasingly integrated, industries. The challenges are serious, very real, and somewhat urgent, especially in New England and the Midwest, and the FERC is currently working hard to improve coordination between these industries.

Testimony of FERC Commissioner Philip D. Moeller

**Before the U.S. House of Representatives
Committee on Energy and Commerce,
Subcommittee on Energy and Power**

Regarding Coordination Between the Gas and Electric Industries

March 19, 2013

Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee, thank you for the invitation to testify on our efforts to address the challenges of coordinating the functioning of the natural gas and electric markets. My name is Philip D. Moeller, and I serve as one of five sitting commissioners at the Federal Energy Regulatory Commission (FERC). Thank you for the opportunity to testify this morning, and thank you for the attention you are giving this issue.

Coordination of the natural gas and electric industries is among the most pressing energy issues we face as a nation, and your highlighting the issue helps us to stay focused on finding solutions to the challenges we face. I have been concerned for several years about our increased reliance on natural gas to produce electricity. I do not contend that this is a bad trend, but rather one that must be managed deftly to protect citizens so as to avoid supply disruptions and to maintain the reliability of the nation's production and supply of natural gas and especially electricity.

Although the most efficient use of natural gas is direct usage – especially space heating and water hearing – as a nation, we are continuing a significant trend towards generating greater amounts of electricity from natural gas. I ascribe five major reasons for this trend: (1) it is easier to site and construct generating plants that burn natural gas; (2) even though expansion of the electric transmission grid is often more efficient and less expensive than building new generating plants, it has become increasingly difficult to construct electric transmission lines in this nation; (3) as the nation expands the deployment of intermittent renewable sources of electricity – especially wind and solar – traditional baseload generation will be needed to "firm" these renewable resources when they are not available. Gas generation is often used as the firming resource since it can quickly respond to sudden output fluctuations by renewable generation sources; (4) a suite of air regulations imposed by the Environmental Protection Agency will result in a significant amount of coal generation either being retired or retrofitted; and (5) lower natural gas prices have resulted largely from new supplies extracted using relatively new technological advances in horizontal drilling and the use of hydraulic fracturing.

Regarding this latter point, I was honored and privileged to serve on the Coordinating Subcommittee of the National Petroleum Council's two-year study released in September 2011 that focused on the potential production and supply of North American oil and gas resources through 2030. I continue to recommend the study, titled "Prudent Development" as it documents the stunningly enormous oil

and gas resources that we have in North America. The size of this resource base was generally unrealized even a few years ago, and the aforementioned technological breakthroughs are now allowing for extracting these resources. This has had profound impacts for our nation's economy in addition to worldwide geopolitical ramifications. As a society we may choose to limit these techniques for resource extraction. However, technological advances will only allow us to find and potentially extract additional resources. Absent major restrictions on these new technologies, we appear to be facing a sustained period of abundant supplies of natural gas in North America.

Notwithstanding the dramatic increase in domestic natural gas supply over the last several years, areas in our nation have already experienced reliability challenges arising from the convergence of the natural gas and electricity industries. Well known is the 2004 event in New England that my colleague, Commissioner LaFleur, experienced first hand. Among others, some examples include rolling blackouts in the Denver area in 2006, and a near catastrophe in my home of the Pacific Northwest in December 2009 when quick action limited outages to several thousand natural gas customers.

The event that especially focused my attention on this issue was the Southwest Outage of February 2011 that impacted customers in Texas, New Mexico, and Arizona. Although unseasonably cold weather greatly contributed to this event, supply challenges on the natural gas side caused outages on the electric side, and outages on the electric side caused disruptions in the gas transportation

sector. Millions of people (mostly in Texas) lost electricity, and thousands of customers (mostly in New Mexico) lost natural gas service at a time of very cold weather.

In response to these widespread outages, FERC and the North American Electric Reliability Corporation (NERC) conducted a joint study of the causes of the event. The ensuing report that was issued in August 2011 thoroughly described the event and included 32 recommendations for industry and regulators in an attempt to avoid a similar occurrence.

I highly recommend this report for you and your staff. It is not only well written but also includes primers on the gas industry and electric industry. The report highlights the differences between the two industries. Each industry has fundamental physical differences (for example, the near-instant speed of electricity moving across transmission lines compared with the relatively slow speed of moving gas molecules) and the different industries have their own language and style. Yet the industries are converging and the need for each sector to understand the other is growing. Energy professionals typically have been involved with the electric industry or the natural gas industry but rarely both industries in a career.

Growing increasingly concerned about the lack of attention to the convergence issue (especially related to industry communications during the winter heating season) in February 2012 I posed a series of 11 questions to the public on the reliability ramifications of these trends. These detailed questions fell into three broad areas: (1) in the short term, what needs to be done to assure that

entities better communicate during potential supply emergencies; (2) in the medium term, do policies need to change to better align the electric and natural gas trading markets; and (3) are investment signals adequate so that additional energy infrastructure—especially additional natural gas pipelines—can be deployed to meet this growing demand?

I am grateful that FERC Chairman Wellinghoff made the series of questions, along with several others added by Commissioner LaFleur an official FERC proceeding in Docket No. AD12-12-000. In addition, our chairman has dedicated significant staff resources to this effort which has contributed momentum to address this issue.

FERC received over 70 responses to the list of questions, although most filings did not address every question posed. After reviewing the responses, the Commission moved forward with a series of five technical conferences in August 2012 held in Washington DC, Boston, Portland, Oregon and St. Louis. These conferences focused on the regional differences of the challenges posed and the potential solutions to these challenges.

After reviewing the extensive comments made during these region-specific technical conferences, the Commission scheduled another series of technical conferences on specific subject areas to discuss possible solutions and next steps. The first of these was held on February 13, 2013 on the subject of improving communications between the natural gas and electric system operators. The

second is scheduled for April 25, 2013 on the subject of the major differences between the gas trading day and the electric trading day and possible ways to harmonize or better align these days. Our third is scheduled for May 16, 2013 when the Commission will hear from the operators of the organized electric wholesale markets on their respective systems' performances during the 2012-2013 Winter season.

As stated earlier, solutions to the problems arising from the convergence of the gas and electric industries have varying time frames over the next several years. With only a few exceptions, most of the nation has had two consecutive unseasonably warm winters. My fear is that this warmer weather has masked system vulnerabilities that will be exposed when more normal colder weather patterns occur. My goal heading into next winter is to have additional confidence that natural gas and electric system operators in each region have widely disseminated and understood communication protocols in the event of extreme weather that results in greater system demands. It's not clear yet if formal Commission action will be needed to effectuate these communications channels.

Next we need to address the differences in the gas and electric scheduling and trading days and whether changes would result in greater efficiency and increased reliability. Until now, the industries largely operated independently of each other, and if problems arose during a particular day, there was typically sufficient pipeline capacity available to address any concerns. However that level of flexibility is not as common as more power generators rely on natural gas-fired

generation as well as non-firm pipeline transportation contracts to supply their needs.

And finally, longer term we will need to consider whether the correct market rules, investment signals and environmental policies are in place to assure that adequate natural gas infrastructure exists to meet this growing demand. During this period, the agency will continue to conduct outreach, pursue solutions, and consider next steps as we identify these longer term issues affecting the natural gas and power industries.

Ultimately, the challenges we face with gas and electric coordination is a good problem to deal with as it's partially the result of abundant domestic gas resources. But the challenges are serious, very real, and somewhat urgent, especially in New England and the Midwest. Indeed, some in the industry believe nothing short of a major blackout will provide sufficient motivation to the various stakeholders to solve the problems facing us. We need the energy industry, regulators, and legislators focused on the range of solutions necessary in the near term, medium term and longer term.

Again, I thank you for the chance to testify on this subject and the attention you are giving it. I look forward to working with you in the future and to answering any questions.

Mr. WHITFIELD. Thank you, Mr. Moeller.

And Ms. LaFleur, you are recognized for 5 minutes.

STATEMENT OF CHERYL A. LAFLEUR

Ms. LAFLEUR. Thank you very much, Chairman Whitfield, Ranking Member Rush and Phil, and the members of the subcommittee. I appreciate your holding this hearing and the opportunity to testify.

Since July 2010, I have served as a commissioner of the Federal Energy Regulatory Commission. Earlier in my career, I had the privilege of serving electric and natural gas customers in New England and upstate New York. That experience taught me firsthand how important reliability is to customers in real communities. Since joining the Commission, I have made reliability and grid security my top priorities.

As everyone has said, our Nation is experiencing a substantial growth in the use of natural gas to generate electricity. In the past 15 years, gas used for generation has increased at the rate of 6 percent per year, but in the past 3 years it has accelerated to 10 percent per year more gas being used for electricity. There are several reasons for this. The primary one is the increased availability and affordability of domestic natural gas, which is leading to sharply lower gas prices. In addition, natural gas is the cleanest-burning fossil fuel, making it an attractive option for new generation and for repowering generation that is uneconomic to retrofit for new environmental regulations. Finally, the flexible operating characteristics of natural gas work well with the Nation's growing fleet of renewable resources.

This steady growth in natural gas for generation has led to concerns about the interdependence of the gas and electric markets. Because natural gas is generally delivered in a pipeline network rather than stored onsite like other generating fuels, it is important that we have both an adequate network of pipelines and operating practices to support reliability.

At the technical conferences we held last summer in five regions of the country, we heard about two basic issues. The first is infrastructure: making sure we have enough pipelines in the right places to support both electric and gas reliability. It is not a supply issue; we have plenty of gas. It is a pipeline issue. In some places the pipelines are constrained in specific regions or localities.

Since deregulation of the gas network by the Congress several decades ago, pipelines have been permitted by FERC based on long-term commitments for firm supply. And that system has worked well. We have permitted 10,000 miles of gas pipelines in the last decade. However, in regions with competitive electric markets, gas generators often don't enter into the long-term firm contracts but instead rely on interruptible contracts or buying gas that is resold by others with firm contracts. This can lead to shortage of gas at stress times, particularly in the winter heating season in certain regions, most notably New England.

At the conferences we received a strong message, really from folks across the country, that the need for infrastructure is a regional issue that varies by geography, the existing pipelines, fuel mix, and the structure of the market. Many regions, particularly

the mid-Atlantic, the South, and the West didn't identify a systemic problem with getting infrastructure built at this time. So the conference participants urged FERC to work with the regions on their issues rather than impose a national solution. And on the infrastructure issue, that is what we have been doing.

The operators of the markets you will hear from a little later are working under our jurisdiction to make sure that their market rules and their detailed operating rules support reliable electricity. In particular, ISO New England is working on both short-term and long-term enhancements to better ensure that it builds fuel security into its generation markets. We have already approved some market rules for this winter.

The second basic issue is operations, making sure that we coordinate the use of the pipelines we have to make sure that we get the best use of the infrastructure that is in place. As has already been mentioned, we had a tech conference on communications and we are working on next steps and have one coming up on scheduling to make sure the gas electric days work together to promote getting the most value from the pipelines we have in place. We are getting quarterly reports on this and in-person reports from all the regions at our open meeting so we can follow it closely.

This issue of gas electric interdependence is not a reason to panic, but it is absolutely a reason to plan and do so now. Viewed in the larger perspective, it is a byproduct of an American success story, which is the growth of domestic natural gas resources. The Nation's generation fleet has historically experienced large turnovers in fuel mix and large building cycles, and they inevitably require adaptations of supporting infrastructure and operations. I believe with diligent and timely effort, we can make this adaptation as well, and I pledge to use the authority I have at FERC to be proactive in meeting the challenge. Thank you and I look forward to your questions.

[The prepared statement of Ms. LaFleur follows:]

Summary of Testimony of Commissioner Cheryl A. LaFleur
Federal Energy Regulatory Commission
Before the House Subcommittee on Energy and Power
Of the Committee on Energy and Commerce
United States House of Representatives

March 19, 2013

Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee, here is a summary of my testimony, as well as a copy of my written testimony.

Our nation is experiencing substantial growth in the use of natural gas for electric generation, due primarily to the increased availability and affordability of domestic natural gas, but also to the environmental advantages of gas as the cleanest-burning fossil fuel, and the operating advantages of gas-fired generation in balancing the growing fleet of variable renewable resources. This steady growth in natural gas-fired generation is leading to greater interdependence between natural gas and electric markets and infrastructures. FERC held five technical conferences across the country last summer on this topic, and identified two key issues.

The first issue is ensuring adequate pipeline capacity to support both gas-fired electric generation and other gas customers. This is not a gas supply issue but a pipeline infrastructure issue. In certain regions, there may be inadequate local pipeline capacity to support generation during the winter heating season, due to geography, fuel mix, and market structure. This is already an issue in New England, and may be an emerging issue in other regions as more gas is utilized for generation. We got the strong message at the technical conferences to address the issue regionally rather than imposing a national solution, and that is what we are doing. In particular, the market operator in New England, ISO-NE, is working on market enhancements to better ensure the adequate supply of fuel for generation.

The second issue is improving the coordinated operation of the gas and electric networks to optimize the use of the pipelines we have in place. FERC has held a technical conference on improving communication between gas and electric operators to ensure reliability, and has an upcoming technical conference on harmonizing the schedules of gas and electric markets to improve coordination.

Gas-electric interdependence is not a reason to panic, but it is definitely a reason to plan. Viewed in larger perspective, this issue is a byproduct of an American success story: the growth of domestic natural gas resources. As with other major changes in our generation fleet in past decades, this one will require adaptations in operations and infrastructure. I will certainly be proactive in identifying ways to use the authority of FERC to help this adaptation happen smoothly and reliably.

Testimony of Commissioner Cheryl A. LaFleur
Federal Energy Regulatory Commission
Before the House Subcommittee on Energy and Power
Of the Committee on Energy and Commerce
United States House of Representatives

March 19, 2013

Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee:

Thank you for the opportunity to testify.

My name is Cheryl LaFleur. Since July 2010, I have served as a Commissioner of the Federal Energy Regulatory Commission (FERC). Earlier in my career, I had the privilege of serving electric and natural gas customers in New England and New York. That experience taught me firsthand just how important electric reliability is to real people and real communities. Since joining the Commission, I have made reliability and grid security top priorities. I have chaired several FERC technical conferences on reliability issues, and am the co-chair — with Commissioner Moeller and our state colleagues — of the FERC-NARUC Forum on Reliability and the Environment. I appreciate the opportunity today to discuss the nature of the gas-electric interdependence issues we are currently addressing at FERC.

Our nation is experiencing a substantial growth in the use of natural gas for electric generation. Since 1997, gas use by power generators has grown 135%, or 6% annually on average. However, over the past three years, gas use by power generators

has grown at an increased rate of 10% annually. The primary reason for the growth in gas-fired generation is the increased availability and affordability of domestic natural gas due to the new extraction technologies. For example, prices have fallen, on average, from $8.80/MMBtu at the Henry Hub in 2005, to $2.75/MMBtu in 2012. In addition, natural gas is the cleanest-burning fossil fuel, making it an attractive option for new generation and for repowering older fossil generation that is uneconomic to operate or to retrofit for new environmental regulations. Finally, the operating characteristics of natural gas-fired generation, in particular its dispatch flexibility, make it very useful in conjunction with our growing fleet of variable renewable resources.

This steady growth in natural gas-fired generation has led to concerns about the interdependence of the natural gas and electric markets and their associated infrastructures. Because natural gas is generally delivered on a pipeline network rather than stored on site, it is important that we have an adequate pipeline network and operating practices that support the reliability of both electric and gas networks.

While increased gas-electric interdependence is a national trend, its impact is different in different regions of the country. In August 2012, FERC held five all-day technical conferences, with each focusing on a different region (Central, New England, Southeast, West, and Mid-Atlantic). At each conference we had strong participation from gas pipelines and distribution companies, electric generators, electric network operators, and state regulators. These conferences highlighted sharp differences among the regions in terms of the potential impact of this interdependence issue, largely driven

by geography, the existing pipeline network, the generation fuel mix, and the structure of the electric market.

I would like to highlight a few of the issues that were examined at the technical conferences. They fell into two basic categories: infrastructure and operations.

Infrastructure: The first issue is ensuring that we have enough pipeline capacity to support both the reliable operation of gas-fired electric generation and the needs of other gas customers: in other words, to ensure there is enough gas in the right places to operate the systems reliably. Importantly, the issue is not a gas supply issue (e.g., not a shortage of gas) but specifically a pipeline infrastructure issue, often of a regional nature.

Since deregulation of the natural gas system several decades ago, gas pipelines have been permitted by FERC and financed based on long-term firm commitments to buy pipeline capacity, usually made by local gas distribution companies, but also by generators in some regions. This system has worked well overall – over the last decade, FERC has issued permits for construction of nearly 10,000 miles of new pipeline. However, there is typically no requirement for gas generators that operate in competitive markets to enter into long-term firm gas pipeline contracts. Instead, those generators often rely on gas resold by entities with firm contracts, or on their own interruptible contracts. Therefore, despite the recent pipeline capacity improvements, there is often a disconnect between market price signals and the associated infrastructure that is necessary to support the gas resources in those markets, especially on a regional basis.

This problem is most acute during the heating season in regions with very high gas utilization, a limited supply of non-gas generators, and very constrained pipelines (e.g. New England).

At the technical conferences, we received a strong message that the need for infrastructure is a regional issue that requires regional solutions. That is what we are doing. The regions that operate competitive electric markets work under the jurisdiction of the Commission to ensure that their market operations support reliable electric supply. In particular, ISO New England, the regional operator in New England, is working on enhancements to its electricity markets to better ensure adequate supply of fuel for generation. FERC has already approved new market rules that allow ISO-New England to procure an increased amount of short-term reserves to better allow ISO NE to ensure reliability during periods of stressed system conditions.

Operations: The second issue is ensuring that the gas and electric networks are coordinated to optimize the use of the pipelines we have in place. Improved communication and coordination between the natural gas and electric markets can help maintain reliability at times when gas pipeline capacity is stressed. FERC held a day-long technical conference in February, 2013 focused on communications between gas and electric operators. Our goal was to identify what information should be exchanged to run the system as reliably as possible, and what challenges may be impeding that communication. We appreciated that there was a strong consensus on the need for situational awareness between the electric and gas network operators. However, there

was disagreement on the specifics of the information that should be exchanged, and under what circumstances. There were also concerns expressed by both pipelines and generators about the commercial sensitivities and corresponding liability for the use of this information. As a result, Commission staff at the technical conference offered guidance about permissible communications under current Commission regulations. We are actively considering whether additional steps are needed in order to further clarify these communication requirements..

An additional coordination issue involves improving the harmonization of schedules between the natural gas and electricity markets. The problem arises due to the fact that gas generators are challenged in managing fuel procurement risks because the timing of natural gas purchase and delivery arrangements is not synchronized with the timing for bidding electricity into the wholesale electric markets. Often, the best time to schedule gas shipments passes before gas-fired generators know whether they have been scheduled in the day-ahead electric market. Although there are additional opportunities to nominate gas later in the 24-hour gas nominating cycle, these periods typically involve smaller gas volumes. On April 25, FERC will host a technical conference to address how the market schedules for electricity and natural gas could be harmonized to provide the most efficient scheduling systems for both industries. As stated in the notice, the conference will consider whether changes should be made to provide additional scheduling flexibility, explore coordination of gas and electric scheduling, and what

options or enhancements would allow for more efficient use of existing infrastructure by both gas generators and other customers.

The issue of gas-electric interdependence is not a reason to panic, but it is definitely a reason to plan. At FERC, we closely monitor gas and electric market conditions through weekly reports. We have also required quarterly staff reports at FERC open meetings, including this Thursday, on the progress being made on these issues. In addition, we have required all regional market operators to report to FERC during an open meeting after each peak season to describe the challenges and lessons learned on gas-electric coordination, beginning with this May.

In closing, I would like to note that, viewed in larger perspective, this issue is a byproduct of an American success story: the growth of domestic natural gas resources. I lived through $10/MMBtu gas a decade ago, and on balance I would much rather be dealing with the problem that we are discussing today. The nation's generation fleet has historically experienced large turnovers, such as the changeover of generation from oil to coal after Arab oil embargoes ran up oil prices in the 1970s and the nuclear construction cycles of the 1970s and 1980s. Inevitably, there are adaptations needed to make the system work most efficiently. The gas-electric coordination issue is yet another example, and I am confident that asset owners, market operators, and regulators will adapt to maintain the reliable electricity and natural gas markets that we enjoy today. I will certainly be proactive in identifying how we can use the authority of FERC to support this adaptation. Thank you, and I would be happy to take your questions.

Mr. WHITFIELD. Well, thank you, Commissioner LaFleur, and we appreciate both of you for giving your statements.

Last year, we had a hearing before this subcommittee, and FERC at that time talked about the importance of coordination between EPA and DOE and other agencies regarding reliability issues. And we have had EPA before us on many occasions talking about—because they have been very aggressive on regulations. And sometimes you get the impression that EPA is the arbiter for reliability issues. But in actuality, that is you all's responsibility. And I would just ask both of you, can you comment on the coordination between the agencies? Are we making progress in that regard? And what is your personal view about that issue? Mr. Moeller?

Mr. PHILIP MOELLER. Well, I remember that hearing quite well having testified at it. I guess we hear that there is talk going on between the staffs at FERC and the EPA. I will have to get back to you with more details as to actually the substance of those discussions. We have talked about the 5th year that plants would get—they were a year into it. It is effective April 16, 2015, MATS that is. Most people think that entities will get another year if they are going to be retrofitting. And then there is the question of the 5th year. The industry has told us that until the federal law is resolved between the Federal Power Act and the Clean Air Act, that they are very reluctant to even ask for the 5th year.

So that plays out differently in different load pockets depending on how much coal is going to be retiring. We are practically concerned about Northern Ohio and the timeline there but there are other areas. So I would just hope, and I think I have been consistent in urging the EPA that they be very involved with the market operators, two of whom will be on your next panel, so that if—you know, the faster you rush a job, the more expensive it is to consumers. So as long as they are engaged and the have some kind of a mechanism, perhaps give another extension of time if they just can't get the new generation or the new transmission built in particular load pockets, that is where it gets so complicated. It is about physics and it is about the flow of electricity, and it is just not universally the same everywhere.

Mr. WHITFIELD. Right. Ms. LaFleur, do you have a comment?

Ms. LAFLEUR. Yes. It is my understanding that there are a couple of things in place. There is a regular monthly telephone conference between the RTOs, the DOE, FERC, and the EPA, and then, in-person meetings ad hoc between FERC and the EPA. In preparation for this hearing I got copies of a lot of the—what do you call them—PowerPoints at the last tech conference, which was really a report from the different RTOs on what they are seeing.

In addition, I initiated, and Commissioner Moeller and I cochaired an ongoing forum between FERC and the state regulators. We meet at every NARUC meeting and have EPA there in person to hear what is coming out, what is emerging, what do we think the issues are. In May of last year we put out a policy statement on how FERC would approach the 5th year if anyone came to us. We haven't heard from anyone yet because they are still working on their 4th year. But we wanted to be ready so we could hit the ground running.

I agree with Commissioner Moeller that Northern Ohio is one of the places that has been identified. I was there 3 weeks ago. I know we are going to hear from the Ohio chairman today, and we have to work closely on all of those things through these various fora.

Mr. WHITFIELD. Yes. Mr. Gordon van Welie is with us with the ISO up in the Northeast and, of course, you mentioned that there are a lot of concerns about the Northeast, and I am sure he will get to that. But are there any other areas that you all have particular concern about? You mentioned the Northeast; you mentioned Northern Ohio. What are some other geographical areas?

Mr. PHILIP MOELLER. Well, the Midwest. And you will hear from Clair Moeller from MISO later, too. But just the number of megawatts that are either being closed down or retrofitted is enormous in a relatively short amount of time.

Mr. WHITFIELD. Right.

Ms. LAFLEUR. New England is clearly at the cutting-edge but the Midwest and also New York were places that had a lot to say when we had our tech conferences.

Mr. WHITFIELD. And we still have a lot of unknowns out there, too, because, as we say, EPA is looking at greenhouse gas regulations. Are they going be applicable to the existing plants? They haven't quite finalized the new construction, so we have a lot of question marks out there, a lot of unknowns.

And at that this time my time is expired, so I will recognize the gentleman from Illinois, Mr. Rush, for 5 minutes.

Mr. RUSH. I want to thank you, Mr. Chairman. Mr. Chairman, I have a different line of questions. I am going to begin with Commissioner LaFleur.

Commissioner LaFleur, in your testimony you cite the lack of pipeline infrastructure as your first area of concern in ensuring adequate pipeline capacity to support most gas-fired electric generation and other gas customers. Lack of access in pipeline infrastructure is also an issue that I have concerns about. But for me, the concerns are regarding the lack of access for minorities and women when it comes to jobs and contracts and economic opportunity available in the pipeline industry.

Specifically, over the last Congress, this subcommittee heard from witnesses from all aspects of the pipeline industry, including private companies and associations, as well as from federal agencies. And each time, I posed a simple question. Are there women, are there minorities who are owners, builders, and operators of pipelines in this country and what are their levels of participation?

Because I can never get a straight answer on this question, I drafted language in the Pipeline Safety Regulatory Certainty and Job Creation Act of 2011 which calls for a comprehensive GAO report examining the levels of engagement and participation of minority-owned, women-owned, and disadvantaged business enterprises and contractors involved in the construction and operation of pipelines in this country. So absolutely no one was surprised when the GAO report came back stating that the levels of minority participation in the pipeline industry was so small that it was almost negligible.

Now, I understand this is not your area of expertise, but I want you to know that my office will be working with you, reaching out to you, and reaching out to FERC in general to work with us on establishing strategies for increasing access for minorities and women in the pipeline industry.

As you stated in your testimony, over the next few years we will have to build up the Nation's pipeline infrastructure in order to address the shale oil and gas boom, and make sure the energy is getting to urban areas, rural centers, wherever it is needed at. As policymakers, it is our responsibility to ensure that all segments of the population are able to participate in building this critical infrastructure and that all communities have access to the economic opportunities that will be available in the pipeline industry over the next decade.

Mainly, I look forward to working with FERC, engaging FERC on this issue, and I would like to ask both of you, do you have any responses or any comments to share with this subcommittee, now that I have raised this particular issue?

Ms. LAFLEUR. Well, thank you, Congressman Rush, for bringing up an important issue and one I probably haven't thought enough about. I am involved in several organizations for women in energy. I actually was meeting with one group of women last night and we were talking anecdotally about how they were more women in electricity than in natural gas as an anecdotal impression. And that backs up what you are saying. And more of them are on the regulatory legal side than on the construction side. I have also met with the American Association of Blacks in Energy, which is headquartered here in the city, and that is an issue they are working on.

We don't at FERC give out contracts or choose who would construct the pipelines, but there is going to be a period of infrastructure opportunity, so I would be willing as, you know, a citizen in the industry to work further with any of the groups to help make that happen. There certainly should be opportunities.

Mr. PHILIP MOELLER. Congressman, I think we want to get all kinds of new people into the energy industry. Minorities, women, young people—it is an aging industry. There is a great need for skilled labor, so to the extent that vocational education can be emphasized again in this country as it once was, that will help on the skilled labor side.

I have tried to go out and be a force for involvement in what is, I think, a very exciting industry. I was the guest speaker at the annual meeting of the Association of American Blacks in Energy in Columbus, Ohio, a few years ago. So I have certainly tried to get a greater involvement from everyone in this industry because I think it is the greatest industry and it is a great future and great jobs.

Mr. WHITFIELD. Thank you.

At this time I recognize the gentleman from Louisiana, Dr. Cassidy, for 5 minutes.

Mr. CASSIDY. Yes. And Mr. Rush, I agree with you. This industry has tremendous opportunity for folks who are minorities. One of the reasons I represent firms in which there is female and minority participation, and one the reasons our side is so interested in Key-

stone XL is that those 20,000 direct jobs created will be just among the working class that are most in need of jobs right now.

So I agree with you, Mr. Moeller. It is a great opportunity for many people. I just wish that the President would sign on to creating those jobs.

I got asked at a bipartisan dinner last night, actually, put on by one of my colleagues. The point was made that EPA is currently driving our energy policy. I am struck that you mentioned the potential for shortages in New England and the mothballing, I gather, of many coal-fired plants. This must be billions of dollars worth of investments being replaced by other billions of investments, all paid by families struggling to meet their current bills.

So I guess my point being, is that a fair assessment that EPA's environmental regulations are now driving our electrical market?

Mr. PHILIP MOELLER. It certainly is a factor, yes.

Mr. CASSIDY. Now, a factor could be 1 percent or it could be 90 percent. But I gather that these mothballed coal plants, it is 90 percent EPA. Is that a fair statement?

Mr. PHILIP MOELLER. I do not know if I would pick a number, but——

Mr. CASSIDY. Give me a ballpark. I am not going to hold you to it. I mean, is it 1 or is it 100 or is it some—where would you make it closer to with 100 being the highest?

Mr. PHILIP MOELLER. Well, it depends on the plant but in some plants it is 100 percent. I mean, they are being shut down clearly because of air regulations. In other cases, you would probably say 50 percent because they are being retrofitted. They will still burn coal but they are of a right vintage where that investment makes sense. And so——

Mr. CASSIDY. Now, I am from a natural gas state. I am all about natural gas. On the other hand, I am all about having a diversified fuel source. It really does seem as if we are putting a heck of a lot of our eggs in the natural gas basket for no other reason than EPA is driving this. Is that correct?

Mr. PHILIP MOELLER. That is a major factor. Prices and the access is also part of it, but that is where we are concerned from a reliability perspective. If you are dependent on a pipeline and just-in-time fuel will supply, it is a lot different than a 60-day pile of coal.

Mr. CASSIDY. Yes, it seems that way. And if you are dependent on one plant and the other has been with—the diversified fuel has been mothballed, then your whole supply chain is, if you will, just in time. Fair statement?

Mr. PHILIP MOELLER. Yes. If you have more pipeline to access, that helps diversify your options. But that is one of the problems. Some plants are dependent on one pipe.

Mr. CASSIDY. Now I am struck, Ms. LaFleur—a good Louisiana name—I don't know if you are but could be. You speak specifically of New England and the problems that they have. Will the development of the Marcellus Shale bring some relief there? Obviously, the supply is closer. Will further development of that benefit?

Ms. LAFLEUR. Well, my dad was French-Canadian but there are a lot of LaFleurs in Louisiana.

The fact that gas is being extracted much closer to the Northeast in the Marcellus means pipelines have a shorter way to go, and that makes the issues we are working on somewhat more limited, but the challenge is trying to pipeline that last couple hundred miles to the plant because most of the suppliers bring gas to the major junction points and then you need to build laterals to specific plants. But definitely the supply from the Marcellus helps, yes.

Mr. CASSIDY. OK. And I also understand that there is a market issue in terms of how the New England plants buy their gas. You allude to that. I don't understand it well enough. Could you elaborate?

Ms. LAFLEUR. Well, in general terms, natural gas and electric markets attract capital differently. Pipelines build based on 10- or 15-year commitments and electricity, because it is a real-time product, is priced in a 3-year forward market or in the day-ahead market. So the generators might not have certainty of their long-term future to make a 15-year commitment, which means they are going to have to get creative about how we structure these things and get pipelines built.

Mr. CASSIDY. So ideally, a plant in the South, for example, which does not have this problem, is it because we already have the pipeline infrastructure or because they are able to enter into these 15-year commitments?

Ms. LAFLEUR. A little bit of both. In some of the vertically integrated states, the state regulators have decided that customers should backup the long-term gas contracts. They also have considerably less gas dependency in general so they don't have the—if you made every generator in New England buy a firm contract, pretty soon, you would have way too many. You would be having customers pay for way too many pipelines. So it is a combination of factors.

Mr. CASSIDY. OK. Well, I am out of time. I yield back. Thank you both.

Mr. WHITFIELD. Thank you. At this time I recognize the gentleman from Michigan, Mr. Dingell, for 5 minutes.

Mr. DINGELL. Mr. Chairman, your courtesy is appreciated, thank you.

These questions for Mr. Moeller are yes or no, I think. In your testimony you state the country is increasing natural gas electricity generation because EPA air regulations will force coal-fired plants to be retired or retrofitted. Do you believe that the increased availability and the lower cost of natural gas has played an equally important role in our transition to natural gas? Yes or no?

Mr. PHILIP MOELLER. Yes.

Mr. DINGELL. Now, it is my understanding that some coal-fired plants undergoing retrofits have been granted revised air permits and extensions in order to comply with EPA regulations, such as Mercury and Air Toxic Standard. For older coal-fired plants that will not be retrofitted, do you believe will be necessary to allow them to continue operating past the compliance deadline of the Mercury Rule in order to maintain reliability? Please answer yes or no.

Mr. PHILIP MOELLER. In some cases, yes.

Mr. DINGELL. Now, do you believe that renewable electrical generation such as wind and solar should the factored into resource adequacy? Please answer yes or no.

Mr. PHILIP MOELLER. Yes.

Mr. DINGELL. Would you want to submit for the record an explanatory statement to that, if you please?

Mr. PHILIP MOELLER. I would be happy to.

Mr. DINGELL. Now, in FERC's response to a letter signed by myself and other members of the Michigan delegation, FERC indicated that it was in the process of preparing an environmental assessment on the issue of the Trunkline Mainline Abandonment Project. Has the EA been completed, and if not, when will it be?

Mr. PHILIP MOELLER. I don't know.

Mr. DINGELL. All right.

Mr. PHILIP MOELLER. I will have to check that and get back to you.

Mr. DINGELL. Would you submit that, please?

Mr. PHILIP MOELLER. Sure.

Mr. DINGELL. Now, when do you anticipate FERC making the final decision on the project proposal?

Mr. PHILIP MOELLER. I will have to get back to on that.

Mr. DINGELL. All right. Now Commissioner LaFleur, thank you for your presence. In your testimony, you note that more planning to address the issue of gas electric interdependence will be necessary. As you also note, there is no requirement that generators enter into long-term gas pipeline contracts. Do you believe FERC needs the authority to require longer-term contracts? Yes or no?

Ms. LAFLEUR. I don't think we need more authority at this time.

Mr. DINGELL. At the end of your testimony you state that you will find ways to use FERC's authority to address this issue. Do you believe that FERC needs additional authority in order to ensure reliability for all of our natural gas needs? Would you please answer yes or no?

Ms. LAFLEUR. No.

Mr. DINGELL. Mr. Chairman, I note that I have completed my questions with 2 minutes remaining. I return them to you with thanks.

Mr. WHITFIELD. Very impressive. Thank you, sir.

At this time I would like to recognize the gentleman from Texas, Mr. Olson, for 5 minutes.

Mr. OLSON. Thank you, Mr. Chairman. And welcome to the witnesses. Commissioner Moeller, Commissioner LaFleur, thank you so much for your time and your expertise.

With the Administration's war on coal, service capacity is shrinking in many States across the country. My home State of Texas needs five large power plants by 2014, 2015, to keep growing or we risk rolling blackouts, as you alluded to in 2011. One way we can prevent these brownouts or blackouts from happening is to order power plants to keep generating beyond the 24/7 limits that they have, keep that power up online. And that is for emergency conditions only, and again these may lead to, you know, power generation collapses.

Unfortunately, we have got two examples recently where power plants have been kept up online and then third parties have come

back in behind them and sued them for damages. And some of these have been seven figures in damages.

I introduced a bill last Congress that passed unanimously from this committee, unanimously on the floor. Unfortunately, it died in the Senate, which many, many bills did last Congress.

But I just want to talk to guys about that. Do you support that bill? Is that something viable to adjust this power capacity, power shortage capacity we may have in Texas?

Mr. PHILIP MOELLER. And last year I testified in support of that bill in front of this committee.

Mr. OLSON. I just wanted to make sure something didn't change your mind. Commissioner LaFleur?

Ms. LAFLEUR. Yes. I support that targeted bill to give relief if you are ordered to stay on.

Mr. OLSON. Great. Commissioner Moeller, you talked about the 2011 power crisis we had in Texas, basically the wind power crisis, and 12 percent of our demand dropped offline almost automatically. About 50 power plants were impacted by that. Most importantly for Texans, the Super Bowl was in Dallas that weekend, almost got canceled because no power could run to Cowboy Stadium. Could you please elaborate on what you learned from that incident and what advice you can give me for my State to take away from this? You have got the report there.

Mr. PHILIP MOELLER. I will again commend the report that FERC and NERC did together on it. It is a great read. It is a good primer. It has 32 recommendations, mainly to the legislatures and the Public Utility Commissions of those States. And I think they are at various phases of implementing those recommendations. To me what hit home was that people felt like they either legally couldn't talk to each other or they felt there was a perception that they couldn't talk to each other legally, in addition to a number of problems with inadequate weatherization of a lot of those power plants. So I think they are on the weatherization.

The communication set of issues, though, I think is an issue in every region of this country. And that is where, I think, we will really be pushing over the summer to make sure—we don't know whether we have to take formal action at FERC or informal action, but to make sure that when we have another one of these cold weather events—it is a matter of when not if—and the systems are stressed, and they can be stressed anywhere but New England and the Midwest are our top concerns—that the right operators of the grid, the electric system, the pipelines, the generators, are all in a position where they can share information without a fear of breaking the law so that people's service isn't disrupted.

In the cases of the Northwest in 2009, there was a power plant they could have relieved a lot of the problems that was around Portland, Oregon, but the utility in Washington State was afraid to call that utility thinking they might be violating the law if they did.

So that is what I will be pushing on and I think the rest of the Commission as well going into next winter since we have had two such warm winters in a row, it is not going to last very much longer.

Mr. OLSON. Commissioner LaFleur, anything to add ma'am?

Ms. LAFLEUR. I agree that communication was one of the big lessons and that is what we need to work on and have already given some guidance as to what is allowed so that people don't think our regulations are stopping that. I think also situational awareness between different operators, both adjoining electric operators and different gas operators, was a big lesson of that incident.

Mr. OLSON. Another lesson learned in Texas is we got power from Mexico. When that crisis happened, we had to go across the border to get that power from another country. And that scares me a little bit, that we are dependent upon a foreign nation as opposed to taking care of our needs.

And also, it is not just cold there, I mean cold weather. We had the summer of 2011, every city in Texas, every single one of them was over 100 degrees the whole month of August. If that happens again, with the war on coal, we have tried to get the Las Brisas power plant up online, the White Sand power plant, coal power plant, Pepco plant shut down. They pulled back because of EPA regulations and these lawsuits. We have got to get the legal system out of here and let the people do what the people need to do.

Thank you. I yield back the balance of my time.

Mr. WHITFIELD. At this time I recognize the gentleman from California, Mr. McNerney, for 5 minutes.

Mr. MCNERNEY. Well, thank you, Mr. Chairman. I thank you for having this hearing. I think it is an important and interesting issue.

Ms. LaFleur, you mentioned that reliability and security were your top issues. You must be familiar with the San Bruno explosion a few years ago. How typical is the condition of those pipelines throughout the country? It seemed to me that it was a combination of lack of maintenance or age of the pipes, plus lack of inspections to make sure that they were operating. It also seems people didn't have access to the valves to turn them off, and so on. How vulnerable are we to those just due to natural causes?

Ms. LAFLEUR. Well, I certainly hope the pipelines in San Bruno were not typical that, as I am sure you know, both the State of California and PHMSA, which is part of the Department of Transportation here, have put out some strong new regulations that require more inspection to make sure that particularly older pipelines in high-consequence areas are maintained correctly. And I think our job at FERC is to make sure that we have supportive regulation for those gas pipeline requirements.

Mr. MCNERNEY. So there will be a little bit higher rates for——

Ms. LAFLEUR. It is more a matter of we have had a few cases—we have some pending so I have to be careful—of how pipelines are required to cover additional expenses that might be required for inspection and how that works technically within their tariffs.

Mr. MCNERNEY. So how vulnerable are our national pipeline networks to cyber attacks? I mean, could a cyber attack result in something like that or other types of disruptions, major disruptions?

Ms. LAFLEUR. I think any major critical network that is run by computer systems—and that includes gas and electric—are vulnerable to cyber attack. And that is why both voluntary—and in the case of electricity—mandatory standards are very important.

Mr. MCNERNEY. Well, that is good. So part of the legislation that is being considered is to require sharing of information, but there aren't that many advocates for actually requiring utilities to do certain things to protect themselves. So where do you think we need to fall on that issue?

Ms. LAFLEUR. Well, on electric side, we do have mandatory regulations under the Energy Policy Act of 2005. We do regulate that at FERC. I think the biggest thing we need in legislation is that information-sharing, as well as someone having emergency authority in the case of an emergency. And I think most of the proposals I have seen have both of those elements in them.

Mr. MCNERNEY. But they don't have standards then for equipment or software?

Ms. LAFLEUR. I think if I were the queen of the world, mandatory standards would be good. I think getting some legislation passed, even the more modest legislation, would help a lot. I think information-sharing is the top priority.

Mr. MCNERNEY. Thank you. Mr. Moeller, you mentioned that we need increased flexibility to address the pipeline capacity issue. Is this a regulatory or a statutory issue in your opinion?

Mr. PHILIP MOELLER. Well, it is a regulatory issue primarily. If you ask me for statutory recommendations with the intent of getting more pipeline in, I could come up with some. But I think, for the most part, people have been fairly satisfied with the process we have at FERC for new pipelines. If you cross the state line, you come to FERC for a certificate to build it. And it is a public process. The routes always get changed and then there is the regulatory cost recovery that we handle with. I mean, it could be done quicker. Again, if you want recommendations, I can give you those.

Mr. MCNERNEY. When you say flexibility, do you mean increased capacity, more pipelines? Is that what you mean by flexibility?

Mr. PHILIP MOELLER. I think both operationally and additional infrastructure. We clearly need more pipe in New England. They are at the end of the pipe; they are more dependent. On the other hand, as you will hear from the Midwest later on, there is some question as to which power plants that the grid operates are fed by which pipes. And I am not suggesting this, but there is no equivalent kind of regional oversight of the pipeline network like there is on electricity. So the coordination fact, it is just different. And that is where we need kind of the communication flexibility. Particularly, we get to times when the system is very stressed and there is the worry of not enough gas to go around.

Mr. MCNERNEY. Thank you. Good timing, Mr. Chairman?

Mr. SCALISE [presiding]. You got it. You hit the number. Perfect. I thank the gentleman. I recognize myself for 5 minutes to ask questions.

Mr. Moeller, in response to the chairman, after some questions I think you responded specifically about some concerns in northern Ohio related to their coal plants. Can you expand on the concerns that you have there?

Mr. PHILIP MOELLER. Yes. And I know we have the chairman of the Ohio Commission coming up later so I wouldn't want to usurp his expertise. But we have a zone in northern Ohio where a number of plants are being shut down in the next 2 years. Perhaps

there is a need for greater either generation in that load pocket or more transmission or both. And when the market did—Commissioner LaFleur alluded to the 3-year forward-capacity market and new generation did not clear in that market because the prices were suppressed by a lot of demand response. There is some concern whether that demand response is actually going to be there in the summer of 2015.

So there are a lot of issues. They come together in the summer of 2015 when, of course, the load is the highest and, you know, it is something we are watching very closely.

Mr. SCALISE. Thank you. And you were also talking about kind of a concern about regulation, if there is a haste to put regulations in place quickly that in order to add more on top that it can actually add to the cost of electricity for consumers. Can you expand on what you were referring to there?

Mr. PHILIP MOELLER. Yes. Well, given the number of megawatts in this country and they are spread out around most of the country. They are not a lot in the Northwest or the Northeast anymore or California. But the number of coal plants that are being retrofitted in a short amount time, there is a squeeze on the engineering talent, the skilled labor component. There is some argument they are not enough boilermakers to go around. Just the supplied chain gets squeezed the shorter that time frame is to try and get it all done to meet the regulations. So like any job in your house, if you want it done quicker, you are going to pay more. And in this case, consumers will bear that, and I hope that that is kept in mind.

Mr. SCALISE. Is there any one agency that you are referring to in terms of regulation? We see the EPA throwing a lot of this on top of industry. Again, you know, when industry talks to us, they talk about the added cost that it forces on consumers as they are doing this so there is definitely a cost associated with it. Is it EPA? Are there others as well that you are referring to?

Mr. PHILIP MOELLER. No, it is primarily EPA. I am talking about the air regulations, and I am not here to bash them but——

Mr. SCALISE. We do that, don't worry. When we hear about a lot of the things that they do that, you know, don't have anything to do with improving health or safety, it is more just to kind of put burdens to, it seems like, pursue an agenda. And you know this isn't a question to you; this is more things we see in the hearings when we have them before us. And, you know, it just seems like they keep going in their own direction to pursue an agenda, you know, whether it is kind of a cap-and-trade de facto regulation when Congress is, you know, has expressed in a number of different ways that that is not the direction that we would like to go. And, you know, hopefully I know we have got legislation and many of us are supporting to say Congress shouldn't put some kind of carbon tax in place. You know, and maybe we will have more hearings on that. But, you know, to see them going off in their own direction anyway to try and pose regulations that just carry an agenda, there is a cost to that, and I think those costs need to be brought up.

I do want a touch on something you talked about your opening statement where you were talking about this revolution in natural gas that has come about through hydraulic fracturing, through hor-

izontal drilling, that technology that has allowed us to open up vast reserves of new energy here in America. And, you know, of course, we hear about EPA looking at trying to get into that and trying to regulate what States already do. States do a great job of regulating hydraulic fracturing. It has been very successful, created great jobs, but also a great potential for American energy security. And of course that is threatened.

You talked about technology allowing us to find more natural resources. And I do have concerns, you know, that is these natural resources are found, that the government regulators themselves could impede that innovation, that technology if they do try to regulate it in a way that doesn't allow us to access those natural resources. So I don't know if you want to touch on that, if either of you, both Mr. Moeller or Ms. LaFleur.

Mr. PHILIP MOELLER. Well, those will not be our decisions because that is not in our jurisdiction, but hydrofracking and horizontal drilling and the shale revolution, it has been a revolution. A few years ago at FERC, the most controversial things we dealt with were LNG import facilities. Now they are LNG export facilities.

Mr. WHITFIELD. And then, Ms. LaFleur, before the clock expires, any——

Ms. LAFLEUR. Well, I agree that we are going to have to closely monitor regulations that come out that might affect gas extraction because they could affect gas supplies. It is not something we are specifically responsible for. We really just certificate the pipeline network.

Mr. SCALISE. All right, thank you. I think the ranking member, Mr. Waxman, is up next.

Mr. WAXMAN. Thank you very much, Mr. Chairman.

The Nation's electricity generation portfolio is in the midst of a significant transition. We doubled our capacity to generate renewable electricity from wind and solar in just 4 years. And last year, nearly half of all new generation capacity came from wind. There has also been a large increase in natural gas generation. Commissioner LaFleur, what is the primary reason utilities are increasing their natural gas generation?

Ms. LAFLEUR. I would say the primary—if I had to point to one reason—is the reduced cost of natural gas.

Mr. WAXMAN. Yes.

Ms. LAFLEUR. I mean, most of the Nation's coal fleet was built when that was by far the cheapest fuel, and now that gas is the cheapest fuel, people in the market are responding.

Mr. WAXMAN. In your testimony you discussed how natural gas generation also supports the expansion of renewable energy. Could you explain how wind and solar power benefit from the increased use of natural gas for electricity generation?

Ms. LAFLEUR. Yes. Because wind and solar, they don't consume fuel, but they can only operate when the wind is blowing or the sun is shining, for the most part, you need quick-ramping resources that can fill in when they ramp-down, and because natural gas machines tend to be more flexible, they are well adapted to that filling in with wind and solar.

Mr. WAXMAN. As utilities move from coal-fired generation to cheaper, cleaner, and more flexible sources of power, we hear complaints about the retirements of coal-fired plants. Commissioner LaFleur, my understanding is that most of the planned retirements are the oldest, least-efficient coal plants. These are plants that have operated for 50 or 60 years or even longer. Is that right?

Ms. LAFLEUR. Yes, for the most part. I mean, we are monitoring this. We get reports from the different regions of the country, and most of the first coal plants to retire are the older, built in the '50s and '60s, most expensive to run, and for that reason, they were rarely operated. It is like if they came up with a new rule that you needed some expensive braking system for your car, the first thing you would do is put it on the car you drive to work every day. But on the car you only drove on vacation, you might say, gee, do I want to spend the money on a car I drive once a year? Some of these plants were kind of on the edge of the system.

Mr. WAXMAN. OK. While moving away from the oldest, dirtiest generation is reducing our carbon pollution, many other coal-fired power plants are going to be installing modern pollution controls to reduce their toxic emissions. For the first time, that is going to provide tremendous health benefits. This transition in our energy sector is important for the climate and for public health. It is a positive development, but like all major transitions, it requires planning.

Commissioner LaFleur, in your testimony you said that this is the time to plan, not to panic. Do you believe the communications scheduling infrastructure issues we are talking about today are manageable?

Ms. LAFLEUR. Yes, I do.

Mr. WAXMAN. Is this an area where FERC should be promulgating national rules or is regional action more appropriate?

Ms. LAFLEUR. Well, as I said in my testimony, right now, I think the infrastructure issues are better tackled regionally because the different markets have different rules. But if we do something on either the schedules or on communication, those might lend themselves to national action.

Mr. WAXMAN. Yes. Well, it sounds like FERC and grid operators are doing exactly what they should be doing, identifying the challenges posed by this transition and developing solutions to address those challenges while moving away from a coal-heavy energy portfolio to a truly diverse energy portfolio. If we want to prevent the worst impacts of climate change, our energy infrastructure will need to continue changing in the years and decades to come.

Commissioner LaFleur, as regional action is taken to accommodate the energy transition we are seeing, in your view, would it be prudent for regional planners to anticipate that greater carbon pollution emission reductions are likely to be required in the future?

Ms. LAFLEUR. Most of the planners, whether they are at the state level or at the regional level, do scenario planning. And it is probably prudent to model, well, what if there is new carbon legislation? We don't have that legislation now, so it is not an immediate thing to plan for. But they probably model multiple futures, and I think they should.

Mr. WAXMAN. Well, I would think that they would anticipate not having the same do-nothing Congress we have now, forever. And even a stopped clock is correct twice a day, so perhaps we will get bipartisan support and do something about climate change. And that would be, I think ultimately, good. Thank you very much for your time.

Mr. WHITFIELD. At this time, I recognize the gentleman from Kansas, Mr. Pompeo, for 5 minutes.

Mr. POMPEO. Thank you, Mr. Chairman. I want to talk about the pipeline permitting process.

So there was a recent GAO study on this from February of this year, February 2013, that talked about the process. And in that report, it said that FERC does not track the time frames for these permits being granted. And in light of stakeholder concerns, do you think that FERC should be tracking—I will ask you both, yes or no—do you think FERC should be tracking the time that permits are being granted from application to completion?

Ms. LAFLEUR. I think we should be aware of that. My understanding of the NGER report is that it said FERC did a pretty good job meeting deadlines——

Mr. POMPEO. This was the GAO. I am talking about the GAO report that said——

Ms. LAFLEUR. Oh, I am sorry.

Mr. POMPEO [continuing]. That you all are tracking how long it takes. They had to go to public records to identify the lengths of the permit process, that you all kept no such records? Is that true?

Ms. LAFLEUR. I don't want to say something I am not positive of, but I think we should know how long our process takes, yes.

Mr. POMPEO. Great. That is my question. Commissioner, do you agree?

Mr. PHILIP MOELLER. Absolutely.

Mr. POMPEO. Yes. Now, NGER did a report that said that 20 percent of natural gas pipelines experienced delays of 6 months or more, largely because the delays occurred after FERC's NEPA analysis had been completed, which has a 90-day requirement under EPAct. Is that statement also correct?

Ms. LAFLEUR. Yes, it is my understanding that it is. A lot of the delays are in the conditions that are put on in the FERC environmental permits that have subsequent conditions.

Mr. PHILIP MOELLER. As far as I know, that is correct.

Mr. POMPEO. So a) FERC doesn't know how long it has taken; and, b) it is not complying with EPAct. So in my view, there is work that needs to be done in this permitting process. I am actually going to propose legislation that does that. I hope it to be bipartisan. I think it is a good government solution which puts cabined risk and allows pipelines to move forward where they can have a little more certainty.

I guess I would ask each of you—I am happy to share with you and talk to you and get your input—but Commissioner Moeller, you suggested that you had some ideas on how we might do this permitting process more quickly. Would you be willing to share a couple of those thoughts with us this morning?

Mr. PHILIP MOELLER. Yes. I think the challenge that you alluded to is that the resource agencies typically don't have the account-

ability to come back with an answer. We see the same thing in hydropower relicensing. And it is the way the statute is. And if you created some timeline of accountability, I think they would be a lot more responsive.

Mr. POMPEO. Do you agree with that, Commissioner LaFleur?

Ms. LAFLEUR. Yes, I do. I agree both on the problem and that we do not control all of the other agencies who have to act to get a permit out, and I would be happy to look at legislation.

Mr. POMPEO. Great. Great. Thank you. I would love to give you all more capacity to control those processes and legislation I am drafting, I think, will move us along that way.

I wanted to just say one more thing on permitting that I want to talk about. I won't go through the list of permits. There is a very long list of folks who you have got to go please before you get to build some of this new capacity. But I want talk about a statement that the President has made about NEPA process. He says now NEPA process will have to include and analysis of climate change, at least as reported in an article in the Bloomberg on March 15.

From a natural gas infrastructure perspective, it seems to me this could be very problematic in terms of extending the timelines to get pipelines built. As the lead agency for approving the interstate natural gas pipeline constructions, tell me what you think the impact would be if FERC were required to take into account climate change as part of each of its NEPA analysis.

Mr. PHILIP MOELLER. Well, it is not make any faster.

Mr. POMPEO. Do have the capacity and resources to do that analysis? Where would you begin?

Ms. LAFLEUR. I think a lot of it comes down to what is the scope of our review. There has been a lot of controversy about does FERC review the pipeline it is certificated or the entire lifecycle of the gas? And there have been some court cases on that. As long as we are working on the pipeline or the project we are looking at, I think if new laws are passed, we will incorporate them in our review.

Mr. PHILIP MOELLER. That is a good statement. We are cabined by the certificate in front of us, and that is not something we have done and I do not know how we develop that expertise. I would leave it to our Office of Energy Projects.

Mr. POMPEO. Yes, I don't know how you do either. You don't have the expertise, in fact. Yes or no, do you think you have statutory authority to do that today, to consider climate change as part of a NEPA project?

Mr. PHILIP MOELLER. Maybe we should review the court decisions on that before we answer that.

Mr. POMPEO. OK. I am happy to let you do that. But I would appreciate a response to whether FERC believes or you as commissioners believe you have the statutory authority to consider climate change as a part of an interstate pipeline approval process.

Ms. LAFLEUR. I would also like to get back to you on that.

Mr. POMPEO. Thank you. I yield back.

Mr. WHITFIELD. Thank you very much.

At this time I recognize the gentleman from Texas, Mr. Green, for 5 minutes.

Mr. GREEN. Thank you, Mr. Chairman.

And I agree with my colleague that FERC is not prepared to do that but there was a bill here last session that was going to give FERC the authority to approve the TransCanada pipeline and I think your testimony was that you are not prepared to do that either. And so, hopefully, we have problems on both sides of our aisle with giving agencies responsibilities that they are not ready for.

But let me get back to my line of questioning. Both commissioners, welcome and thank you both for being here today. I represent a district in Texas and so ERCOT is our RTO, and I have heard that there are some pretty serious concerns about there not being enough forecasted power generation to ensure reliability in the ERCOT market in the future. Could both of you please speak to whether you think that the market structure under ERCOT is enough to incentivize the creation of new generation? And if you don't think it is, what can we do?

And I know our next panel, we have a former Public Utility Commissioner for Texas and also our Railroad Commission Chairman, so I will ask him the same question.

Mr. PHILIP MOELLER. Well, Congressman, thank you for the question.

ERCOT jealously guards its own jurisdiction so that FERC does not tread in it, but of course we watch what is going on and we have a responsibility on the reliability side, not on the market administration side.

Mr. GREEN. Yes.

Mr. PHILIP MOELLER. And you have two very fine public utility commissioners in Texas that are debating this very issue of do you need a capacity market? What do you do with the real-time energy prices because of the reserve margins declining for some of the reasons that have been discussed today?

As I look to the summer, you know, the summer concerns are southern California, Texas, and Boston. They were last summer. They are going to be this summer again. If we have a really, really hot summer in Texas, you will see this debate probably on a daily basis.

Ms. LAFLEUR. I would add that most of the U.S. markets that have gone to competitive electric markets do have some sort of a forward market as is being considered in Texas right now, and that is for the very purpose of attracting capital for future reliability. It is not within our jurisdiction. I feel Mr. Smitherman's eyes on my back, so I will let him take it from there.

Mr. GREEN. Well, and I appreciate it. And being from Texas, we stand shoulder-to-shoulder in protecting ERCOT. I just want to make sure—and we did have rolling blackouts in February of 2011. And it seemed like I heard that our wind power growth, which has been phenomenal in Texas, helped stabilize that situation. Is that the information FERC has?

Mr. PHILIP MOELLER. We can get back to you. But the focus of the report was really on the outages as opposed to the role that wind had, but I will get back to you on that.

Mr. GREEN. OK, I appreciate it.

In light of the increase in natural gas electricity generation, in February of 2012 FERC issued a request for comments regarding natural gas electric coordination. In August of 2012, over 1,200

stakeholders attended five regional technical conferences hosted by FERC to discuss these issues. What are each of your biggest takeaways from those conferences that FERC received?

Ms. LAFLEUR. I think our takeaway was that a lot of the issues are regional in nature but there are some cut-across issues that we should work on, particularly communications and scheduling, the harmonization of the days. I think another takeaway is that the situation is evolving fast so we need to really stay on top of it. New England is where the issues are right now, but it is evolving everywhere. And we have heard that in the conferences.

Mr. PHILIP MOELLER. I would agree that this is an issue everywhere to varying degrees, and the gratifying thing is that a year ago, not everybody thought it was an issue. Now, almost universally, people agree that there are challenges out there, and we are trying to keep the momentum going at the Commission to keep people focused on solutions.

Mr. GREEN. Commissioner Moeller, after the Southwest outage of February of 2011, FERC and the North American Electric Reliability Corporation conducted a study for the cause of the event, issuing a report that was issued in August of 2011 that had 32 recommendations for industry and the regulators in an attempt to avoid a similar occurrence. What are some of the more important recommendations, and is there a plan for enacting these?

Mr. PHILIP MOELLER. There is a plan. I haven't had an update for a couple of months, but the focus of most of the recommendations was to regulators and legislators in those three States. The primary recommendation on the electric side was winterize the system, go into the winter with the same kind of urgency you go into the summer in ERCOT. And I think there has been a lot of progress, and I think Barry Smitherman can answer a lot of those questions.

Some of the others are tougher, like Arizona doesn't have any storage. We had a conference to try to promote storage, gas storage, underground, but that doesn't seem to be materializing.

So I expect another report on the status of the 32 recommendations sometime later this year, but it is something I am very concerned about.

Mr. GREEN. Well, and I only have a couple seconds left, but I appreciate what FERC does and the stability that it does, and I am glad you came for our committee. I appreciate it.

Mr. WHITFIELD. The gentleman's time has expired.

At this time I recognize the gentleman from Virginia, Mr. Griffith, for 5 minutes.

Mr. GRIFFITH. Thank you, Mr. Chairman. I appreciate that, your courtesies in recognizing me.

I would also say to the witnesses here that it was very refreshing to hear folks from an agency come in, and on two occasions said I don't believe we need more authority at this time. It is very unusual to hear those comments in this committee at least.

Also, Ms. LaFleur, I note—and it has been mentioned before—but I would note again because sometimes some of the folks on the other side of the aisle want to think it is just gas prices that are causing a problem, and you did acknowledge in your written testimony on page 2 that it is repowering older fossil generation that

is uneconomic to operate or to retrofit for new environmental regulations when talking about the shutdown of coal. I do appreciate you recognizing that it is this combination.

And likewise, in light of the fact that experts have previously testified in another hearing in this committee that they anticipate that gas will rise back up to about $4 by the end of the year, and that at that point coal once again becomes competitive on pricing. Would you not acknowledge that at that point if we get to that point—and there is some speculation there—but once we reach that point, that then it would be predominantly the new environmental regulations that are shutting down our facilities, our coal facilities? Yes or no?

Ms. LAFLEUR. I don't see it exactly that way, no.

Mr. GRIFFITH. All right.

Ms. LAFLEUR. OK.

Mr. GRIFFITH. But it is still a major concern and you having acknowledged that and I appreciate that.

Ms. LAFLEUR. Absolutely.

Mr. GRIFFITH. You know, I thought it was interesting somebody else brought up the cyber attacks, and apparently in 2012, we had a series of cyber attacks on gas pipeline companies and so forth. Do recall seeing that information?

Ms. LAFLEUR. Yes.

Mr. GRIFFITH. And the concern was, I mean, they might have been trying to steal some information on how to do the fracking because we have been so successful on it, but also there were concerns that there were cyber attacks on the valves and the on-off switches, basically. Isn't that correct?

Ms. LAFLEUR. It was on the energy management system that regulates the pipelines and that opens valves and runs compressors and so forth, yes.

Mr. GRIFFITH. So theoretically, a successful cyber attack could close down or open up gas pipelines, close down ones we don't want closed down and open up ones we don't want opened, isn't that correct?

Ms. LAFLEUR. Yes. Theoretically, yes.

Mr. GRIFFIN. Now, I am no expert on using the computer, but I was sitting here when that question was asked and I started looking for, you know, attacks and cyber attacks, et cetera, on coal facilities, and the only thing I could find were EPA attacks on coal. I didn't find anything about foreign powers. Have you run across any instances where it appears that foreign powers are attempting to figure out ways to disrupt our supply of coal?

Ms. LAFLEUR. There have been cyber attacks on the energy management systems that turn plants on and off. And like FERC, cyber attacks are fuel-neutral. They would mess up whatever was being turned on and off. I am not aware that I remember of any specifically at a coal unit.

Mr. GRIFFITH. But I do think that in regard to your concerns about the pipelines, you previously indicated that one of the concerns was getting the pipelines to the facilities and so forth and that it was a whole lot easier to have a supply of coal sitting there on the ground than it was to have the natural gas automatically

show up when it was needed at the power plant. Didn't you indicate that to us earlier?

Ms. LAFLEUR. I think I said that was what was different about gas, that it came in a pipeline, yes.

Mr. GRIFFITH. And so if an energy production plant had a supply of coal and it was a coal-burning plant, it would be less likely that for a few hours or even for a day, that somebody could affect that supply of energy at that power plant than it would be if somebody did a successful cyber attack on our pipeline. Isn't that true?

Ms. LAFLEUR. Certainly, the coal pile doesn't have the cyber risk, but I think you could still affect the energy management system that turns the plant on and off. I mean, we need to guard against these risks wherever they are.

Mr. GRIFFITH. All right. I do appreciate that as well.

In regard to the natural gas supply, we are already having trouble getting the pipelines there. Do you think that there needs to be a redundancy built in on those pipelines? I know that you don't want to charge the customer too much and you don't want to have too many pipelines, but at the same time, don't you think we would need more than just one pipeline to the facilities to make sure that if something happened to one supply that there be another supply readily available, if we are going to put all of our eggs in that basket or in one of those baskets?

Ms. LAFLEUR. Well, I am not even sure I would use the word redundancy. You need a robust grid, a robust network of more than one source of supply in different regions and localities. Yes.

Mr. GRIFFITH. And it is always a little bit dangerous to put a huge percentage of your energy into one fuel source. It is always better to have multiple sources available to supply the electricity for the American citizen, isn't that true?

Ms. LAFLEUR. Yes, I believe that.

Mr. GRIFFITH. And so it would be ill-advised for our country to completely eliminate coal as an energy source in light of the fact that we have the world's greatest supply of coal. Wouldn't that also be true?

Ms. LAFLEUR. I think we are much better off with the coal plants being retrofitted, as the vast majority of them are, than losing all of them.

Mr. GRIFFITH. I thank you, and yield back.

Mr. WHITFIELD. At this time I recognize the gentleman from New York, Mr. Tonko, for 5 minutes.

Mr. TONKO. Thank you, Mr. Chairman. Thank you for this very interesting topic today. And let me welcome Commissioner Moeller and Commissioner LaFleur, and your expertise is very helpful in this discussion.

And further, Commissioner LaFleur, let me thank you, as a representative in upstate New York in the capital region in Mohawk Valley, for your prior service before your commissioner status. It was much appreciated then and much appreciated now.

Commissioner LaFleur, the pipeline capacity issues in the Northeast region appears to be a greater constraint on natural gas distribution than in other areas. We have had a lot of focus on that today, but I am primarily concerned about the Northeast. And are issues related to the siting of pipelines a constraint or is this pri-

marily a matter of needing to speed up the investments in natural gas infrastructure?

Ms. LAFLEUR. I think it is more of an investment issue. I mean pipelines are harder to build in urban areas but we have had a number of them built. So I have confidence that they will be constructed if the investment comes forward.

Mr. TONKO. And in terms of the investment, what, if anything, could be a response to that? What could enhance the investment opportunity?

Ms. LAFLEUR. Well, ISO New England, I think they will talk about, is working on ways in which to structure the generation markets to motivate the generators to build in more fuel security to invest or increase their commitments to pipelines or other dual fuel commitments or other gas storage. We do have LNG storage in the Northeast, other ways of getting fuel security. So it is pricing the fuel security into the generation I think is the big response.

Mr. TONKO. Thank you. And as utilities have reduced their coal-fired generation, we have seen reductions in carbon pollution from the energy sector, and increased natural gas generation is one factor in this drop of carbon pollution but it is obviously not the only factor. So Commissioner, would you agree that state-level renewable energy policies have helped to reduce emissions from the power sector?

Ms. LAFLEUR. Yes. I think they are driving a lot of renewable investment including in upstate New York, as you know. If you drive up near Niagara Falls, you just see windmills as far as the eye can see.

Mr. TONKO. Absolutely right. And as a result of their renewable energy policies, States like New York and Colorado and California are displaying a significant amount of renewable generation capacity. So to both commissioners, which state policies would you note have been the most effective in deploying renewable energy?

Ms. LAFLEUR. I think that renewable portfolio standards are certainly starting to be felt. We don't regulate it, but I would point to Texas but also other States. You mentioned upstate New York has a lot of wind. Some of the States have very effective small solar policies. States as diverse as California and New Jersey, which clearly have different weather, have very heavy penetration of home- and business-level solar, and the programs they have in place appear to be very effective at getting those done.

Mr. PHILIP MOELLER. Congressman, I am not really an expert on all 29 different renewable portfolio standards throughout the country, but I think the ones have been most successful are the ones that have adequate transmission infrastructure to make sure that that power can move around from, typically, where it is generated to where it is consumed and have the kind of flexibility that don't overly favor one or two sources.

Mr. TONKO. And I would assume that the upgrades in interconnection are important in that regard?

Mr. PHILIP MOELLER. They are vital, absolutely important. And it is usually difficult to site this transmission so that is part of the challenge as well.

Mr. TONKO. And to the policy area, which federal policies would you suggest have helped deploy renewable energy?

Ms. LAFLEUR. Well, certainly, right now, the Production Tax Credits are having an impact on investment in that area. I also think federal R&D, as well as private R&D, has helped bring down the cost of some of the technologies.

Mr. PHILIP MOELLER. I go more toward market access in making sure that the transmission infrastructure is there to move the power around. And there are a variety of things we could talk to you later about that could promote that. We are doing an exercise at FERC, Order 1000, which is an attempt to make the planning better on transmission.

Mr. TONKO. Thank you. And Mr. Chair, I note my time is expired so I yield back.

Mr. WHITFIELD. Thank you.

At this time I recognize the gentleman from Illinois, Mr. Shimkus, for 5 minutes.

Mr. SHIMKUS. Thank you. And Mr. Chairman, it is great having you here.

Ms. LaFleur, you mentioned many coal-fired power plants have been retrofitted. Can we retrofit a coal-fired power plant to an existing plant to address site greenhouse gas rule or regulation?

Ms. LAFLEUR. I am not an expert on that but I think it is much harder than scrubbing things out of the stacks.

Mr. SHIMKUS. It is impossible. There is no technology right now. The cost would triple the amount of infrastructure costs and the electricity required to run this was probably about 30 percent of the generation capacity of a power plant at this time. So that just goes into the emissions, kind of the whole debate, what is toxic, what is not is not, just that debate. And it does segue into this fear on reliability because, as we have this debate and concern about environmental rules and regulations, the pulling off of generation should be of major concern. Is that correct?

Ms. LAFLEUR. Well, in the case of other EPA regulations, like when we worked on Mercury and Air Toxics, as the rules become final, we had to work at FERC and with the EPA to make sure we had the coordination and flexibility that was needed to make sure we protected reliability. If there are other suites of regulations, that will be equally necessary.

Mr. SHIMKUS. Well, let's talk—and Commissioner Moeller, you are more than welcome to chime in, too.

We know based upon MACT that anywhere from 50 to 70 gigawatts of coal-fired generation may be retired over the next decade. That is a lot, with 90 percent coming within the next 5 years. So this next 3- to 5-year window aligns with the compliance deadlines for EPA's Utility MACT Rule in places like the Midwest. Some of this coal-fired generation will be replaced with natural gas-fired power plants and that is part of the debate of having them and also getting the natural gas in the pipeline siting.

From your perspective—and this is for Commissioner Moeller—would you agree that the short compliance time frame for EPA's Utility MACT rule is compounding reliability concerns for regions heavily relying on coal such as the Midwest and the mid-Atlantic?

Mr. PHILIP MOELLER. Yes, I do. You bet.

Mr. SHIMKUS. It is just a matter of numbers, isn't it?

Mr. PHILIP MOELLER. Well, the environmental benefits are coming. The question is, if you squeeze them on too tight a timeline, there can be reliability challenges that are probably going to land in our lap. So that is why I have urged the EPA to be flexible if certain areas need a little more time, to give it to them.

Mr. SHIMKUS. It is reliability that segues into cost, too. And an unreliable grid is a costly grid, wouldn't you argue? So from the individual consumer's point of view that if the reliability of the grid becomes uncertain and there is a risk premium then paying for reliability, that will get passed onto the individual consumer, would it not?

Mr. PHILIP MOELLER. It will, depending on the market structure, in different ways.

Mr. SHIMKUS. Given your background as a state public utility commissioner and now your experience at FERC, do you believe having a diverse range of fuel resources available to generate electricity is important to provide affordability and reliable service to customers?

Mr. PHILIP MOELLER. Yes. I have never been a state commissioner but optionality is always good.

Mr. SHIMKUS. And I understand that FERC does not have jurisdiction over generation, but would you agree that an overreliance on any one particular fuel source could be problematic from a reliability perspective?

Mr. PHILIP MOELLER. Yes.

Mr. SHIMKUS. Thank you, Mr. Chairman, and I yield back my time.

Mr. WHITFIELD. The gentleman yields back his time. I would like to recognize the gentleman from Colorado, Mr. Gardner, for 5 minutes.

Mr. GARDNER. Thank you, Mr. Chairman, and I welcome the commissioners to today's hearing. Thanks for being here to share your expertise.

And Chairman Moeller, I wanted to talk to you a little bit about some of the comments made in your testimony. You talk a little bit about traditional base load generation will be needed to firm renewable energy resources. We hear a lot of talk about that, whether it is wind, solar, what backup will be needed. Is there a percentage that you can give me of that base load generation so, for instance, if you have a megawatt of wind production, what percent of firming base load would you need for that 1 megawatt of wind?

Mr. PHILIP MOELLER. Well, it depends on the wind because your home State of Colorado has some really good wind and——

Mr. GARDNER. I live on the Eastern plains so——

Mr. PHILIP MOELLER. Your chairman can talk about it later, but because of the characteristics of how it comes off from the Rockies, it is really good wind. So they don't have as much of a challenge firming it—they still have a challenge. Another area that, you know, might have a capacity factor of 20 percent, you know, that means that 80 percent of the time you have to back it up. So wind quality differs.

Mr. GARDNER. So for every 5 megs, you need 4 megs of base load in that instance? Is that one way look at it?

Mr. PHILIP MOELLER. Yes. Right.

Mr. GARDNER. OK. And then, talking about pipeline issues, talking about production of natural gas, we have in Colorado several cities that are banning hydraulic fracturing. We also are hearing rumors that there may be a statewide initiative to ban hydraulic fracturing. If they go that direction, is there an interstate commerce issue that FERC would have to look at based on this transition to natural gas power generation?

Mr. PHILIP MOELLER. Congressman, I don't think it would be in our jurisdiction to do that, but I am sure someone would be thinking about it.

Mr. GARDNER. And I would love to hear your further thoughts on that and perhaps maybe even somebody in the Council's office talking a little bit about that issue specifically. When it comes to the EPA, we have seen a growing, sort of, decisions by the EPA when comes to things like LNG export facilities where EPA is asking targeted questions in their environmental assessments and analysis on pipelines and whether or not an LNG facility would require additional pipelines. Is the EPA consulting with FERC when they are requiring an analysis of pipeline need or capacity?

Mr. PHILIP MOELLER. I don't believe so. I will get back to you, but they certainly have submitted comments for the record on the environmental analysis.

Mr. GARDNER. OK. And then I think Mr. Pompeo may have touched a little bit on this, but do you have an average time that it takes to site a pipeline in the U.S. on private land?

Mr. PHILIP MOELLER. We might but I would have to get back to you on that.

Mr. GARDNER. That would be great. And if you could get back to me on the federal land as well, do you have that answer of the top your head?

Mr. PHILIP MOELLER. OK.

Mr. GARDNER. Perfect. And then, are you working on ways—and you can follow up with me on this as well—working on ways that FERC can improve upon the time it takes to site a pipeline? I think that is an important conversation with those answers in mind.

Mr. PHILIP MOELLER. Well, I have a lot of confidence in our Office of Energy Projects. They are doing the best job they can under the given circumstances and statutory responsibilities, as I alluded to earlier. One way to speed up the process would be to create some timelines and the accountability that come with timelines on the resource agencies that a pipeline is also dependent on getting permits from.

Mr. GARDNER. OK. And do you believe that coal still plays a role in our electric generation and that it would be unwise to move too quickly to natural gas if there is no infrastructure if it is not currently supported?

Mr. PHILIP MOELLER. Well, coal is still an extremely significant part of our electricity mix and will be for the foreseeable future.

Mr. GARDNER. Mr. Chairman, I yield back my time.

Mr. WHITFIELD. The gentleman yields back the balance of his time. Thank you.

Well, I believe that is it. Commissioner Moeller and LaFleur, thank you all again for your testimony and we look forward to your providing the additional information that was requested. And you

all are dismissed at this time. But we do look forward to working with you as we move forward.

I would like to call the second panel of witnesses. On the second panel today, we have Hon. Barry Smitherman, who is the chairman of the Railway Commission of Texas. We have Hon. Joshua Epel, who is chairman of the Colorado Public Utilities Commission. We have Mr. Clair Moeller, who is executive vice president, Transmission and Technology for the Midwest Independent Transmission System Operator. We have Mr. Gordon van Welie, President and CEO of ISO New England. And we have Mr. Paul Hibbard, who is the vice president of the Analysis Group. Todd Snitchler, who is the chairman of the Public Utilities Commission of Ohio, was scheduled to be with us, but because of an unexpected development, he is not here today.

So welcome all of you. Thank you for agreeing to come and testify. And Mr. Smitherman, we will begin with you.

Each one of you will be given 5 minutes for your statement, and the little red light will come on when your time is expired. So we thank you for being with us, we look forward to your testimony, and we welcome your expertise as we try to deal with these significant issues.

So Mr. Smitherman, you are recognized for 5 minutes.

STATEMENTS OF BARRY T. SMITHERMAN, CHAIRMAN, RAILROAD COMMISSION OF TEXAS; JOSHUA B. EPEL, CHAIRMAN, COLORADO PUBLIC UTILITIES COMMISSION; CLAIR J. MOELLER, EXECUTIVE VICE PRESIDENT, TRANSMISSION & TECHNOLOGY, MIDWEST INDEPENDENT TRANSMISSION SYSTEM OPERATOR, INC.; GORDON VAN WELIE, PRESIDENT AND CEO, ISO NEW ENGLAND, INC.; AND PAUL J. HIBBARD, VICE PRESIDENT, ANALYSIS GROUP

STATEMENT OF BARRY T. SMITHERMAN

Mr. SMITHERMAN. Thank you very much, Chairman Whitfield, Ranking Member Rush, members of the committee, including my good friends from Texas.

My name is Barry Smitherman. I am the chairman of the Texas Railroad Commission. I was electing statewide last November with 74 percent of the vote, apparently receiving at least two votes from this room.

The Railroad Commission of Texas was created by an amendment to the Texas Constitution in 1891, and we are the oldest regulatory body in Texas, one of the oldest in America. While we no longer regulate railroads, we have for almost 100 years regulated the oil and natural gas industries. We also regulate intrastate pipelines, surface mining for lignite, and natural gas utility rates.

I am also the former chairman of the Public Utility Commission, as you heard earlier, which regulates the electric and telecommunications industries. In that capacity, I was a member of the ERCOT Board of Directors, which is the grid operator for most of Texas.

I am honored to be the only person in Texas history to serve as commissioner on both the PUC and the Railroad Commission. I am also the chairman of the NARUC Gas Committee, although I am not appearing in that capacity today.

Today's hearing focuses on natural gas and electric coordination challenges, and my focus in these comments will be on upstream production issues. In analyzing these two issues, we must keep in mind two significant developments. The first of which is been touched upon is that EPA, under this Administration, has ramroded through a suite of anti-fossil initiatives led by six new greenhouse gas rules, which effectively make it impossible to build a new coal plant in America.

Texas has refused to comply with these sweeping EPA regulations, and therefore, EPA has rejected our permitting authority through the first-ever imposition of a Federal Implementation Plan, or FIP. The Texas Attorney General has assured me that he will challenge these greenhouse gas rules in the U.S. Supreme Court if it is granted.

When I last appeared before this committee, I spoke of the Cross-State Air Pollution Rule. CSAPR is the successor to the Clean Air Transport Rule, and had it been implemented in early 2012, it would have caused the premature closing of several coal-fired power generation plants in Texas. Such closures would have increased the likelihood of rolling blackouts last summer and this coming summer. Fortunately, Texas and the other litigants were successful at the Court of Appeals for the District of Columbia when the Court vacated CSAPR by concluding that the EPA had exceeded its authority.

I could talk about the remaining rulemaking initiatives, but I would prefer a focus on the second development, which is actually very positive, timely, and quite fortuitous. We now have abundant supplies of natural gas in America. Through horizontal drilling and hydraulic fracturing techniques developed by the private sector, we have seen a 180 degree turnabout from just 5 years ago. In late 2008 it was believed that were running out of natural gas in America. And in fact, the price was very high, over $12 MMBtu, and several firms were considering importing LNG.

Today, America is awash in natural gas. And whether it is a 100-year or 200-year supply of natural gas supply of natural gas, we have a lot of it, and Texas is leading the way. We produce almost 20 Bcf of gas per day, which is about 30 percent of all U.S. production. The Barnett Shale, for example, has produced 12 trillion cubic feet of gas and we believe there are 44 trillion cubic feet of gas remaining.

The importance of this is that electricity prices in many parts of the country are driven by the price of natural gas. For example, in Dallas, where Chairman Emeritus Barton is from, you can get electricity for less than .05 a kilowatt hour, .05 a kilowatt hour. That is 1/3 of what the price was 5 years ago, almost directly related to the cheap price of natural gas.

However, I must point out that there are potential storm clouds on the horizon, whether it is potential endangered species listing, which would take prime gas-producing areas off the table; new source performance standards; new fugitive methane emissions requirements; frac-water-use studies and possible restrictions on supply and disposal; overly onerous permitting requirements to fracture oil on federal land. The list goes on and on and we could potentially kill the goose that lays the golden egg.

In conclusion, I would say new nuclear power construction is prohibitively expensive, renewable power is variable and not yet scalable, and coal-fired power plants are under constant attack from the EPA. Natural gas is the only fuel source that makes electricity today, at scale, with reasonable prices to the consumer.

However, let's be clear. Without hydraulic fracturing, this incredible supply of natural gas disappears, and prices for both gas and electricity will skyrocket and our economy will stop dead in its tracks again. Thank you for the opportunity.

[The prepared statement of Mr. Smitherman follows:]

Testimony of Barry T. Smitherman

Chairman, Railroad Commission of Texas

Before The Committee on Energy and Commerce, Subcommittee on Energy and Power

United States House of Representatives

Hearing: American Energy Security and Innovation

March 19, 2013

Mr. Chairman and Members of the Committee and Subcommittee:

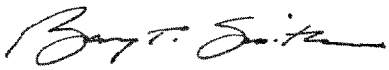
Thank you for the opportunity to provide testimony regarding natural gas and electric coordination challenges.

My testimony will focus on issues surrounding the interdependence of natural gas and electricity in Texas. As Chairman of the Railroad Commission of Texas, I oversee the nation's leading natural gas and oil producing state. In 2012, over 7 trillion cubic feet of gas was produced. I also serve as the Chairman of the Gas Committee for the National Association of Regulatory Utility Commissioners (NARUC). My service in these positions has given me a first-hand view of how vital a resource natural gas has become in this nation.

As Texas is a major supplier of natural gas to the United States, how we address these issues will affect not only our state but the nation as well. In my testimony, I will address the status of Texas' current natural gas production. I will also speak to the reserve margins in Texas and its causes, including low natural gas prices and wind production. I will also address some of the challenges we face in Texas in energy production, including actions by the federal government and the Environmental Protection Agency.

I look forward to addressing this subcommittee and welcome any questions.

Sincerely,



Barry T. Smitherman
Chairman
Railroad Commission of Texas

Testimony of Barry T. Smitherman

Chairman, Railroad Commission of Texas

Before The Committee on Energy and Commerce, Subcommittee on Energy and Power

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Hearing: American Energy Security and Innovation

March 19, 2013

Mr. Chairman and Members of the Committee and Subcommittee:

Thank you for the opportunity to provide testimony regarding natural gas and electric coordination challenges. As Chairman of the Railroad Commission of Texas, Chair of the Gas Committee for the National Association of Regulatory Utility Commissioners (NARUC), and former Chair of the Public Utility Commission of Texas (PUC), I am keenly aware of the significant role natural gas now has in fueling our nation. Natural gas is a clean, reliable, low-priced source of fuel. It is being produced in abundance, particularly in Texas, but it is important to note that natural gas is not the only source of fuel that drives this county. However, because the federal government and the EPA continue to set unreasonable roadblocks to diverse fuel production, the natural gas industry is challenged to supply enough energy for the nation. The interdependence of Texas', and the United States', electric infrastructure with natural gas infrastructure brings many issues into question, including how natural gas reserve margins will affect the electric market, the long-term reliability of natural gas, and how the EPA has affected or attempted to affect the market in Texas specifically.

The first issue to address regarding energy production is the effect of recent actio s by the EPA and the federal government. The EPA has implemented such onerous restrictions on the ability to build new coal plants that it has greatly impacted fuel supply in Texas and the nation.

These restrictions, coupled with the fact that nuclear plants have become prohibitively expensive to build, have put added pressure on the role of natural gas as a fuel source. Further, the subsidizing of wind allows for essentially negative prices for the resource, thereby making other sources noncompetitive. The combination of these factors, all driven by the federal government and the EPA, creates some major problems for our nation's fuel supply.

A few examples from Texas can illustrate the problems the EPA has created, or attempted to create, in energy production. According to the EPA, the Cross-State Air Pollution Rule (CSAPR) was proposed to address air emissions that cross state lines and contribute to ozone and particulate matter pollution in the eastern United States. The final rule included federal implementation plans to reduce sulfur dioxide and nitrogen oxide emissions from electric power plants in 32 states, including Texas. This goal was to be accomplished through abatement standards promulgated by the EPA, as well as a voluntary cap and trade program. The rule would require the 32 numerated states to cut power plant sulfur dioxide emissions by 71% and nitrogen oxide emissions by 52% from 2005 levels. These cuts were to be met by 2014, with emissions reductions beginning in January 2012.

Originally, in the EPA's proposed rule, Texas was not included in the states to be affected by the rule. The states included were those that allegedly contributed significantly to nonattainment, or interfered with maintenance by a downwind area of national ambient air quality standards. Once the rule was adopted by the EPA, however, Texas was included in the affected states. Instead of including Texas based on actual measurements and sound science, the EPA included Texas as an affected state, at the last minute, based solely on EPA modeling indicating that Texas would contribute significantly to nonattainment in 2012 by slightly

affecting parts of Illinois. Based on their modeling, the EPA planned to require Texas to reduce potential emissions which would potentially lead to the modeled contribution of nonattainment.

The Railroad Commission, the Public Utility Commission (PUC), the Texas Commission on Environmental Quality (TCEQ), and the General Land Office sued the EPA in federal court. Because Texas was added to the final rule but was not included in the original proposed rule for comment, the Texas agencies argued that the EPA failed to provide proper notice of the rule or a true and fair opportunity for comment to the rule's application to Texas. In addition, the state agencies argued that the EPA failed to provide notice of the factual data and analysis used in the determination to include Texas as an affected state in the rule. If the EPA had done so, Texas would have been afforded an opportunity to challenge the data.

The Texas agencies requested a stay of the effective date of the Cross-State Air Pollution Rule from the federal court. Without a reprieve from the EPA's designated effective date of January 1, 2012, generation plants would have been unable meet the aggressive deadlines in order to comply. Plants would be forced to cease operation, likely causing rotating electricity outages throughout the ERCOT region. Texas would also be required to comply with emission allocations under the rule starting January 1, 2012, which was only five months after the final rule was published in the Federal Register. These draconian measures, the agencies argued, would cause Texas would suffer irreparable harm. Texas was ultimately successful in its appeal of the rule to the DC Circuit Court of Appeals, as the court found that the EPA had exceeded its statutory authority in its rule-making.

In the same month, the Fifth Circuit Court of Appeals struck down the EPA's rejection of Texas' Flexible Permits Program. The EPA had claimed that Texas' program did not meet the

standards of the Clean Air Act. However, the Court held that the EPA's findings were based not on actual standards or procedures, but instead based on wording.

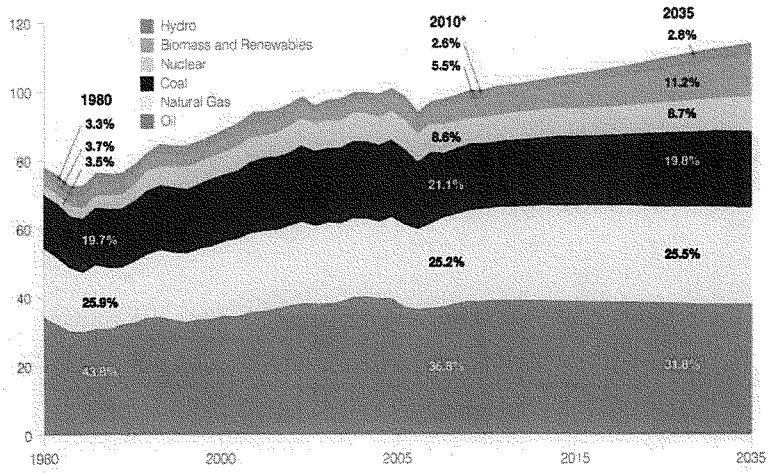
Texas has recently fought several battles against the EPA, and the state has been successful so far due to the EPA's overreaching. However, upcoming rules on methane gas emissions, in addition to decisions on the suite of rules concerning greenhouse gas emissions, will continue to pose potential problems for the state in energy production. The EPA's rules on coal production have exacerbated the use of natural gas because coal plants, and coal production, is slowing to a halt. There are several reasons that natural gas is an excellent resource to turn to, although it not the only answer.

The booming natural gas industry, especially in Texas, has certainly helped increase the nation's use of natural gas as a fuel source for electricity. The domestic supply of natural gas has grown dramatically in recent years, due in major part to new technologies in the development of shale gas production. This is particularly true in Texas, where the Barnett, Haynesville, and Eagle Ford shale plays have greatly increased natural gas production. In 2012, Texas produced over 7 trillion cubic feet of natural gas, 19.5 billion cubic feet per day. In 2011, production was over 7 trillion cubic feet as well. In 2001, natural gas production was at 5.8 trillion cubic feet. The Railroad Commission of Texas issued 22,479 oil and gas drilling permits in 2012, 22,480 in 2011, and 18,029 in 2010. To contrast, in 2002, 9,716 drilling permits were issued.

Natural gas is not only abundant, but natural gas-fired generation facilities are quicker to build and require less initial capital outlays than other options. As stated above, the EPA's major air quality regulations regarding coal make it difficult to build new coal plants to generate reliable electricity. Natural gas is a clean source of fuel and firm, reliable power, and it is

projected to continue to contribute a significant amount of electricity needs, although cannot supply all electricity needs. The figure below illustrates reliance on natural gas, among other fuels.

Future U.S. Energy Demand (Quadrillion Btu)



Source: EIA, *Annual Energy Outlook 2012*, Tables A1 and A17

In addition to being an abundant resource, natural gas prices have remained relatively stable and low in the past few years. Natural gas-fired technologies have also resulted in more efficient generation units, allowing for a larger volume of electricity per unit of natural gas to be burned. Illustrated below are natural gas prices from 2002-2012. Changes throughout the years show the variety of prices for natural gas, with lower numbers in recent years.

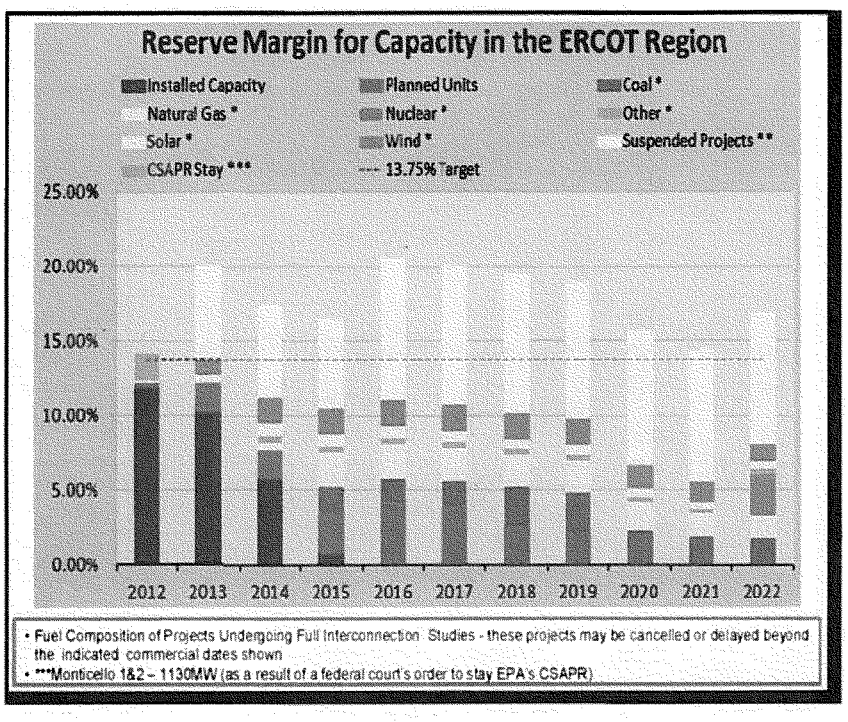
Texas Natural Gas Price Sold to Electric Power Consumers (Dollars per Thousand Cubic Feet)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002	2.65	2.36	2.96	3.57	3.52	3.39	3.37	3.21	3.49	3.95	4.09	4.28
2003	5.11	6.91	7.20	5.20	W	5.97	5.27	5.06	4.91	4.62	4.49	5.39
2004	5.92	5.41	5.22	5.54	6.14	6.45	6.07	5.86	5.13	5.85	6.57	6.59
2005	6.01	6.04	6.47	7.07	6.66	6.88	7.29	8.41	10.43	11.30	9.32	10.72
2006	8.48	7.48	6.76	6.82	6.34	6.08	6.06	7.03	5.83	5.09	6.87	6.92
2007	6.42	7.34	6.90	7.29	7.51	7.48	6.55	6.19	5.88	6.68	6.58	7.00
2008	7.73	8.08	8.92	9.95	10.48	12.18	11.34	8.63	7.10	6.26	5.72	5.91
2009	5.24	4.42	3.67	3.62	3.82	3.87	3.77	3.54	3.13	4.05	4.11	5.26
2010	6.19	5.60	4.76	4.21	4.32	4.80	4.81	4.62	4.12	3.83	3.81	4.54
2011	4.51	4.75	4.22	4.53	4.56	4.75	4.70	4.45	4.22	3.90	3.60	3.55
2012	3.10	2.90	2.52	2.26	2.54	2.71	3.13	3.21	3.04	3.46	3.74	3.72

While now inexpensive natural gas has been a benefit to consumers, it also discourages new investment due to a lack of returns. Low prices, coupled with EPA's restrictions on coal, have caused a narrowing of reserve margins in Texas. The Electric Reliability Council of Texas (ERCOT) and the Public Utility Commission (PUC) are attempting to address the balance of low costs with a need for more power.

ERCOT operates the power grid and manages the electric market for the majority of the state. The wholesale electricity market in Texas has been deregulated since 1995. Deregulation has helped create a competitive and efficient energy wholesale market, as market forces drive the supply of energy and standby reserves for the ERCOT region in Texas. While this model may provide less stability or predictability than more tightly regulated models, the benefits of a free market place construction risks on shareholders, not customers, and end-use customers enjoy reasonable prices and more retail choices.

Although in the past generators were easily able to realize revenues that ensured reserve resources in Texas, upcoming years are expected to provide more of a challenge. Lower natural gas prices have affected generator revenues. In addition, wind production tax credits have contributed to low wholesale prices, particularly in off peak settlement intervals at night, as well as certain months in the spring and fall when wind blows a lot and electricity demand is lower. Lower priced gas and low-priced wind generation have reduced potential revenues for Texas generators, discouraging capital investments in new generation capacity. To address some of these issues, the Texas Public Utility Commission (PUC) recently voted to raise the system-wide offer cap, or the amount generators may bid into the market, from $3,000/MWh to $4,500/MWh, ultimately to $9,000 in the summer of 2015. In order to increase reserve margins, ERCOT and the PUC will have to find a way to further incent investment in new generation. The figure below illustrates the challenges ahead.

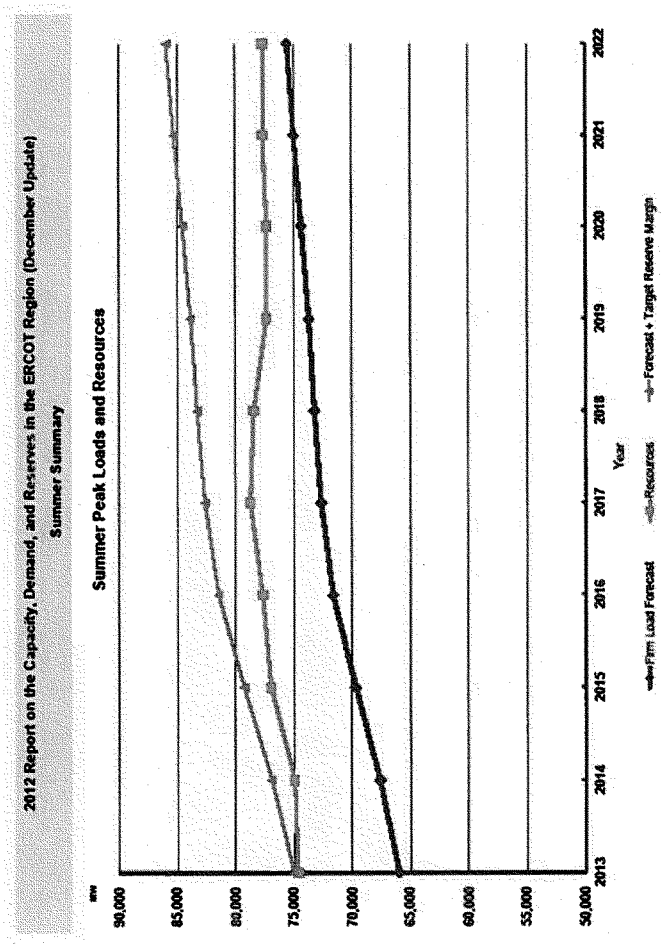


As it stands today, ERCOT forecasts that reserve margins may fall below the desired reserve level of 13.75% in coming years. ERCOT has predicted that in upcoming summer months, similar to last summer, the amount of electricity available for consumer demand will be tight. Electricity needs are expected to be met during the spring, however, barring any extreme weather events during the early part of the season, when power plants undergo regular maintenance in preparation for the summer.

ERCOT's 2013 summer assessment projects a peak demand of 67,998 megawatts. This projection is based on a summer weather outlook similar to 2010's. Without accounting for

power plant outages, ERCOT anticipates 73,308 MW of generation capacity. Power plant outages typically account for a total of 2,600 MW during an operating day, resulting in a net of 70,708 MW. The summer is expected to be hotter and drier than normal, although no prolonged heat waves are expected. Therefore, although ERCOT will have more resources available for summer demands than in 2012, there is also expected to be a higher demand. Air conditioning use in homes and businesses put high power demands on ERCOT in the summer. For example, the ERCOT region reached an all-time record high on August 3, 2011, where consumer demand reached 68,305 MW.

Reserve margins in the ERCOT region are expected to be below the target reserve margin of 13.75% for the 2013 peak season and to remain below that target level for the duration of the reporting period. The planning reserve margin for the peak season of 2014 is forecasted to be 10.9%. However, according to ERCOT, there are three combined-cycle projects that are currently under construction and are scheduled to enter commercial operation in the third quarter of 2014. These units may be available to provide energy in test mode, or may be commercially available by the time of system peak in August of 2014. Because of that late date, they are not included in the Planned Units (Not Wind) category for 2014, but if all of the units are available at the time of system peak, the effective planning reserve margin will be 13.6%. Below is a figure that illustrates the estimated Summer Peak Loads and Resources, provided by ERCOT.


2012 Report on the Capacity, Demand, and Reserves in the ERCOT Region (December Update)
Summer Summary
Summer Peak Loads and Resources
MW
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Year
Firm Load Forecast
Resources
Forecast + Target Reserve Margin

9

Challenges clearly exist in increasing Texas' reserve margins, but ERCOT, the PUC, and the Railroad Commission of Texas are in coordination to address these issues. A reliable supply of natural gas and power, prices that will incent investment and the authority to allow a free and competitive market to address these problems will help the state provide valuable energy sources, now and in the future. For this to occur, the EPA and the federal government must not interfere unnecessarily with overly burdensome restrictions on fuel production. Unchecked regulation poses a danger to these vital resources, and is something the natural gas community must continue to address.

Thank you for the opportunity to testify before the Subcommittee and for your attention to this urgent matter.

Sincerely,

Barry T. Smitherman
Chairman
Railroad Commission of Texas

Mr. WHITFIELD. Thank you.

And Mr. Gardner, I will call on you to make some comments about our next witnesses.

Mr. GARDNER. Thank you, Mr. Chairman. And I would just like to welcome Chairman Epel to the committee. I have worked with the chairman on a number of issues over the years, and as chairman of the Public Utilities Commission, he has jurisdiction over not only some of the regulations that we are talking about here today but also taxicabs and all kinds of other fun stuff in Colorado. But certainly appreciate your work as chairman of the Colorado Oil and Gas Conservation Commission as well, and welcome to the committee. Thanks for sharing your expertise with us.

STATEMENT OF JOSHUA B. EPEL

Mr. EPEL. Well, thank you Congressman. Thank you, Chairman Whitfield, Ranking Member Rush, and members of the subcommittee for the opportunity to testify at today's hearing.

My name is Joshua Epel. As the Congressman mentioned, I am the chairman of the Colorado Public Utilities Commission. Prior to my appointment to the Commission, I was chairman of the Colorado Oil and Gas Commission, so I understand a little bit of the issues, and we are sort of the baby brother to the Railroad Commission.

The State of Colorado began to diversify its source of electric generation in 2005 when it adopted its Renewable Energy Standard through a valid initiative. Subsequently, the Colorado legislature increased the renewable energies requirement twice with bipartisan support. The Colorado legislature also adopted minimum standards for electricity savings through energy efficiency resulting in a decrease in the amount of fossil fuel necessary to meet the electric demands of Colorado.

In 2010, the Colorado General Assembly did something extraordinary. It passed the Colorado Clean Air-Clean Jobs Act. Representative Gardner was a supporter of the Act. What made the Act remarkable and instructive for today's hearing is the Act mandated that the State's largest investor-owned utility undertake a process of significantly reducing its coal usage in Colorado. And most importantly, certainly to me, is the legislature did not mandate the fuel mix. It left that decision to the Colorado Public Utilities Commission.

The decision adopted by the Commission, and ultimately approved by EPA, is instructive on a way to meet the challenge of natural gas and electric coordination and also to meet the potential EPA regulations for existing generation sources.

First, the Air Quality Control division, our regulatory agency in Colorado, was instructed to aid the Commission. And second, it was the Commission that determined the correct mix of fuel switching to natural gas, plant retirement, and retrofitting of existing coal-fired units.

The plan adopted by the Commission will allow our largest utility to be in compliance with the Regional Haze Rule, the Mercury and Air Toxics Rule, and reduce greenhouse gases by 30 percent by 2020 from 2005 levels. By the very nature of the plan, the cost will

be reasonable and ensure that we have safe and reliable electric generation in Colorado.

A central element of this plan is Colorado has made a conscious decision to switch some generation, not all, from coal to gas. We are assured that we will not have a conflict with electric and gas generation because Public Service Company of Colorado signed a 10-year long-term contract with the gas producer in Colorado.

Now, at this point, I have got to be fair to the other regions. Colorado is unique. We have a surplus of gas and we also have an existing pipeline infrastructure that allowed that signing of a long-term contract. But this program does not come without cost to Colorado. The estimated price tag of Clean Air-Clean Jobs is around $900 million. Colorado will also be required to make additional infrastructure changes, and as was asked in the previous questions, assured the safety of the gas distribution system.

As the members of the subcommittee know, an additional challenge for the electric generation system are the EPA's rules for existing sources. I believe Colorado's approach provides a lesson on how to address existing and future rules. However, to be successful, key principles must be observed.

The Clean Air-Clean Jobs Act enabled Colorado to meet numerous federal air quality requirements. And because the Commission selected a suite of controls, fuel switching, and plant retirements—and what we did was we examined the entire fleet of Public Service Company. If each generation plant were controlled individually, it would have been prohibitively expensive and politically impossible. By being technology agnostic, Colorado selected the right balance of fuel switching, retirements, and retrofits to provide both the necessary reductions and keep rates reasonable and the system safe and reliable.

Finally, implementation of the Renewable Energy Standard in the Clean Air-Clean Jobs Act is a major investment. As EPA develops its new rules for existing sources, if Colorado is not given credit for this investment, it will be penalized unfairly when compared to States that have not taken early action.

Thank you for the honor of representing Colorado before this subcommittee, and I will be pleased to answer any questions.

[The prepared statement of Mr. Epel follows:]

Witness Testimony
Before the
House Committee on Energy and Commerce
Subcommittee on Energy and Power

"American Energy Security and Innovation:
The Role of Regulators and Grid Operators in Meeting
Natural Gas and Electric Coordination Challenges"

Joshua B. Epel
Chairman
Colorado Public Utilities Commission
March 19, 2013

Thank you, Chairman Whitfield, Ranking Member Rush and the members of the subcommittee for the opportunity to testify at today's hearing.

My name is Joshua Epel, and I am the Chairman of the Colorado Public Utilities Commission. Prior to my appointment to the Commission, I was the Chairman of the Colorado Oil and Gas Conservation Commission. The Colorado Public Utilities Commission regulates the Investor Owned Utilities that serve 1.5 million customers in Colorado. These investor owned utilities are vertically integrated, and therefore the issues and constraints we face are different from other States and regions of the Country.

I appreciate the opportunity to share with the panel the unique innovations pioneered by Colorado. Colorado's path towards fuel diversification and extraordinary use of renewable energy began in November of 2004, when Colorado became the first U.S. state to create a renewable energy standard (RES) by ballot initiative. The Renewable Energy Standard has evolved over the years to require utilities to increasingly obtain energy from

renewable resources. This citizen driven effort, which has been enhanced by the Colorado Legislature, reflects Colorado's determination to chart its own energy future.

The Colorado Legislature also set minimum standards for electricity savings through energy efficiency and other forms of demand-side management. Like renewable energy, consumer energy savings help reduce emissions through reductions in fuel combustion for power generation. The Commission has the authority to set energy savings goals for the investor owned utilities above the statutory minimum standards and the flexibility to direct spending on cost-effective efficiency efforts while taking into account the benefits of energy savings, the immediate impacts on customer bills, and longer-term effects on utility sales.

Colorado's third major initiative was the adoption of the Clean Air Clean Jobs Act. The Clean Air Clean Jobs Act was adopted with overwhelming bi-partisan support. The Act pro-actively addresses Regional Haze, ozone 'non-attainment' and the Mercury Air Toxics Rule. What was remarkable about the Clean Air Clean Jobs Act is that it mandated that the Colorado Health Department work cooperatively with the Commission and the 34 stakeholders to develop a plan that achieves both air quality objectives and assures that Colorado ratepayers have reliable electricity at a reasonable cost.

The significance of both the Renewable Energy Standard and the Clean Air Clean Jobs Act cannot be overstated. Colorado has the highest per capita wind resource in the U.S.: 2,100 Megawatts out of a total generation of 14,000 Mw. The plan adopted by the

Commission requires our largest electric utility to retire, fuel-switch, or retrofit approximately 50% of their coal-fired generating capacity. As a result, it is estimated that CO2 emissions in Colorado will be reduced by 30% by 2020 from 2005 levels.

The lynchpin of the Clean Air Clean Jobs Act is the important role that natural gas will play in Colorado's efforts to ensure a diverse source of generation and reduce emissions.. Natural gas is the fuel of choice for generation facilities that will replace the least efficient coal units that are being retired pursuant to the utilities' emission reduction plans, and natural gas will also repower other units that once burned coal. A key element of the Clean Air Clean Jobs Act is the legislation authorized our investor owned utilities to enter into long term gas supply contracts. The ability of our utilities to enter into a ten year contract with a fixed price and annual adjustment or escalation addresses the issue before the Subcommittee: "How to address the Natural Gas and Electric Generation Challenges."

The Colorado Public Utilities Commission completed, just last week, our Electric Resource Plan for Public Service Company of Colorado. The Electric Resource Plan has valuable lessons for this Subcommittee and EPA. First, the projected demand growth in Colorado reflects the sluggish state of our economy, but also the achievements of energy efficiency and conservation to reduce electric demand. Second, we are requiring that all projects proposed to meet the relatively low projected need of about 300 MW in 2018 go through a competitive bidding process that will be reviewed by an Independent Evaluator to guarantee fairness and transparency. And finally, the Commission has established a

process to encourage the cost –effective implementation of innovative technologies to meet some portion of future electric generation.

Colorado has clearly taken bi-partisan steps to achieve a diversified mix of electric generation, which reduces criteria and hazardous pollutants as well as greenhouse gas emissions. These reductions are not being achieved without a cost to our ratepayers. The estimated cost of the Clean Air Clean Jobs Act is $900 million dollars, to be born by our citizens and businesses. Additionally, the Commission will have to authorize significant infrastructure projects to modernize our grid as well as assure the gas distribution system is safe and reliable.

All of these constraints highlight the central tension the Subcommittee is addressing: how to address the rapidly changing regulatory and economic issues facing regulators and electric utilities. As we move to introduce additional natural gas and renewable energy to reduce greenhouse gas emissions from the electric generating system, we need to keep certain facts in mind, and respect the respective statutory obligations of Utility regulators and environmental regulators. Economic regulators and the FERC are required to deliver safe, reliable energy at just and reasonable rates. Environmental regulators are tasked with achieving air quality goals and regulations. To successfully achieve reduced greenhouse gas emissions at a cost that will allow states to thrive economically, statutory changes or a regulatory program must adhere to the following principles:

Greenhouse gas reductions must establish targets that are achievable through a broad spectrum of strategies that can be tailored by a State with a vertically integrated utility, or by a region in an organized market;

The CO2 emission strategies must be technology and fuel agnostic to give Public Utility Commissions and state and regional air agencies maximum flexibility to achieve the reduction requirements. While the New Source Performance Standard for greenhouse gas emissions set a plant standard for CO2, such an approach is not appropriate for existing sources. The Congress and EPA must acknowledge that it is the exclusive province of the Utility Commission or ISOs to determine the mix of strategies to achieve the standards set by the EPA or the Congress.

CO2 emissions are different than criteria or hazardous pollutant emissions. Other pollutants can be reduced with the installation of scrubbers, baghouses and bolt-on emission controls. CO2 can only be reduced through fuel switching, use of renewable energy, upgrading plant or transmission efficiency or implementing energy efficiency programs. Only State or regional Utility Commissions have the expertise and experience with evaluating and authorizing these programs.

This reduction in CO2 emissions in the electric power sector, however, has required an unprecedented degree of cooperation and collaboration among the relevant parties, both at the state and federal level. As stated earlier, our statute in Colorado required our air quality regulator to work collaboratively with the economic regulator, the Commission,

in achieving these goals in a timely and fair manner. NARUC, our national association, has established a more collaborative working relationship with the federal EPA, and more importantly, with our sister agencies in both air quality and state energy offices around the country. We schedule annual meetings, which we call the 3-N meetings (for NARUC, NASEO, and NACAA), where we discuss these difficult issues with the support of federal EPA, and we at NARUC are actively involved in education and outreach efforts to all commissioners and staff on these complex environmental and energy issues.

States, such as Colorado, that have already made significant investments to reduce greenhouse gas emissions must be given credit for their programs. Not crediting the early reductions would be both unfair and penalize economically states that are already incurring costs to reduce emissions.

The Colorado experience illustrates why these principles are essential:

The Clean Air Clean Jobs Act enabled Colorado to meet numerous federal air quality requirements. The program, designed in cooperation with the State Air Agency and 34 interveners, selected a suite of emission controls, fuel switching and plant retirements that examined the entire generation fleet of Public Service Company. If each generation plant were controlled individually, it would have been prohibitively expensive and politically impossible.

By being technology agnostic, Colorado selected the right balance of fuel switching, retirements, retrofits and use of existing coal plants to provide the necessary reductions and keep rates reasonable and the system reliable and safe.

Finally, implementation of the Renewable Energy Standard and the Clean Air Clean Jobs Act is a major investment. If Colorado is not given credit for this investment, it will be penalized unfairly when compared to the States that have not taken early action.

Thank you for the honor of representing Colorado before the subcommittee and I am pleased to answer any questions.

Mr. WHITFIELD. Thanks very much, Mr. Epel.

Mr. Moeller, you are recognized for 5 minutes.

STATEMENT OF CLAIR J. MOELLER

Mr. CLAIR MOELLER. Thank you, Chairman Whitfield, Ranking Member Rush. Thank you for the opportunity today to present before this committee.

I am Clair Moeller, the Executive Vice President of Transmission Technology for the Midwest ISO, or MISO. We are a nonprofit public interest organization charged with operating a wholesale market in the States we serve, as well as ensuring reliability to the consumers. It is important that we guard both the reliability and consumer cost as we work our way through those issues.

My task as a planner for the Midwest ISO is to be the early warning system to ensure that consumers have both low cost and high reliability at the end of the day. To protect that, we look towards various scenarios about how the effect of changing policies might reduce reliability or increase costs for our customers.

Recent economic and regulatory pressure is having the effect of reducing excess capacities in the Midwest. Historically, we were blessed with an excessive capacity which frankly made the reliability job fairly easy. These pressures, we believe, by the end of the day will have reduced our coal fleet by approximately 18 percent. That will bring our required reserve margins to their minimum level.

The low cost of gas, in addition to these regulatory pressures, are what are driving those retirements in the older coal fleet. Almost 90 percent of the resulting fleet will have to be retrofitted to comply with the rules. Our concern at that point is accommodating those outages simultaneously as we reach the end of the compliance period.

It is important to note that the gas industry and the electric industry have grown up very differently. The flexibility that we require on the gas industry is simply not part of the design requirement of the historic gas infrastructure. So our best friend in the electric business is a simple cycle combustion turbine because it is very fast and very flexible. It is the hardest thing for gas pipelines to manage because it changes their pressure so quickly and has the prospect of having an unannounced start.

So the two industries have different requirements in terms of flexibility, and part of the friction between the two industries that we are working our way through is about how to manage the flexibility that, for example, renewable portfolios have caused electricity markets to need to be more flexible. We are trying to reflect that need for flexibility into what we are asking the gas industry to do.

The mismatch between the electric industry and the gas industry is both the infrastructure, its design—the gas infrastructure is designed around long-term firm contracts with fairly slow changes in terms of what the off-takes are. The electricity now has a 5-minute market; we re-price electricity every 5 minutes. Gas typically has a day that closes around nine o'clock and you wait other day in order to make significant changes. So it is both the pipeline capacity needs to be engineered to accommodate the flexibility, and the market rules need to be engineered to accommodate the flexibility.

In that regard, the MISO is working with the FERC, our state commissions through an organization of MISO states, which is essentially a representative from each State that we serve, the load-serving entities, which at the end of the day have the interface with the customers, the gas pipelines who have been very accommodating in terms of beginning this conversation, as well as a gas suppliers. So we can look to what these issues are in aggregate in the hopes of achieving a single solution that both protects consumers from unnecessarily high costs and maintains the reliability of the system, which after all is a public safety matter that we all must guard.

With that, I look forward to your questions.

[The prepared statement of Mr. Moeller follows:]

Testimony of Clair J. Moeller

Executive Vice President of Transmission & Technology of the

Midwest Independent Transmission System Operator, Inc. (MISO)

Before the House Committee on Energy and Commerce

Subcommittee on Energy and Power

March 19, 2013

Executive Summary

- ***What:*** Existing and proposed environmental regulations for the electric energy industry, in combination with sustained low natural gas prices, are causing a shift in the generation resource mix in the MISO footprint towards an increased reliance on natural gas.

- ***Latest Survey Results***: The most recent MISO survey identified almost 50,000 MW (247 units) of coal capacity affected by MATS and other EPA regulations – or about 37% of the total generation capacity in the MISO Market footprint.

- ***Reliability Impact:*** MISO has historically been long in capacity but the retirements of units within the footprint will remove most, if not all, of the excess reserves on the system. Plants going on outage simultaneously to retrofit could also create challenges in meeting electricity demand. Gas-fired generation will play an instrumental role in filling these voids.

- ***Gas Transportation Concerns:*** MISO analyses identified that gas supply availability at the wellhead for use in power generation was not an issue; however, there were three major areas of concern: storage, pipeline capacity, and timing.

- ***Economic Impacts:*** The analyses put an economic value on the challenges ahead, at the expected 12,000 MW retirement level in MISO, at a cost impact associated with pipeline infrastructure development of about $2 billion for main gas pipelines, plus $950 million for lateral lines.

- ***Conclusion:*** Addressing the increasing need for gas supply will require coordination between the electric and natural gas industries to produce tangible solutions to key issues.

Good morning Chairman Upton, Chairman Emeritus Barton, Ranking Member Waxman, Subcommittee Chairman Whitfield and Ranking Member Rush, and members of the Committee; thank you for inviting me to speak to you today. I am Clair Moeller, Executive Vice President of Transmission & Technology of the Midwest Independent Transmission System Operator, Inc. (MISO). MISO is a not-for-profit, independent, member organization serving members in all or parts of 11 states and one Canadian province, from eastern Michigan to eastern Montana and Missouri to Manitoba. In 2001, we were the first Regional Transmission Organization approved by the Federal Energy Regulatory Commission. Today, MISO provides reliability to the electric grid, administers the market for electricity producers and users on a wholesale level, and performs a regional planning function for the members in its footprint

MISO's Changing Generation Resource Mix

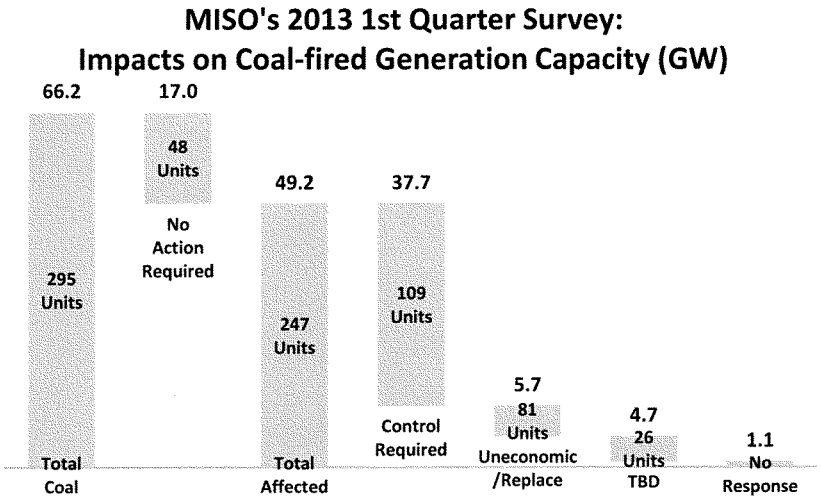
Households and businesses in the MISO footprint rely heavily on power plants fueled by coal to supply their electric energy needs. Historically, between 70 and 80 percent of the electricity produced in the MISO region has been generated by coal-fired plants. Base demand for power in the region is met primarily by coal and nuclear generating plants. Gas-fueled power plants have historically been utilized primarily to cover peak demand periods and to address near-term energy needs. In general, less than 5 percent of electricity in the MISO footprint has been generated by gas-fired plants. But we are seeing that begin to change.

Low natural gas prices over the last couple of years have made gas generation more economical, and able to compete more effectively with coal generation, which is generally a relatively inexpensive form of power generation. This has resulted in gas generation becoming

increasingly utilized in MISO's energy market, which selects power plants based on cost, causing a shift in the generation resource mix in the MISO footprint. In 2012, approximately 65 percent of energy was generated by coal-fueled sources, with 12 percent coming from gas-fired power plants.

Going forward, we expect to see this trend continue due to the combination of low gas prices and impacts from Environmental Protection Agency (EPA) rules – primarily the Mercury and Air Toxics Standards (MATS) rule. MATS will introduce limits on emissions that will drive some coal plants to retire and force others to invest in technology that allows them to continue operating in a manner that is compliant with the environmental regulations. This will drive the shift in MISO's generation further towards gas-fired resources. This transition presents new challenges in fulfilling our obligation to maintain reliability at just and reasonable prices. MISO is responding to these planning and system operations challenges by investigating potential impacts and working with our Stakeholders and the natural gas industry to develop effective and innovative solutions.

Our Market footprint consists of roughly 132,000 MW of electric generation capacity—approximately half of which is coal-fired. In an effort to better understand the impacts of EPA regulations on these coal units and the overall generation fleet, we solicit information from the owners of those assets regarding their plans to comply through on-going quarterly surveys. The most recent survey identified almost 50,000 MW (247 units) of coal capacity affected by these regulations–or about 37% of the total generation capacity in the MISO Market footprint. The graphic below shows the magnitude of the impact to our coal-fired generating capacity and the compliance strategies that will be employed by generation owners as reported in the first quarter survey for 2013.



While we await decisions from some generation owners on the actions they plan to take, it is clear that plant retirements and retrofits will cause challenges that we have not faced before. The compliance deadline for the MATS will mean that large numbers of coal plants will be looking to take outages to retrofit at the same time. The coordination of those outages will be critical to ensuring adequate resources remain available to meet electricity demand. In addition, while MISO historically has had adequate capacity, announced and projected retirements of units within the footprint will remove most, if not all, of the excess reserves on the system. We are currently addressing these challenges by creating or enhancing processes that better position us to ensure adequate resources are available to maintain reliability of the system. This includes the development of a process for determining the level of generation outages that could be accommodated at a given time while still meeting demand. Also, we recently worked with the Federal Energy Regulatory Commission (FERC) and our Stakeholders to revise and update our retirement analysis process to effectively meet the current needs of the marketplace.

Coordination Between Natural Gas and Electric Industries

This shift in MISO's generation mix, to one of increasing reliance on gas-fired resources, has introduced the need to further and improve the coordination between the gas and electric industries. Taken in the context of a system that is already seeing increased contributions from gas-fired generation due to economics, coal unit outages and retirements put additional pressure on gas resources in the MISO footprint to meet demand. Currently, MISO has 39,000 MW of gas generation in the region, 19,000 MW of which is without oil backup or a firm gas supply. Last year, MISO performed analyses of natural gas supply, storage, and pipeline infrastructure in the Midwest. These analyses identified potential insufficiencies in pipeline capacity for peak levels of operation of gas-fired units in the MISO footprint. Other findings of note include the abundance of gas supply availability at the wellhead for use in power generation and the importance of timing of natural gas infrastructure expansion MISO's study indicated that regulatory approval, design, and construction for pipeline development takes three to five years to complete once a defined plan exists. As gas-fired generation begins to serve more of the demand within the MISO footprint, construction of new gas-fired generation, and increased demands upon the current gas infrastructure in the Midwest, will follow. As we've learned through conversations with pipeline companies in our footprint, there is flexibility in the capability of natural gas pipelines to deliver gas through varied contractual and physical arrangements. However, to keep pace with demand, system expansion will be needed—and needed relatively soon. In our most recent survey, we learned that approximately 18 GW of coal units will apply for or have already been approved for one-year extensions of compliance windows with EPA regulations. Even taking this number into account, the next few years are going to be a crucial transitory period for MISO and natural gas pipelines alike.

MISO's gas infrastructure analyses led to the creation of the Electric and Natural Gas Coordination Task Force (Task Force), which serves as a forum for cross-industry education and for identifying and working towards tangible solutions to key issues. These key issues, as ranked by the Task Force, include the misalignment of the Electric Day and the Gas Day, the need for coordinated emergency operations, and the challenge of ensuring we have adequate resources to meet demand (Resource Adequacy).

The first issue highlights the misalignment of the schedules for the Electric Day and the Gas Day and its impact on the ability of generators to get the fuel they need in time for operation. The focus is on the gap between when gas-fired units schedule pipeline capacity for the next day and when MISO posts its Day Ahead Market schedules. Discussions with our Stakeholders have yielded the suggestion of moving up the posting of the Day Ahead Market schedules to allow generators more advance notice for procuring the fuel they need to operate in real time.

The issue of coordinated emergency operations has evolved into a conversation on whether information and data can and should flow between gas pipelines and MISO. These exchanges may take the form of short-term data alerts on system conditions or longer-term planning information to aid in outage coordination, for example.

The third topic gets back to the issue of uncertainty—will there be enough resources to meet demand on peak days in our footprint? Inherent in these issues are the questions of how firm individual plant fuel supply needs to be to ensure reliable system operation and whether the current MISO market constructs incentivize the type of generator behavior (e.g. securing firm fuel supplies, having a backup fuel option on-site, etc.) that supports system reliability.

Other issues raised in the Task Force include the need for more education for MISO's Stakeholders on gas pipeline tariff products, operations and planning, as well as for getting state and federal regulators involved in the conversation, and finally, various issues surrounding the physical impacts of increased gas-fired generation on both gas and electric infrastructure.

Peak Day Event: Jan. 22nd, 2013

A recent event highlights the growing need for gas-electric coordination and better understanding of the risk on our system. On January 18th, MISO declared a Cold Weather Alert effective from 1/21/13 to 1/22/13, in anticipation of forecasted sub-zero temperatures. This declaration, in accordance with MISO's Conservative System Operations Procedure (RTO-OP-018), expressed concerns about potential fuel restrictions. In this same timeframe, natural gas pipelines in the region were implementing System Overrun Limitations, which is essentially an alert issued by the pipeline telling its customers there is some system condition that is going to limit operations, e.g. extremely cold weather. Several days later (Jan. 22nd), the extreme forecast was realized, with the coldest day of 2013 recorded in the MISO footprint and the highest load of the year, of 74,403 MW at 6:57PM.

In the early morning hours on the 22nd, MISO received notification from several Market Participants that generation resources were having "gas supply" issues. We've since learned that these problems were due to a number of factors, including mechanical failures at several dual-fuel (units that can switch between burning oil and burning gas) units, potentially caused by the extreme cold. Another issue that played into the event on the 22nd is the nature of the gas pipeline contracts held by certain gas-fired units. Some gas-fired and dual-fuel units in the MISO footprint hold firm gas transportation contracts to operate only for a portion of the day. Others

contract for interruptible service, which is likely to be available during warm weather but not during extreme cold temperatures. If MISO needs to call up units to meet unexpected demand, as was the case on the 22nd, it may need to ask gas-fired units to run. If the gas unit has an interruptible fuel contract and no backup fuel, it may not be able to respond to the call—especially on a very cold day. While the majority of units scheduled to run on the 22nd in MISO's Day Ahead process operated as planned, certain significant units could not arrange for gas to accommodate MISO's call for additional generation.

MISO has an obligation to meet demand in real time and commits generation resources to ensure enough capacity is online to maintain reliability. Though the event on the 22nd was localized, it illustrates the unpredictability in system conditions, i.e. mechanical failures of individual units and extreme cold temperatures, and the importance of reliable fuel supply. One of MISO's main concerns surrounding the shift in our footprint from coal to gas is that the gas-fired generation we need on very cold winter days will not be able to get fuel, and in turn, generation may not be able to meet demand. In order to better prepare for these peak days, we are working to understand and prevent events like those that occurred on the 22nd.

In Conclusion

Existing and proposed environmental regulations for the electric industry, in combination with sustained low natural gas prices, are causing a shift in the generation resource mix in the MISO footprint from coal to gas-fired generation. Taken in the context of a system that is already seeing increased contributions from gas-fired generation due to economics, coal unit outages and retirements from these regulations put additional pressure on gas resources in the MISO footprint to meet demand. Addressing the increasing need for gas supply will require coordination

between the electric and natural gas industries to produce tangible solutions to key issues. MISO has an obligation to maintain reliability at just and reasonable prices and we intend to continue to work together with our Stakeholders and the natural gas industry to ensure reliable and efficient system operations in the face of a changing resource mix. Thank you very much for this opportunity to speak to you today. I look forward to your questions.

Mr. WHITFIELD. Thanks very much.

And Mr. van Welie, you are recognized for 5 minutes.

STATEMENT OF GORDON VAN WELIE

Mr. VAN WELIE. Thank you. Chairman Whitfield——

Mr. WHITFIELD. Be sure and turn the——

Mr. VAN WELIE. Yes. Thank you. Chairman Whitfield, Ranking Member Rush, and members of the subcommittee, thank you very much for the opportunity to appear before the subcommittee this morning.

My name is Gordon van Welie. I am the president and CEO of ISO New England. Today, I plan to highlight the serious operational challenges facing New England's power system. In the past decade, natural gas has become the predominant fuel used to produce electricity in New England. However, the limitations of the current market design and the consequent inadequate fuel arrangements by natural gas and oil-fired generation, have led to serious reliability threats to the bulk power system. Therefore, we are moving at an urgent pace to develop short- and long-term plans to address these issues, primarily through changes to New England's wholesale electricity markets.

New England has seen a major shift in its generation suite, from a diverse mix of oil, coal, nuclear, and natural gas generators, to a system with more than half of the region's electricity being produced by power plants using natural gas. In addition, we are observing the retirement of coal and oil generators and the introduction of a diverse set of renewable and demand resources.

Wholesale electricity prices are now primarily driven by natural gas-fired generation. The natural gas and electric industries operate under different structures but are increasingly interdependent. Electricity supply and demand must be balanced on an instantaneous basis and problems on the electric system require immediate action, often through the operation of fast-responding gas generators. However, if generators have not contracted for gas prior to the electric operating day, the gas system may not be able to respond to the real-time instantaneous demands of the electric system.

For power grid reliability to be maintained, we need to have adequate levels of fuel inventory within the region either through storage, or reliable transportation arrangements so that the electric sector is ready to respond whenever called on by the ISO. Those arrangements should be incentivized through changes to the wholesale electricity market design so as to provide strong economic signals for generators to perform when needed. It is likely that this will result in incrementally higher wholesale prices in order to pay for the improved reliability that we seek.

New England cannot access the full benefit of the domestic shale gas deposits because of pipeline constraints leading to New England from both the West and the South. Interstate national gas pipelines operate under a business and regulatory model that requires a long-term, firm commitment by the pipeline customer. Because the current wholesale electricity market design does not provide gas generators with the necessary performance incentives, we have found that generators often do not make arrangements to en-

sure that they have an adequate and reliable fuel supply for the output of their facilities.

The region has historically relied on its oil and coal generation to provide fuel diversity and offset the operational risks associated with the constrained gas transportation system. However, the confluence of low wholesale market prices, high oil prices, and increasing environmental costs is causing its generators to retire and/or limit the output of fuel inventory that they carry. Thus, our dependence on gas generation is poised to increase, and our operational options are becoming more limited.

The New England States are studying the ability of the natural gas pipeline system to set aside both heating and electric market demand in the region. These efforts are intended to provide information to policymakers and market participants on a range of possible solutions to deficiencies in natural gas infrastructure.

This winter, New England did not experience record or sustained cold temperatures or unusually high demand for electricity. However, wholesale electricity prices rose significantly during this period because of physical constraints moving the lowest price natural gas into New England. During that period, as well as during a significant winter storm in early February, ISO operators had to cope with multiple instances where generators could not get fuel to run. Our experiences this winter lead us to conclude that the status quo is not sustainable.

ISO New England is working with the New England States and its stakeholders to develop market changes to provide the economic incentives necessary to ensure that generators have adequate and reliable fuel supplies. Additional flexibility in the natural gas industry would also help address the challenges of increasing interdependency between the two industries. The gas sector could assist with reliability efforts if gas supplies provided generators with additional opportunities to obtain fuel outside of normal business hours, and if pipelines would offer more flexible scheduling, additional services, and provide real-time information on the status of the pipeline system.

In the long-run, it would be helpful for the Federal Energy Regulatory Commission to improve the operational alignment between the electric and gas systems.

In conclusion, we recognize that we have to address these issues with a sense of urgency. Discussions are underway with our stakeholders and we will be making multiple findings at the FERC over the next 12 months to address the many components of our action plan.

Thank you and I look forward to your questions.

[The prepared statement of Mr. van Welie follows:]

SHORT SUMMARY OF TESTIMONY

GORDON VAN WELIE, PRESIDENT & CEO, ISO NEW ENGLAND
BEFORE THE HOUSE ENERGY & COMMERCE COMMITTEE, SUBCOMMITTEE ON ENERGY & POWER

"AMERICAN ENERGY SECURITY AND INNOVATION: THE ROLE OF REGULATORS AND GRID OPERATORS IN MEETING NATURAL GAS AND ELECTRIC COORDINATION CHALLENGES."

TUESDAY, MARCH 19, 2013

- ISO New England is the independent system operator for the New England power grid with three major areas of responsibility: operate the bulk electric system on a 24x7 basis, administer the region's wholesale electricity markets, and conduct long-term planning of the transmission system.
- In a little more than a decade, New England has seen a transformation in its generation mix, moving from a mix of oil, coal, nuclear, and natural gas generators, to a system with more than half of the electricity production coming from natural gas generation (52%). In addition, the region is seeing the retirement of coal and oil generators, and the introduction of a diverse set of renewable and demand resources.
- Wholesale prices are driven by natural gas generation, but the wholesale electricity markets do not provide adequate incentives for generators to provide electrical energy when called upon by the ISO during stressed system conditions, and in particular for gas generators that have not made adequate and reliable arrangements for fuel supply.
- The region's reliance on generation with "just in time" interruptible fuel-delivery arrangements has created operational challenges that are escalating rapidly. The region experienced significant operational challenges in January and February when a significant number of generators were unavailable due to uncertain fuel supplies or storm-related outages. We are seeing this more frequently and it is unsustainable.
- The market-based solution to this problem is to strengthen the economic incentives in the wholesale markets to cause generators to make adequate and reliable fuel arrangements, so that they are ready to respond to the ISO when needed.
- New England is urgently working toward solutions that include market changes that provide the incentives necessary to provide greater fuel certainty.

TESTIMONY OF
GORDON VAN WELIE
PRESIDENT & CHIEF EXECUTIVE OFFICER, ISO NEW ENGLAND

BEFORE THE HOUSE ENERGY & COMMERCE COMMITTEE
SUBCOMMITTEE ON ENERGY & POWER

"AMERICAN ENERGY SECURITY AND INNOVATION: THE ROLE OF REGULATORS AND GRID OPERATORS IN MEETING NATURAL GAS AND ELECTRIC COORDINATION CHALLENGES."

TUESDAY, MARCH 19, 2013

Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee. Thank you for the opportunity to appear before the subcommittee this morning.

My name is Gordon van Welie, and I am the president and chief executive officer of ISO New England (ISO-NE). ISO New England is the independent system operator for the New England power grid and wholesale electricity markets. We have three major areas of responsibility: We operate the bulk electric system on a 24-hour, seven-day-a-week basis, we administer the region's wholesale electricity markets, and we are responsible for long-term planning of the transmission system.

Today, I plan to highlight the serious operational challenges facing New England's power system following a major shift that has occurred in the region's generation mix. In the past decade, natural gas has become the predominant fuel used to produce electricity in New England; however, the limitations of the current market design and the consequent inadequate fuel arrangements by natural-gas and oil-fired generation have led to serious reliability threats to the bulk power system. Therefore, we are moving at an urgent pace to develop short- and

long-term plans to address these issues, primarily through changes to New England's wholesale electricity markets.

Shift to Natural Gas for Electric Generation

In a little more than a decade, New England has seen a major shift in its generation fleet, moving from a diverse mix of oil, coal, nuclear and natural gas generators, to a system where more than half of the region's electricity (52%) is produced by power plants using natural gas and more than thirty percent is produced by nuclear power (31%), leaving little room for fuel diversity. In addition, we are observing the retirement of coal and oil generators and the introduction of a diverse set of renewable and demand resources, with the potential for a significant amount of wind generation. Wholesale electricity prices are now primarily driven by natural-gas-fired generation, but the wholesale electricity market design currently does not provide adequate incentives for generators to provide electrical energy when called upon by the ISO during stressed system conditions, and in particular for gas generators that have not made adequate and reliable arrangements for fuel supply.

This shift has provided clear economic benefits for New England. The investment risk for new power plants has shifted to private investors, and electricity consumers in New England have benefited from the recent low prices in the natural gas market. In addition, the shift toward natural gas has resulted in significant reductions in power-plant emissions of nitrogen oxides (NO_x), sulfur dioxide (SO_2), and carbon dioxide (CO_2).

New England has a Significant Reliance on "Just in Time" Fuel Delivery

The natural gas and electric industries operate under different regulatory, contracting and operational structures, but are increasingly interdependent.

Electricity supply and demand must be balanced on an instantaneous basis and problems on the electric system require immediate action, often through the operation of fast-responding gas generators. However, if generators have not contracted for gas prior to the electric operating day, the gas system may not be able to respond to the real-time, instantaneous demands of the electric system. This is particularly acute in New England, where the region has a significant reliance on "just in time" interruptible fuel delivery and it is clear that the gas system is inadequate to meet the demands of electric generators during peak periods.

When power plants do not have the fuel they need to operate it creates tremendous operational challenges and threatens reliability. We are seeing this on a more frequent basis, and we believe the status quo is unsustainable.

For power-grid reliability to be maintained, we need to have adequate levels of fuel inventory within the region, either through storage or reliable transportation arrangements so that the electric sector is ready to respond whenever called on by the ISO. Those arrangements should be incentivized through changes to the wholesale electricity market design, so as to provide strong economic signals for generators to perform when needed. It is likely that this will result in incrementally higher wholesale prices in order to pay for the improved reliability that we seek.

The region realized a nearly $7 billion reduction in wholesale electricity costs over the past five years as natural gas prices fell to record lows in 2012. New England would benefit by using some of this savings to invest in infrastructure to expand the region's access to low-priced natural gas and strengthen the reliability of a power system that will become increasingly dependent on natural gas.

New England has Inadequate Natural Gas Infrastructure for Electric Demand

New England cannot access the full benefit of domestic shale-gas deposits because of pipeline constraints leading into New England from the west and south.

The interstate natural gas pipelines operate under a business and regulatory model that requires a long-term firm commitment by the pipeline customer. Because the current wholesale electricity market design does not provide gas generators with the necessary performance incentives, we have found that generators often do not make arrangements to ensure that they have an adequate and reliable fuel supply for the output of their facilities. These arrangements can include dual-fuel capability, contracting for liquefied natural gas (LNG), or contracting for reliable gas supply and transportation.

The region has historically relied on its oil and coal generation to provide fuel diversity and offset the operational risks associated with a constrained gas transportation system. However, the confluence of low wholesale market prices (primarily caused by low natural gas prices), high oil prices (which limit the opportunities to profitably operate), and increasing environmental compliance costs is causing these generators to retire and/or limit the amount

of fuel inventory that they carry. Thus, our dependence on gas generation is poised to increase and our operational options are becoming more limited.

The market-based solution to this problem is to strengthen the economic incentives in the wholesale markets to encourage generators to make adequate and reliable fuel arrangements, so that they are ready to respond to the ISO's call to produce electrical energy when required. This, in turn, will create a demand for reliable fuel services, which could be served by additional investment in gas pipeline and/or storage infrastructure, including dual-fuel infrastructure.

However, the region faces a regulatory conundrum. The natural gas generators generally have a short- to medium-term financial horizon and they are a diverse group with diverse market interests. Thus, they are a group of "fragmented buyers" who are unlikely to enter into long-term fuel arrangements on a large scale. This does not align with the long-term commitment preferred by investors in gas pipelines and gas storage infrastructure.

The New England states are studying the ability of the natural gas pipeline system to satisfy both heating and electric market demand in the region. These efforts are intended to provide information to policymakers and market participants on a range of possible solutions to future natural gas infrastructure needs. The value of (and need for) natural gas extends beyond the sphere of electricity generation.

January-February 2013 Operational Concerns

This winter, New England did not experience record or sustained cold temperatures, or unusually high demand for electricity; however, wholesale electricity prices rose significantly during this period because of physical constraints moving the lowest-priced natural gas into New England. Natural gas prices in late January spiked to $34 per million British Thermal Unit ($/MMBtu), in contrast to prices below $4/MMBtu across most of the country. Wholesale electricity-energy prices in New England increased more than 100% in January and more than 300% in February compared to 2012.

During that period, as well as during a significant winter storm in early February, ISO operators had to cope with multiple instances where generators (both gas- and oil-fired) could not get fuel to run. Our experiences this winter lead us to conclude that the status quo is not sustainable.

At one point during the winter storm, more than 6,000 MW of generation was unavailable due to uncertain fuel supplies or storm-related outages. Because the gas market operates during normal business hours and the storm occurred over a weekend, natural gas generators were hindered in their ability to access additional gas supplies because they could not access the gas market. As the region's dependence on natural gas grows it will become increasingly important to have a flexible gas supply system that can meet the demand for electricity 7 days per week, 24 hours a day.

These concerns will likely continue until investments are made in additional gas pipeline and storage infrastructure and changes are made to achieve greater operational alignment between the two industries.

New England is Working Toward Market Solutions

ISO New England is working with the New England states and its stakeholders to develop market changes to provide the economic incentives necessary to ensure that generators have adequate and reliable fuel supplies. These include:

- Changes to our wholesale markets to improve electricity price formation, improve the ability of generators to reflect the true cost of fuel in their offers to sell electricity , and strengthen performance incentives for generators and demand resources;
- Changes to the timing of our electricity market to provide additional time for generators to secure fuel from the gas market to meet their obligations in the electricity market, and to provide system operators additional time to call on non-gas-fired-generators if needed; and
- Expanding the amount of resources held in reserve to respond to the sudden loss of generation due to a system contingency.

Additional flexibility in the natural gas industry would also help address the challenges of increasing interdependency between the two industries. Power generation is rapidly becoming the largest customer for natural gas pipelines and the gas sector could assist with reliability efforts if gas suppliers provided generators with additional opportunities to obtain

fuel outside of normal business hours, and if pipelines would offer more flexible scheduling, additional services, and provide real-time information on the status of the pipeline system. In the long run, it would be helpful for the Federal Energy Regulatory Commission (FERC) to improve the operational alignment between the electric and gas systems.

Conclusion

New England is one of the first regions to face these reliability challenges, primarily because of the shift in the generation mix in New England, the current limitations of the wholesale electricity market design, and the limitations of the current fuel supply infrastructure. In conclusion, we recognize that we have to address these issues with a sense of urgency. Discussions are underway with our stakeholders and we will be making multiple filings at the FERC over the next twelve months to address the many components of our action plan.

Thank you.

Mr. WHITFIELD. Thanks very much.

And Mr. Hibbard, you are recognized for 5 minutes.

STATEMENT OF PAUL J. HIBBARD

Mr. HIBBARD. Thank you. And good morning, Chairman Whitfield, Ranking Member Rush, and members of the committee for the opportunity to testify before you today.

The challenges associated with coordination of natural gas and electric markets is particularly important from both the perspectives of electricity and natural gas users throughout the U.S. and from the perspectives of reliability and cost. So considering these issues now is both appropriate and very well-timed.

So let me summarize my view on coordination issues with just five key points. First, we shouldn't forget the benefits of improved coordination and we should focus on it. As a former chairman of the Public Utility Commission in Massachusetts, at a time when natural gas prices were both very high and very volatile, I want to emphasize the consumer rationale for better coordination.

The emergence of shale gas has dramatically lowered the cost of living and doing business across many States and has generated significant economic benefits. When considering coordination challenges, this should be front and center. We need to improve coordination because that will allow electric ratepayers to realize the benefits that our expanded domestic natural gas resource base represents.

Adding new gas-fired generating capacity to a region can lower costs, expand use of a domestic fuel, provide environmental benefits, and facilitate the integration of variable, renewable resources. Improving the stability and efficiency of electric gas market transactions must thus be viewed not as a challenge but as an opportunity.

The second point I want to make is that power grids can be operated reliably with a significant reliance on natural gas with a critical caveat that I will mention in a minute. Heavy reliance on natural gas-fired generation does not, by definition, diminish the reliability of power grid operations. New and efficient gas-generating technologies can provide numerous reliability advantages. They are relatively easy to develop and site, can be built in various sizes and configurations, and can be located close to where electrical load is. They offer the ability for continuous operation, faster startup, and faster response to grid-operated dispatch instructions over many competing resource types.

Finally, as our States seek to integrate vast amounts of renewable resources, gas-fired power plants offer the best physical operating characteristics for managing the variability associated with these sources.

The third point I want to make—the critical caveat—is that natural gas infrastructure must be sufficient to meet the coincident demands of heating, industrial processes, and electric generation at all times. In the time frame of short-run transactions between electric and natural gas markets, the prevailing profit motives of market participants are extremely effective at overcoming short-term supply and transportation issues, but they simply cannot overcome physical constraints on the flow of gas.

In summary, gas infrastructure is or will become increasingly constrained, particularly in the winter. Where pipeline and LNG infrastructure is sized primarily to meet winter heating demands, there is limited space on the region's pipelines to carry gas for electricity generation during cold winter conditions. Addressing this is the fundamental challenge of the coordination issues before us today.

Forth, given these circumstances in regions with inadequate natural gas infrastructure, grid operators and regulators must focus on relieving these infrastructure constraints, and in the meantime, ensuring reliable operations in the face of constraints. Grid operators need to ensure that under adverse power system conditions, including constraints on the flow of gas for power generation, there is sufficient capacity to reliably operate the system.

There are a number of tools operators can use to accomplish this, such as retaining non-gas units needed for reliability, requiring switching at units that have dual fuel capability, dispatching resources that otherwise might be uneconomic, calling on demand-response resources and activating operating procedures where necessary to avoid power disruptions.

In addition, regulators and grid operators can take actions to relieve prevailing constraints in the longer-term through regulatory orders and market structures that promote development of dual fuel capability, enhanced demand response, or investment in new natural gas transportation infrastructure where it is economic.

Finally, in regions that currently have adequate natural gas infrastructure, operators and regulators must not let down their guard. Their decisions and actions are key to appropriately planning for avoiding such infrastructure constraints in the future.

In short, regulators and grid operators play vital roles roles in advancing the coordination of natural gas and electric markets, and promoting the development of needed natural gas system infrastructure and in managing the reliable operation of power systems in the face of gas supply constraints. Given the potential economic reliability and environmental benefits of expanded use of natural gas in electric sector, the efforts of regulators and grid operators in this area should receive heightened attention and effort.

So with that, again, I want to thank you and look forward to your questions.

[The prepared statement of Mr. Hibbard follows:]

THE ROLE OF REGULATORS AND GRID OPERATORS IN MEETING NATURAL GAS AND ELECTRIC COORDINATION CHALLENGES

Testimony of Paul J. Hibbard
Vice President, Analysis Group, Inc.

before the

House Committee on Energy and Commerce
Subcommittee on Energy and Power

Tuesday, March 19, 2013

Summary of Main Points:

1. Adding gas-fired generating capacity to a region can lower costs, expand use of a domestic fuel source, increase generation efficiency, improve grid flexibility and reliability, provide environmental benefits, and facilitate the integration of variable renewable resources. In this context, improving the coordination of gas and electric markets must be viewed not as a challenge, but as an opportunity.
2. With an important caveat, there is little reason why heavy reliance on natural gas-fired generation should diminish the reliability of power grid operations.
3. The caveat is the following: natural gas infrastructure must be sufficient to meet the coincident demands of heating, industrial processes, and electricity generation at all times.
4. In regions with *adequate* natural gas infrastructure, grid operators and regulators are key to planning for and avoiding natural gas infrastructure constraints.
5. In regions with *inadequate* natural gas infrastructure, grid operators and regulators are key to planning for and relieving natural gas infrastructure constraints, or otherwise ensuring reliable operations in the face of constraints.

Good morning, and thank you, Chairman Whitfield and members of the Subcommittee, for the opportunity to testify before you today. The challenges associated with coordination of electric and natural gas markets is a particularly important one from both price and reliability perspectives for users of electricity and natural gas throughout the U.S.; your consideration of these issues is both appropriate, and well-timed.

My name is Paul Hibbard; I am a Vice President with Analysis Group, a large economic consulting firm based in Boston, where I consult to numerous electric and natural gas public sector and industry clients – including grid operators – on market structure, system planning and operations, and energy and environmental policy. I also have worked half my professional career in state energy and environmental agencies, most recently as the Chairman of the Public Utilities Commission in Massachusetts. So I have followed gas/electric coordination challenges over the past several years with interest from consumer, market, and policy perspectives.

My comments today may be focused on coordination challenges, but it's important to remember that the task of addressing such challenges is driven by the unique opportunity we have to capture the potentially substantial benefits of expanded domestic natural gas production for business and residential consumers of electricity. In this sense, I view the coordination task as less of a reaction to looming challenges, and more of an opportunity – or obligation – for industry players and regulators to proactively capture these benefits in ways that make sense within regional contexts, and that do not jeopardize power system reliability or market efficiency.

So let me summarize my view on coordination issues with five key points.

1. Recognize the benefits of improved coordination. As a former regulator of electric (and natural gas) rates in Massachusetts – at a time when natural gas prices were very high and volatile – I want to emphasize the consumer rationale for better coordination between the electric and natural gas industries. The emergence of shale gas has dramatically lowered the cost of living and doing business in my state. In New England, the price of electricity is almost completely tied to the price of natural gas, a fact that now has regulators and consumers viewing our region's dependence on natural gas for electricity generation as a good thing, not a bad thing. When considering coordination challenges, this fact must be front and center. We need to improve electric/gas coordination because that will allow electric ratepayers to realize the benefits that our expanded domestic natural gas resource base represents. Adding new gas-fired generating capacity to a region can lower costs, expand use of a domestic fuel source, increase generation efficiency, improve grid flexibility and reliability, provide environmental benefits, and facilitate the integration of variable renewable resources. Improving the stability and efficiency of electric-gas market transactions must be viewed not as a challenge, but as an opportunity.

2. Power grids can be operated reliably with a significant reliance on natural gas. With a critical caveat that I will bring up in a minute, there is little reason why heavy reliance on natural gas-fired generation should diminish the reliability of power grid operations. To the contrary, new and efficient natural gas generating technologies can provide numerous reliability advantages for grid operators. They are relatively easy to develop and site, can be built in various sizes and configurations, and can be located close to where electrical load is. They offer the ability for continuous operation, faster start up, and faster response to grid operator dispatch instructions to ramp up or down than many competing

resource types. Finally, as our states seek to integrate vast amounts of renewable resources, gas combustion turbines and combined cycle facilities offer the best physical operating characteristics for managing the variability associated with such power sources.

3. The caveat: natural gas infrastructure must be sufficient to meet the coincident demands of heating, industrial processes, and electricity generation at all times.

In the timeframe of short run transactions between electric and natural gas markets, the prevailing profit motives of market participants are extremely effective at overcoming issues related to market timing and maintenance scheduling, resource allocation, transportation rights, and supply adequacy and timing. But they simply cannot overcome physical constraints on the flow of gas. This is the fundamental challenge of gas-electric coordination issues. There is a reason why specific efforts to better coordinate gas and electric markets is important in some regions and not others. In some regions, gas production and delivery are more than adequate to meet the coincident demands of all uses, including gas-fired electricity generation, at all times. In other regions, like New England, natural gas infrastructure is or will become increasingly constrained, particularly in the winter. Pipeline and LNG infrastructure is sized to meet heating demands, and is dedicated to heating demands. During times of winter peak heating demand, there is limited space on the region's pipelines to carry gas for electricity generation.

4. In regions with adequate natural gas infrastructure, grid operators and regulators are key to planning for and avoiding natural gas infrastructure constraints. As noted, where underlying natural gas infrastructure is adequate, the profit motives of gas and electric market participants effectively and

efficiently manage sufficient flows of natural gas for electricity generation. However, as natural gas fired generation continues to capture market share, local or regional gas transportation constraints can arise, creating challenges for power grid operations. In these regions, regulators and grid operators must play a proactive role. Regulators should require, and grid operators – whether vertically integrated utilities or regional transmission organizations – should carry out, a careful and continuous forward-looking evaluation of the potential for demand for gas from the power sector to outstrip available excess transportation capacity. In states or regions dominated by vertically-integrated utilities, regulators could also head off these circumstances by requiring utilities seeking to build new gas-fired capacity to evaluate the prudence of entering into long-term firm gas supply and/or transportation contracts to support plant operations.

5. <u>In regions with inadequate natural gas infrastructure, grid operators and regulators are key to planning for and relieving natural gas infrastructure constraints, or otherwise ensuring reliable operations in the face of constraints</u>. Where or when gas transportation infrastructure is inadequate to support all end uses, including electric generation, both regulators and grid operators must play a more reactive role. Grid operators need to ensure that under adverse power system conditions, including constraints on the flow of gas for power generation, there is sufficient capacity to reliably operate the system. There are a number of tools grid operators can use to accomplish this, such as dispatching resources that otherwise would be uneconomic, calling on demand response resources, and activating operating procedures to avoid power disruptions. Key to this, however, is being aware of the status of gas availability for power generation through coordination with regional gas pipelines and power plant operators. In addition, regulators and grid operators can take actions to relieve prevailing constraints through regulatory orders or market structures that promote development of dual-fuel capability,

enhanced demand response, or investment in new natural gas transportation infrastructure where economic.

In short, regulators and grid operators play vital roles in advancing the coordination of natural gas and electric markets, in promoting the development of needed natural gas system infrastructure, and in managing the reliable operation of power systems in the face of gas supply constraints. Given the potential economic, reliability, and environmental benefits of expanded use of natural gas in the electric sector, the efforts of regulators and grid operators in this area should receive heightened attention and effort.

With that, I want to thank you again for this opportunity to comment, and I look forward to any questions you might have.

Mr. WHITFIELD. Thank you, Mr. Hibbard.

And I will recognize myself for 5 minutes of questions.

Mr. van Welie, recently, the New York Times wrote an article about the power shortages in the Northeast, and I know Commissioner LaFleur, in her testimony, pointed out the Northeast as an area of concern, as did you in your testimony. Now, the New York Times article focused a lot on nuclear power, and I would ask—of course you have got the Vermont Yankee plant, you have got the Indian Point plant. Both of them, there are groups trying to shut them down. If that occurred, what impact would that have upon the Northeast and its ability to generate enough electricity?

Mr. VAN WELIE. So both New York and New England have got market mechanisms for replacing that capacity if those two nuclear generators were to retire. So I cannot predict with precision what will replace it. It does seem like the most economic resource to replace at capacity would be additional gas-fired generation, so it would create additional stress on the gas system.

Mr. WHITFIELD. Well, do you have any concerns about blackouts or brownouts in the immediate future?

Mr. VAN WELIE. We do. We got dangerously close this winter and hence, we are moving with a sense of urgency. I think it is all about making sure that in this transition period, we will have to rely on oil and coal generation and LNG imports in the region. And so the reason I say that is it is going to take 3 to 5 years to build new pipeline into New England. So we are going to be in a situation where we have to optimize the use of existing infrastructure within the region, and so we are working closely with our stakeholders to try and identify intra-mechanisms to bridge this transition period.

Mr. WHITFIELD. Yes, and we also appreciate in your testimony your setting out some specific things that needed to be done, which we appreciate your setting that out as well.

Mr. Epel, in your testimony—I was trying to find it real quick here—you made a comment—and I may be paraphrasing. Maybe I can find it real quick. But you made a comment that "Congress and EPA must acknowledge that it is the exclusive province of the Utility Commission to determine the mix of strategies to achieve standards at EPA." And recently, we had three forums on the Clean Air Act and regulators came in from all over the country, and many of them expressed some concerns about their flexibility. So would you elaborate on this just a little bit?

Mr. EPEL. Certainly. Thank you, Mr. Chairman.

My concern is I believe we have to have a bifurcated system for EPA or the Congress to establish what are the goals, what are the targets. But really, when it comes down to who is going to have the capability of making decisions, looking at the entire system, for example, with Colorado, what plants should be retrofitted? Which ones should have fuel switching? How much energy efficiency can we utilize? That is really the expertise of the state commissions or the regional bodies. And that is a complex equation not only of the air quality impacts, but the financial impacts. How much infrastructure has to be built?

I think really it is the state commissions or the regional bodies which have that intricate understanding of the system. And so nei-

ther Congress or EPA really can delve into that level of detail. They certainly can say here is the goal, here is the slope of how quickly it has to be achieved, but when it gets down to the real nitty-gritty of economically making these decisions so we balance both the environmental needs and the financial consideration of the State, I think that is really where our expertise lies.

Mr. WHITFIELD. OK, thanks.

Mr. Smitherman, are there any other States that EPA has issued a Federal Implementation Plan for other than Texas?

Mr. SMITHERMAN. Not that I am aware of, Mr. Chairman.

Mr. WHITFIELD. OK. And of course you all won your flex permit case, and you also won the Cross State Air Pollution Control case as well. Is that correct?

Mr. SMITHERMAN. We did. The 5th Circuit ruled that the EPA had acted in an arbitrary and capricious manner with regard to our flex permitting program.

Mr. WHITFIELD. Yes. Now, you testified regarding wind power, subsidizing wind power, and you talked a little bit about wind generators bidding negative prices into the ERCOT and how that distorts the system. Would you just briefly explain this negative pricing?

Mr. SMITHERMAN. I will. Just to give you a quick snapshot, for the first 2 months of this year we have had 39 percent natural gas, 38 percent coal, 11 percent nuclear, and 11 percent wind. That has been our power mix. With the PTC in effect, wind basically can offer in at negative prices. And because we run a market-dispatch model, the cheapest generation, which is wind and nuclear, is dispatched first. So when the wind is blowing, it creates negative prices, basically pushing off of the dispatch curve occasionally gas and coal.

Mr. WHITFIELD. OK. Thank you. My time has expired.

I recognize the gentleman from Illinois, Mr. Rush, for 5 minutes.

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

I would like to go out on a line and just ask each witness a simple question, and maybe each of you could answer with a yes or no because I do have a follow-up question.

Do you think that the transition from coal-fired power plants to natural gas is mostly a positive development or a negative development for our Nation?

Mr. SMITHERMAN. Well, Mr. Rush, I think we need a balance. We need a portfolio as we have in Texas because if gas prices were to rise back to their 2008 levels, then coal would provide a hedge against that. When gas prices are low, then gas is the right thing to dispatch. So if you put all your eggs in one basket, you run the risk of having not a portfolio but a situation which doesn't give you any options.

Mr. RUSH. Mr. Epel?

Mr. EPEL. Mr. Rush, I would say in the affirmative the transition to utilization of gas is a net positive for society and certainly for Colorado, but as Chairman Smitherman said, we do need to keep that diverse portfolio.

Mr. RUSH. Mr. Moeller?

Mr. CLAIR MOELLER. I apologize. I am going to have to not take a position. Our not-for-profit independent status precludes me from choosing between fuels.

Mr. VAN WELIE. So I think the evidence in New England has been that the transition to natural gas has been a beneficial thing for the region, both from an economic and an environmental point of view. I think to Mr. Hibbard's earlier point, it is vital that we make sure that the fuel infrastructure can support that gas generation.

Mr. HIBBARD. And I would agree as well, that given the economic, environmental, and reliability benefits, the transition is a good one.

Mr. RUSH. Mr. Moeller, in your testimony, you expressed some concerns about the impact of expected coal plant retirements and retrofits on the MISO reserves of electricity generation capacity. When MISO briefed the Committee's staff, they focused on the winter of 2016. By that time, most of the retirements would have occurred. MISO said there was a "potential shortfall" of 11,700 megawatts of generation capacity at that time.

And I know your job is to keep the lights on and that means considering the worst-case scenario. I can appreciate that, but I want to make sure that the Subcommittee gets a realistic picture of some of the resource adequacy situation in MISO. So I would like to ask you a couple of questions about it, about this potential shortfall. MISO's suggestion assumed that 3,000 megawatts of new gas capacity would be available in the next 3 to 4 years. That seems to be kind of low. Would you consider that to be a conservative assumption?

Mr. CLAIR MOELLER. That conservative assumption is based on people who have requested to interconnect new gas-fired generation to the MISO transmission system.

Mr. RUSH. As I understand, the MISO's calculation doesn't count any new wind capacity, is that right?

Mr. CLAIR MOELLER. Wind capacity in our market, should the owner of the wind choose to count it, gets a 12 percent capacity credit for its participation.

Mr. RUSH. Wind is an intermittent resource but it is also the single-largest source of new generation capacity last year, a calculation that doesn't account for any new wind capacity. I may be missing a piece of that puzzle. The MISO analysis also assumes that almost 19,000 megawatts of natural gas generation would not have the fuel to operate in the winter of 2016. That is significantly more than the entire "potential shortfall."

We heard a lot today about the challenge of making sure that the natural gas infrastructure is adequate. Do you have any comments about the adequacy of the shortfall?

Mr. CLAIR MOELLER. Yes, sir. The point I was attempting to illustrate in that conversation was that the majority of the gas-fired generation in the MISO market was constructed around a summer utilization and it did not purchase firm transportation for their gas. In July and August there is typically sufficient gas and gas transportation to meet those requirements because it is not coincident with the heating load. Our concern is that as we move towards

using that gas in the winter periods with the competition for heat load, it is unclear how much that capacity would be available.

So our conversation was it is clear that 100 percent of that capacity won't be available. It is probably also true that zero of that capacity will be available, but at this point in time as we discuss with the gas pipe suppliers, it is unclear how much of that gas we can count on to be there for us in the wintertime. The New England situation is a harbinger of problems we seek to avoid, and so that conversation was to point out how large the problem might be, frankly, sir, to peak people's interest so that we can get the solution in time.

Mr. RUSH. Thank you, Mr. Chairman.

Mr. OLSON [presiding]. The ranking member yields back.

The chair recognizes the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. LATTA. Well, thank you very much. I appreciate it, Mr. Chairman. And thank you very much for our panel and I am sorry this is one of those days we have two hearings going on at the exact same time. But we appreciate you being here and joining us.

If I could just go back to Mr. Smitherman. I found your testimony very interesting. Now, you say on page 1, "however, because the Federal Government and EPA continue to set unreasonable roadblocks to diverse fuel production, the natural gas industry is challenged to boost supply enough energy for the Nation." And then you go on to state that "the EPA has implemented such onerous restrictions on the ability to build new coal-fired coal plants that it has greatly impacted fuel supply in Texas and the Nation." When you are talking about these onerous restrictions, I am just curious, have you heard of the EPA doing any cost-basis analysis for the State of Texas, how it would affect you all?

Mr. SMITHERMAN. Congressman, I am not aware of any analysis that they have done with regard to the State of Texas, though when they put forward many of these regulations, they proffer a certain cost-benefit analysis, and not surprisingly, the benefits, in their minds, always outweigh the cost.

What we have challenged is, what is the cost of failed reliability? What is the cost of not having enough electricity, of the lights going out? And that is a real possibility if we prematurely close down some of our coal-fired power generation plants or we limit the ability to recover natural gas. Either of those could lead to shortages.

Mr. LATTA. Well, and we were talking about looking at those issues, and especially we were here talking about coal-fired plants, especially where I am from, the State of Ohio, up in the northern part of the state, where we are well over 60 percent coal-fired. Anyway, as Republicans have said back in 2008, we all want to have an all-of-the-above energy policy that takes in clean coal, natural gas, nuclear, hydro, and all of the alternatives. But we want to make sure that they are out there for the people because in a question like what could be going on here, especially when the EPA is not doing any cost-basis analysis and we're not really sure of the impacts, when you are starting to close down these plants, whose is going to pay for this in the very end?

Mr. SMITHERMAN. Well, in regulated markets if you are retrofitting these coal plants to come into compliance with everything

except carbon capture, which is another technology altogether, then the ratepayers are going to pay for them. If you are talking about in deregulated or competitive markets, then you are going to see many of these plants close down, which is going to end up giving us a fuel mix which is heavily weighted toward natural gas, which is great if natural gas prices stay low and the supply remains high.

Mr. LATTA. Well, and again, in the State of Ohio we have been very fortunate with the presence of the Utica Shale—and actually, recent geological surveys indicate they are actually moving farther across the State, which is great, but you are right, we have to have that blend out there.

And the thing I worry about is in my district, I have 60,000 manufacturing jobs. We have to have base load capacity to make sure that when the big machines go on in the morning or at night, they stay on. We also want to make sure that folks can compete in the global market.

Mr. Moeller, if I could just move over to ask you—you were talking about some things up in the Northeast, but what about in the Midwest? When you are looking at heating taking precedence over electric generation, should the two compete for natural resources? What do you think about the Midwest and how things could be impacted?

Mr. CLAIR MOELLER. So we have got a very complicated situation in the 21 different interstate pipelines that serve the Midwest region. Each one of those pipelines has a different set of facts and circumstances in terms of how constrained they are, but all of them were constructed on a subscription basis around residential heat load. So we continue to be concerned that as we begin to rely more on gas more in the winter months, we will see conflicts around competition for that gas pipeline capacity. We are trying to understand what that conflict might look like across those 21 gas pipes to see with the cost to consumers might be.

Mr. LATTA. Thank you very much.

And Mr. Chairman, I yield back.

Mr. OLSON. The gentleman yields back.

The chair now recognizes the gentleman from California, Mr. McNerney, for 5 minutes.

Mr. MCNERNEY. Thank you, Mr. Chairman.

You know, I have heard this morning and today a lot about pipeline infrastructure being inadequate or needing flexibility. I haven't heard anything about storage. Is storage a viable option for local utilities? Can they build storage for natural gas or is there some reason why that is not on the table, whoever wants to answer it?

Mr. CLAIR MOELLER. Historically, there has been some natural gas storage in local distribution companies in the form of small liquid natural gas.

Mr. MCNERNEY. All right.

Mr. CLAIR MOELLER. There are also geologic opportunities to store it, but they are not universally available across the entire country, sir.

Mr. MCNERNEY. Mr. van Welie?

Mr. VAN WELIE. Sir, I presume your question was with regard to electrical storage.

Mr. MCNERNEY. No, no.

Mr. VAN WELIE. Oh, fuel storage?

Mr. MCNERNEY. Natural gas storage.

Mr. VAN WELIE. Yes. I think the most practical solution, at least for our region in terms of fuel storage, is LNG. And there are some large LNG facilities around the region, and I think that ultimately the solution is a combination of pipeline and storage because one has to think of the possibility that a pipeline could be compromised in some way and you need to be able to ride through that event. And one way of dealing with that is through local storage.

Mr. MCNERNEY. Is storage more expensive than pipelines?

Mr. VAN WELIE. Typically, yes. I think LNG from some of the numbers that I have seen—it is the energy required in order to compress and liquefy the gas that makes it relatively expensive compared to gas in the pipe.

Mr. MCNERNEY. OK. Thank you. So what would be the best way, then, Mr. van Welie, to get the flexibility you need for reliability from natural gas?

Mr. VAN WELIE. So I think it depends where you are, and if you are in a restructured wholesale electricity market, such as exists in New England, what we need to do is to make sure that the incentives for our generators are such that they will seek reliable fuel supplies. They will then have a number of options open to them.

So, for example, if we have created a strong performance incentive for them and they are out there looking for reliable fuel supply, they could choose to put in dual fuel infrastructure, a tank of oil, and switch from gas to oil if their gas system becomes constrained or they can enter into a contract, bilateral contract, with an LNG storage provider to draw gas from the LNG storage facility, or contract with the pipelines for no-notice service or phone service from the pipes.

So I think the starting point in solving this problem is to have the generators feel like they have to have adequate fuel in order to meet the call from the——

Mr. MCNERNEY. So in other words sort of a free-market approach with the right incentives?

Mr. VAN WELIE. That is right. We won't dictate what their solution is; we just want them to produce electrical energy when we need them to.

Mr. MCNERNEY. Mr. Moeller, I think it was you that mentioned there was a conflict between when certain natural gas pipelines are only approved to deliver during certain periods of time. Does that sound familiar?

Mr. CLAIR MOELLER. No. I was commenting about the fact that gas pipelines are constructed typically based on a subscription form of service where the original owners of the gas capacity have typically been residential heat loads. And so the pipe has been sized based on the original use. And typically those original users—it is 20 years gone by since those pipes have been constructed. So it is unclear in terms of how much capacity is available during what times of the year to supply this new use.

Mr. MCNERNEY. So that wasn't a contractual issue more as a physical capacity issue?

Mr. CLAIR MOELLER. Yes. It is two issues. One is the physical issue and the other is a contractual issue, and because they are both fairly opaque, it is a little hard to figure out what the actual fact circumstance is.

Mr. MCNERNEY. Do you have the resources to make that work better?

Mr. CLAIR MOELLER. We have engaged with the natural gas pipelines that serve our region, and they are working with us to answer those questions.

Mr. MCNERNEY. OK. Mr. Epel, you mentioned that you felt that Colorado was ahead of the curve on these issues. What has given Colorado that sort of wherewithal to get into that position?

Mr. EPEL. Congressman, this is actually driven by the voters of Colorado. Our renewable energy portfolio is really adopted by a balanced initiative, which the legislature then enhanced. And there has been a consistent desire for Colorado to have as much fuel diversification as possible. We spend quite a bit of time on energy efficiency also to reduce overall fuel usage, but it really comes from the voters of Colorado. They have spoken pretty clearly on this topic.

Mr. MCNERNEY. OK, thank you.

And I yield back, Mr. Chairman.

Mr. OLSON. The gentleman yields back. The chair, in applying the gavel-in rule, recognizes himself for 5 minutes.

And first, I would like to welcome all of you for coming but a very special welcome for the chairman of the Texas Railroad Commission, a man I voted for this past November, Chairman Barry Smitherman. And as they say in College Station, Texas, home of the fine Texas Aggies, howdy whoop.

Commissioner Smitherman, this question is for you. As you discussed in your testimony, Texas very clearly has reliability challenges ahead of it, starting as early as next year when resource reserve margins could slip below the 13.75 target that ERCOT has. And while FERC works to address the impacts of increasingly depending on natural gas, would you agree that on the other side of Washington the EPA is working to help make it all but impossible to build any new coal plants that would diversify our power sources?

Mr. SMITHERMAN. Certainly, Congressman Olson. It is great to see you.

You referenced earlier in your remarks a couple of projects which have been taken off the table in Texas because they were unable to meet new federal greenhouse gas regulations. So what that leaves us with in Texas is maintaining the current coal fleet and hoping that generators will add additional combined-cycle gas. It looks like we are going to get a couple of new projects built that are going to be combined-cycle, but probably going forward, that is the only type of generation that we will see built in Texas. It will be combined-cycle gas. And with that we are trying to design a market to incent additional generation, but we essentially have found ourselves with only one tool in the toolbox.

Mr. OLSON. And what tool is that, sir?

Mr. SMITHERMAN. That is modifying the market designed to incent new natural gas-fired generation. Since we will not get any

new coal plants built, we will struggle to maintain the existing coal fleet operational and I think it is almost impossible to build new nuclear in Texas.

Mr. OLSON. Yes, sir. I understand all of that. And you heard my exchange with Commissioner Moeller in the previous panel about the incident on February of 2011, this cold incident—the freezing that was across our State and also the extreme heat wave we had in the State as well in August of that year. The February 2011 event has been held up for a while now as a clear example of the interdependence of the electrical and natural gas industries and what can happen. The systems only run into trouble. Would you say that Texas had learned from that incident, and if so, are the steps you have taken alongside with the PUC and ERCOT so they can be shared nationwide?

Mr. SMITHERMAN. We have learned a number of things. One, that communication among all the agencies is incredibly important. So we have a task force today that meets regularly to investigate and communicate issues of fuel supply, of weatherization. In fact, one of the things we required after that event was additional weatherization on the bowler level, to make sure that these plants are prepared for extraordinarily cold weather, and to encourage firm gas supply contracts to our power generating stations. And if we know that a firm supply contract is not in place, that the ERCOT grid operators do not count on that unit to be available during those periods of time.

We are also working on demand response initiatives and other things to give us a few additional tools. But I think it is important to be mindful of the fact that that was a very, very cold weather event. And for the most part, power generation plants in Texas are designed for summer heat, not for sub 32 degree temperatures for 3 straight days.

Mr. OLSON. And one final question, this is taking a page from Chairman Emeritus Dingell's playbook, but I am going to ask a question for all of you as an answer of yes or no. Starting with you, Mr. Hibbard, on the end there, yes or no. As things stand now, do you see the need for a full FERC rulemaking on the topic of gas electric coordination, or is a focus on regional action and clarification of the existing regulations enough? Yes or no please, sir.

Mr. HIBBARD. I think FERC's approach looking at the issue regionally is correct.

Mr. OLSON. And Mr. van Welie?

Mr. VAN WELIE. I think it is yes and no. So I think most of this can be handled regionally, but I think there are certain issues that Commissioner LaFleur indicated could be looked at nationally.

Mr. OLSON. Yes, I guess I should rephrase that. Regional or FERC regulation? Mr. Moeller?

Mr. CLAIR MOELLER. Regional.

Mr. OLSON. Regional. Mr. Epel?

Mr. EPEL. Regional.

Mr. OLSON. Mr. Smitherman?

Mr. SMITHERMAN. Texans can take care of Texas.

Mr. OLSON. Amen, brother. And one more, Mr. Hibbard, regional? It sounds like you are regional as well? OK. Well, there you go. So five for five. It looks like I am out of time.

I yield back the balance of my time and recognize the gentleman from New York, Mr.—no. The chairman emeritus slipped in here behind me. Mr. Dingell, are you ready to ask questions, sir?

Mr. DINGELL. If you let me get my feet under me first.

Mr. OLSON. OK. Then, we will move on with my colleague from Texas, Mr. Green.

Mr. GREEN. Thank you, Mr. Chairman. And I know some of my questions of our chair of the railroad commission that his earlier hat was on the Public Utility Commission. I can't make the same statement that I voted for him last fall, but I did vote for his mom a few times. But, Barry, it is good to see you, and I know as a railroad commissioner, you have a different hat on in the Public Utility Commission, and I appreciate all your work on the PUC because at one time— and you heard my questions earlier—we are proud in Texas to have ERCOT. And we have never had a reliability issue. And I know we have been rationing it on what we can do. We don't one of burden ratepayers too much, but you also don't want to have some of the incidents that we have. And believe me, in D.C., we protect ERCOT on a bipartisan basis.

You talked about expansion of coal plants in Texas, and I know EPA, when they did the Carbon Rule, it was for future plants, not current plants on sequestration for coal. In all honesty, I can't imagine building a coal plant unless you actually did, like we did in Texas, with lignite right over it. The economics seem like with natural gas, if you have access to natural gas you wouldn't build a coal plant even if the EPA extended that rule to coal plants. Is that true?

Mr. SMITHERMAN. Well, first, let me say I would hope that you would have voted for me because I didn't have a Democrat in my race. So let's remember that we have a lot of Monmouth coal in Texas. And actually, today, Monmouth coal is economic when compared to gas at $3.80 gas prices. So we want to make sure that we keep those units running. And that was really the thrust of our pushback on CSAPR.

Mr. GREEN. Well, and congratulations because that was a part of summer of our hearings over the last few years on the transport rule which never made sense to me, and I grew up there. And the wind comes from the south. At certain times of the year it comes from the north, but I never knew it went to Indiana. Be that as it may——

Mr. SMITHERMAN. Me neither. I think the important thing is to maintain the optionality. Remember in our market, not only did we run a competitive wholesale market, but we also have communities and co-ops like San Antonio and Austin, as well as fully regulated companies on the periphery of the ERCOT market. And for them, having the optionality to build new coal, even if it is Powder River Basin coal, could be an important consideration.

So we want to make sure that we don't have such onerous greenhouse gas regulations that building new coal, unless it has CCS, is completely off the table. Gas prices are low now. That is great. We are long gas; it is terrific. And I would just remind, though, that gas prices have gone from $1.99 to $3.80 over the last 2 years. I think they will stabilize somewhere in the, you know, 4 to 5.50 range. At that point, it becomes probably a break even for coal. So

again, having that balance—and we have a really nice balance right now. I think it is important for consumers.

Mr. GREEN. OK. I know when you talked about nuclear—and we would have gotten our nuclear loan guarantees in South Texas—we only have the two plants, Glen Rose and South Texas—so except for financial problems of one of the investors who was Tokyo Power—and after Fukushima, Japan, what, are you going to send us $125 million? But I know nuclear needs to be part of ours along with our success in natural gas.

I am curious because you had both hats on, both on the Railroad Commission and the PUC. Is there a market structure that we can do under ERCOT that working both with your example from the Railroad Commission with regulation of oil and gas in PUC, to have that reliability we have become accustomed to in Texas?

Mr. SMITHERMAN. I would say several things in support of, one, we need an upstream supply, robust supply, of all the resources; two, we need to build midstream infrastructure, pipelines, and transmission lines. And then we need to continue to tinker with the market design to incent new generation.

You know, the ERCOT market is like an airplane ride. You take midcourse corrections along the way until you get your destination. You don't put it on autopilot. And I am confident that the current commissioners are doing that.

Mr. GREEN. Well, and I understand. I have been through Eagle Ford, and seeing the amount of gas we are flaring, of course, nothing compared to what they are doing in North Dakota. So that infrastructure is really important because I know those producers. We would rather have somebody buying that gas then it would be just flaring it. So the pipeline is important. Mr. van Welie, in New England how many LNG import facilities—I am well aware of the one in Boston Harbor, that has been a debate in our committee for many years. Are there other LNG facilities in New England?

Mr. VAN WELIE. There are two buoys in the ocean off Boston, which are—and I don't think they have ever been utilized, maybe once— but the other one that is sort of a dominant resource for the region is in New Brunswick in Canada.

Mr. GREEN. OK.

Mr. VAN WELIE. So it is owned by Repsol. And they have 10 BC of storage just across the main border.

Mr. GREEN. About a dozen years ago I kept hearing the Austin to Boston connection with natural gas. Is there not enough pipeline capacity to send some of that Eagle Ford gas, instead of flaring it, up to Boston?

Mr. VAN WELIE. That is the basic problem. So the pipelines from the West and the south are fully utilized.

Mr. GREEN. And there is not enough new subscriptions. You know, people won't build a pipeline unless they have customers. And if you want to expand a pipeline, you need to have those customers committed to that because, you know, it is an investment. And is there not enough potential expansion for those to expand those pipelines where we have the natural gas?

Mr. VAN WELIE. Yes. So there is a regulatory, what I call a regulatory conundrum here. On the one hand you have the electric sector and the wholesale markets where generators are thinking

short- to medium-term at best. So year-by-year, sometimes day-to-day, the pipelines, they will only build the pipe if they get somebody to commit to them for 15, 20 years. So how do you actually make those two business models work together? It is——

Mr. GREEN. Mr. Chairman, one last question. How long is that LNG——

Dr. BURGESS [presiding]. The gentleman's time has expired. And the only reason I point that out is because you do have chairman emeritus who is waiting patiently to question.

Mr. GREEN. Far be it from me to stand in the way of——

Mr. DINGELL. This member is not complaining.

Mr. BURGESS. This member is complaining.

Mr. GREEN. Well, if I could just say—you don't have to answer just how long has that LNG import facility been in Boston Harbor?

Mr. VAN WELIE. Yes, about 20 years.

Mr. GREEN. You could probably build a pipeline. Thank you.

Mr. BURGESS. I thank the gentleman for yielding back.

The chair now recognizes himself for however much time he wants for questions. And I do——

Mr. DINGELL. You are a good friend and are always remarkably courteous. I thank you.

Mr. BURGESS. Well, I actually recognized myself, Mr. Chairman.

Mr. DINGELL. Oh, I thought you were——

Mr. BURGESS. I referred to myself as chairman because——

Mr. DINGELL. Well——

Mr. BURGESS. I think there is an aspirational goal involved here.

I do want to thank the members on the panel who stood with us so long today. Mr. Smitherman, and I am going to join the parade, I voted for you as well. I voted for myself, coincidentally, on the same day. But I am going to ask you, but really the question may be one that could be answered or should be answered by everyone on the panel. National Geographic cover story this week or last week was "America Strikes Oil." I realize the cover is a little incendiary, a little inflammatory, to coin a pun there.

But you know, for me was phenomenal to sit in the State of the Union Address 3 years ago and have the President of the United States wax eloquently over the benefits of fracking and how important that was to our economy and ignore his Affordable Care Act which he had worked so hard to get. But I think this speaks how important this activity is for the future of our economy.

In the budget on which will be voting in just a few hours, Chairman Ryan from the Budget Committee has placed a number in the budget for the future development of natural gas on federal lands—and I realize that is not really Texas but on federal lands—of $11 billion for the next 10 years. That strikes me as an awfully light figure for what really should be a real boon to the American economy. Mr. Smitherman?

Mr. SMITHERMAN. Well, Dr. Burgess, it is phenomenal what is happening in the oil and gas patch these days. And again, it is all driven by technology, horizontal drilling and hydraulic fracturing. We are now producing 1.5, 1.6 million barrels a day of crude oil in Texas. That is more than the rest of the country gets from Saudi Arabia. That number could double or triple within the next 10 years, and literally, we could be energy secure in America by 2020.

That will quickly displace imported oil from Africa, from the Middle East, and ultimately from Russia. So America is on the cusp of having energy security, and with that, great paying jobs and revenue streams that you speak of staying here in America.

Mr. BURGESS. Now, does anyone else on the panel have a feeling as to whether or not that $11 billion figure from oil and gas produced on federal lands—does that seem high, low, or just about right?

Mr. SMITHERMAN. Let me just say that this biennium Texas, oil and gas severance taxes will be over $7 billion just from Texas private lands. So that seems to me like a low number.

Mr. BURGESS. Is that $7 billion for 1 year or for 10 years.

Mr. SMITHERMAN. For the biennium. For 2 years.

Mr. BURGESS. For 2 years. OK. Does anyone else have a sense? Is $11 billion high, low? And again, that is a 10-year figure that is calculated in our budget. I rather think those numbers will be much more robust.

Mr. Smitherman, you are correct to point out, and I am in absolute agreement that Texas is unique unto itself. There are aspects of the Texas oil and gas production that are unique to Texas because of archaeology. And the efforts that the Environmental Protection Agency to write rules for the entire country recognizing that Mr. Epel's home State of Colorado is vastly different geologically from our home State of Texas, do you have a feeling as to where those regulations should be written and enforced? Is it at the state level or is at the federal level?

Mr. SMITHERMAN. Certainly, we believe at the state level. The Railroad Commission employees and TCEQ employees know the underground geology of Texas better than regulators either in Washington D.C. or with the EPA. We have been at this for over hundred years and I think the proof is in the pudding. The amount of oil and gas that we produce and our safety record and our environment stewardship is a real testimony to the fact that we are proud of what we do and we want to take every proactive step to maintain it. In fact, as you recall, we passed the first Frac Fluid Disclosure Rule in Texas 2 years ago. We are on the cusp, and next week we will adopt a recycling rule for flow back water we think will be one of the first, and some additional well integrity rules. So we are actually being proactive.

Mr. BURGESS. And you bring up an excellent point, although the concept of horizontal drilling and hydraulic fracturing was, if I recall correctly, part of that was developed in the Barnett Shale, my home county of Denton County, and has been extrapolated worldwide. But the technology changes and the technology that is available today is not the technology that was available 5, 10, 15 years ago. And I am grateful that you brought that point up because I think Texas and your office, in particular, has been a leader in addressing some of the environmental concerns that have occurred as a consequence of this very, very valuable energy source.

And just to wrap up, all of the economists with the benefit of the retrospectoscope were able to tell us that a recession started in December 2007. The area that I represent overlying the Barnett Shale had to read about it in the newspaper because we didn't feel it for almost 14 months. Now, yes, the natural gas price eventually came

down to under $2 as you pointed out, and the effect on the job market was felt. But it was astounding, the economic effect of the Barnett Shale in the area of North Texas that I represent, and my only wish is we could see that economic benefit be extrapolated to the rest of the country.

And I am going to yield at this point to the chairman emeritus of the full committee such time as he may consume.

Mr. DINGELL. Chairman, I will repeat what I said. You are always very courteous and I thank you for your kindness.

These questions are for Mr. Moeller. Mr. Moeller, as utilities build new natural gas electric generating facilities, they retire older coal-fired plants and retrofit other coal-fired plants to comply with EPA regulations such as the Mercury Rule. Do you believe that the Midwest region will have the capacity necessary, in terms of electrical generation, to meet the demand?

Mr. CLAIR MOELLER. Yes, sir.

Mr. DINGELL. Now, is more time needed for compliance under the Mercury Rule to give time for new gas infrastructure and generation to be built?

Mr. CLAIR MOELLER. There may be a small number of projects that will require additional time as they work their way through the construction process.

Mr. DINGELL. I would appreciate if you would add some remarks for the record later on these two points.

Mr. CLAIR MOELLER. Yes, sir.

Mr. DINGELL. Now, sir, in her testimony, Commissioner LaFleur said that FERC has been told that the need for infrastructure is a regional issue that requires regional solutions. You also noted that to keep up with demand, the current system will need to be expanded. Given demands for natural gas, both now and projected in the future, how long do you anticipate it will take to build the infrastructure necessary to serve the Midwest region?

Mr. CLAIR MOELLER. Typically, construction of the natural gas pipeline takes between 3 and 5 years. It will take us on the order of 3 years to understand what pipelines we should ask for.

Mr. DINGELL. Now, do we add also to that some permitting time? Because pipelines are not always greeted with vast acclaim when somebody comes forward.

Mr. CLAIR MOELLER. Three years is the quick time and 5 years is if there are permitting issues that need to be worked through, sir.

Mr. DINGELL. Now, what will the approximate cost be for this new infrastructure?

Mr. CLAIR MOELLER. Our first guess at that cost would be in the range of 3 to $5 billion.

Mr. DINGELL. Now, who will ultimately bear the burden of these costs? The ratepayers, the utilities, or the owners of the pipeline?

Mr. CLAIR MOELLER. Ratepayers, at the end the day, pay for the infrastructure, sir.

Mr. DINGELL. And that is a standard rule? That just always happens?

Mr. CLAIR MOELLER. Yes, sir.

Mr. DINGELL. Thank you. Now, in your testimony you note that given the nature of pipeline contracts with utilities, some natural

gas-fired plants cannot run to provide additional generation during certain peak events. Do you believe that there are changes to be made to ensure utilities have the contracts in place that provide the supply they need to run longer? Please answer yes or no.

Mr. CLAIR MOELLER. Yes.

Mr. DINGELL. Would you like to add to that for the record later, if you please?

Mr. CLAIR MOELLER. We can do that, yes, sir.

Mr. DINGELL. Now, with improved weather forecasting and the increased use of wind to generate electricity, do you believe that this and other forms of renewable electricity should be included in the resource adequacy predictions? Yes or no?

Mr. CLAIR MOELLER. Yes.

Mr. DINGELL. And would you submit to us your comments as to why this would be so for the record?

Mr. CLAIR MOELLER. Yes, sir.

Mr. DINGELL. Mr. Chairman, you have been most gracious. Thank you to our panel.

And I would just like to make one observation. I have been dealing with these energy questions for years and years and years. And the free economic system always surprises us by how well it works, but it has a lot of other surprises in it for us. And technology seems to change under our feet. We find that where we were anticipating shortages, we all of a sudden have abundance. Where we anticipated abundance, we all of a sudden have shortages.

And I just worry constantly about the way things change under our feet and how it is that we must act to see to it that we are ready when the next set of difficulties comes upon us. Whether we get gas lines or cold winters and shutdowns and the gas pipelines crater and we have all kinds of troubles, and I am hopeful that the nice picture that I see today is one which is going to be as nice or nicer tomorrow.

But having been a little like the dog that backed into the hot stove, I am not backing into any stoves hot or cold right now. So having said these things, your additional comments for the record would be appreciated. Mr. Chairman, I thank you.

Mr. WHITFIELD. Thank you, Mr. Dingell. At this time I recognize the gentleman from Virginia, Mr. Griffith, for 5 minutes.

Mr. GRIFFITH. Thank you, Mr. Chairman. I appreciate all of you all being here today and appreciate the testimony that I have heard.

I think that Mr. Dingell's comments in regard to the circumstances are always changing is one of the reasons that I feel so strongly that we ought not to throw coal out, or treat coal as if it were a bad word, because long-term, we know we have got plenty of coal. It may be a little bit harder to get out, but if we run into circumstances that we need it, it is there. And we just need to make sure we have the capabilities when we need it to be able to use it.

Likewise, it is great that we have natural gas at fairly reasonable prices and that, you know, do anticipate one of our—in a previous hearing some of you may have heard this earlier—witness indicated that they thought it was going to actually hit $4 by the end of the year. At that point, coal does become competitive again. And

then the question becomes, you know, who wants to use it and are they going to be allowed to use it by regulations?

And I would ask you all—and I don't care who wants to volunteer to answer this question—but we hear a lot about retrofitting some of the coal plants, which is a good thing and some coal plants are fairly new. In light, though, of some of the new regulations that are out there, notwithstanding some comments this week that the White House may back off of some of the greenhouse gas regulations in regard to power plants, how likely is it that you all would anticipate that your power producers are going to be anxiously looking to find ways to retrofit coal plants in light of the uncertainty that is out there with what they might have to do with CO_2?

Do you want to start, Mr. Smitherman?

Mr. SMITHERMAN. Yes. Congressman, you raised a great issue because that is the unknown. You could retrofit to capture SO_2, mercury, particulate matter, everything else that goes up that flue except for CO_2 and then find yourself 5 or 10 years from now having to make a major retrofit to capture carbon or it be cost-prohibitive and you just have to close the plant down and then you have lost all that capital.

Mr. GRIFFITH. Does anybody disagree with that?

Mr. Moeller, did you want to make an additional comment on that?

Mr. CLAIR MOELLER. In the Midwest with traditionally regulated States, the generation owners in conjunction with their regulators have committed to retrofitting 54,000 megawatts of the 66,000 megawatts on our system.

Mr. GRIFFITH. OK. Thank you.

Mr. van Welie, let me ask you this, just because, as Mr. Dingell also pointed out, sometimes pipelines aren't so popular, that LNG storage facility just over the line in Canada, is there already a pipeline into the States?

Mr. VAN WELIE. Yes.

Mr. GRIFFITH. OK.

Mr. VAN WELIE. There is a pipeline that comes over.

Mr. GRIFFITH. Because we had had some difficulty getting the pipelines across the Canadian border of late, and I just wouldn't want to see us run into that problem.

I will tell you that I suspect that some of the natural gas comes out of a pool of natural gas that we have been trying in my home State of Virginia now since 2004 to get permission to explore and figure out what is out there. And many geologists have told us that natural gas the Canadians are getting offshore is in a pool that stretches all the way down to northern North Carolina, which covers a big chunk of Virginia in that patch. We would love to have you have a source of American natural gas from just offshore. If you don't want to do it in Massachusetts, we are glad to do it Virginia.

Mr. VAN WELIE. We would be happy to have you build a pipe. That would be great.

Mr. GRIFFITH. And we would love to create jobs for all Americans.

Mr. Rush asked about minorities earlier, and we just think there is huge potential for not only the United States but also for the Commonwealth of Virginia if we can get that permission.

Mr. Chairman, that being said, you know, this has been a great hearing, but I believe a lot of questions that I would have asked have already been asked and I will yield back.

Mr. WHITFIELD. Well, thank you, Mr. Griffith.

At this time I recognize the gentleman from Colorado, Mr. Gardner, for 5 minutes.

Mr. GARDNER. Thank you, Mr. Chairman. And again thank you to the witnesses for joining us today. Chairman Epel, just a couple of questions from your testimony and the experiences that we have shared. Could you talk a little bit about the long-term contracts that you mentioned, natural gas, and how does the ability to enter into long-term contracts help with certainty and pricing for utilities?

Mr. EPEL. Thank you, Congressman. We could not have developed Clean Air-Clean Jobs without a long-term contract. We had to take the volatility out. And so when we developed the program with this long-term contract, it just gave us that opportunity to have the smooth glide path for the next 10 years. And we don't anticipate any type of rate impact. In fact, we entered into a multiyear rate case with Pelletier's Company of Colorado with only 5 percent increase in rates for the next 3 years.

Mr. GARDNER. And, I believe it was Mr. Burgess from Texas who talked about just the differences between Colorado's unique needs and Texas' uniqueness and just the variety of States and the differences between the geography in the mountains versus the plains. And so when we came up with the solutions unique to Colorado, I think that is important.

Mr. EPEL. Yes.

Mr. GARDNER. And you hear people talk about the single stack solutions versus letting a State do a broader whole approach. And so I guess what I am leading into is this: when you have a rule that allows you to make a decision for a State, that is a better way than individualizing, targeting specific sites. Is that correct?

Mr. EPEL. I agree with you completely. It has to be a system benefit. If we did not look at the full suite of the older plants, the gas availability, including the energy efficiency opportunities, the program could not have gone forward.

Mr. GARDNER. And so Colorado is best-equipped to make decisions for Colorado just as Texas is best-equipped to make decisions for Texas?

Mr. EPEL. Well, I think the basic point is the West is the best and I am pleased to brag about it. But absolutely——

Mr. GARDNER. I wholeheartedly agree with you. Thank you, Mr. Chairman. Yes. And to the point of allowing a holistic solution versus stack specific. Would everybody else agree on the panel that that is the better way to proceed?

Mr. CLAIR MOELLER. Yes.

Mr. VAN WELIE. Yes.

Mr. GARDNER. Thank you. And you talk a little bit about greenhouse gas reductions. You indicate in your testimony that greenhouse gas reductions must establish targets that are achievable

through this suite of strategies, tailored specifically to a State and the State with vertically integrated utility or by a region in an organized market. Do you think that the proposals we see from this Administration have done that?

Mr. EPEL. You know, we have not yet seen the existing source rule which to me is the critical rule that all of us are concerned about. I mean clearly, in Colorado, we have addressed Regional Haze at least for our industrial and utilities, Mercury Air Toxics. This is the biggest wildcard but I think if we have a sensible slope and length of time, it is manageable. But that really has to be driven by the State once EPA or the Congress defines that goal.

Mr. GARDNER. And you talked a little bit about, in addition to the cooperation that we have in Colorado, we also had a very cooperative process on our Regional Haze issue in the SIP that we developed bipartisan support, but we have seen now several groups in Colorado that choose not to participate in the process despite its wide bipartisan support. Wild Earth Guardians National Parks Conservation Association have sought to upend the process of the SIP that we got through bipartisan efforts. Through the PUC, do support the Colorado Regional Haze SIP in its entirety?

Mr. EPEL. Absolutely.

Mr. GARDNER. Yes. And then you agree that the Department of Justice and the EPA should defend the SIP in its entirety and should oppose modifications which could be entering into a consent decree if that is what they would end up pursuing that changed the balance approach agreed to by the diverse parties involved. You would agree that the Department of Justice ought to defend the whole thing?

Mr. EPEL. Well, I am reluctant to ever tell the Department of Justice what to do, but I think Colorado did as fine a job as possible on Regional Haze, and clearly, the EPA supported it. They have turned around the approval of our State Implementation Plan as quickly as possible, I mean, in record time.

Mr. GARDNER. And did this Administration consultant with—Texas, Colorado, I will ask all of you—did the Administration consult with your State before issuing rules like Utility MACT?

Mr. SMITHERMAN. Not at all. Let me just add, Congressman, quickly, SO_2, NO_x, particulate matter, CO_2 down to 1992 levels in Texas, in the face of a growing economy without cap-and-trade.

Mr. GARDNER. Chairman Epel?

Mr. EPEL. I am not familiar with that.

Mr. GARDNER. Yes, I understand. Anybody else care to—OK. Thank you very much, Mr. Chairman. I yield back my time.

Mr. WHITFIELD. Well, thank you, Mr. Gardner. And thank all of you for your testimony.

I think everyone agrees that the wildcard is the CO_2 regulations. And speaking for myself, all of this came about as a result of the Supreme Court decision, and there really has not been a national legislative debate on this issue. And something that we are going to be focused on is drafting some legislation in which we can have a national debate on it and let the legislative body decide.

But the ramifications are big, the uncertainties are big, and we are going through great changes today. And so that is why we feel

like this hearing is so important and to hear from experts who are dealing with it in various ways, we appreciate that very much.

And without objection, I would like to enter into the record this statement of our chairman, Fred Upton.

[The prepared statement of Mr. Upton follows:]

PREPARED STATEMENT OF HON. FRED UPTON

I would like to thank Chairman Whitfield for holding this important and forward-looking hearing—one that seeks to proactively address emerging issues resulting from the increased use of natural gas in the nation's electric generation portfolio. An ounce or two of prevention now can avoid big problems down the road.

This country is undergoing a shale gas revolution that is providing the nation with growing supplies of affordable domestic natural gas for use in electric generation as well as manufacturing and residential uses. But at the same time, we are facing the substantial loss of coal-fired generation capacity that will only accelerate over the next few years, especially in the Midwest. Some of these coal-fired plants are closing for good, while others will go offline for extensive retrofits to meet new EPA rules.

The rapid replacement of coal with natural gas in the generation mix can be a challenge in some regions of the country, and I am pleased that two of our witnesses hail from the Midwest and will provide a unique perspective from this region where we need affordable and reliable power not just for homeowners and small business owners but also for our manufacturers.

The Midwest is particularly hard hit by the rapid loss of coal-fired capacity—and this committee will continue to scrutinize the wave of EPA regulations that have targeted coal. And while the Midwest supply of natural gas is plentiful, there are issues that need to be addressed regarding its expanded use in the generation mix. For example, the Midwest Independent Transmission System Operator (MISO) estimates we will need $2–3 billion in new natural gas pipeline infrastructure by 2015.

Beyond the infrastructure challenges are the regulatory issues. The natural gas and electricity sectors have market and operational differences that may need to be reconciled for this transition to go smoothly.

Again, I would like to thank the chairman for getting out in front of these emerging issues. The shale gas revolution is very good news for the country, but only if we are sensible in how we go about integrating it into the electricity mix. This hearing is a great start toward that end.

Thank you and I yield back the balance of my time.

Mr. RUSH. Mr. Chairman, I just hope and sincerely wish that along with your plans for future hearings, I mean, you know how crazy I am about these hearings that we are holding. I wish you would also certainly consider a hearing where we will have some scientists come in and discuss climate change.

Mr. WHITFIELD. Yes, well, we have had a lot of hearings on climate change. That is for sure.

Mr. RUSH. But no scientists.

Mr. WHITFIELD. Well, over the last 5 years, we have had 22 some hearings on climate change with scientists. But thank you for you and Mr. Waxman reminding us of that and for the letter that you sent.

Mr. RUSH. We certainly would like to hear from——

Mr. WHITFIELD. Thank you.

Mr. RUSH [continuing]. Some scientists.

Mr. WHITFIELD. Thank you.

Thank you all once again for being with us. And the record will remain open for 10 days. Some of you made commitments to provide additional information. And we look forward to working with all of you as we strive to meet the energy demands of our country and make sure we have adequate supply as well. Thank you.

And with that, the hearing is adjourned.

[Whereupon, at 1:08 p.m., the subcommittee was adjourned.]
[Material submitted for inclusion in the record follows:]

Ohio | Public Utilities Commission
John R. Kasich, Governor
Todd A. Snitchler, Chairman

Commissioners
Steven D. Lesser
Andre T. Porter
Lynn Slaby
M. Beth Trombold

Testimony of Todd Snitchler, Chairman of Public Utilities Commission of Ohio
Coordination between Natural Gas & Electricity Markets

Good morning. My name is Todd Snitchler and I am the chairman of the Public Utilities Commission of Ohio. I am also the co-vice chair of the National Association of Regulatory Utility Commissioners (NARUC) Gas Committee. First, thank you for permitting me to offer comments to you today on what I view is a critical issue in the utility world, the issue of harmonization between gas and electric utilities. Commissioners Moeller and LaFleur at the Federal Energy Regulatory Commission took the lead on this important issue by initiating the discussion through the opening of a docket, asking some key questions of stakeholders, and then pursuing the issue and seeking resolution of this issue. The large number of interested parties includes gas and electric utilities, state and Regional Transmission Operators (RTOs)/independent System Operators (ISOs) in organized markets, transmission and distribution utilities in areas without a regional grid operator, gas and electric suppliers, state commissions, federal agencies and others – all of whom have similar goals – system stability and reliability. The challenge comes in trying to reconcile differing opinions on how to ensure the proper role and best alignment of the gas and electric markets for the benefit of consumers of all types. The comments I share with you this morning are mine and do not reflect those of NARUC, the NARUC Gas Committee, or the PUCO.

I have worked over the past year to bring attention to this issue, including moderating two panel discussions at NARUC's annual and winter meetings to highlight the need for action.

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The principal issues to deal with are the challenges of: (1) the "dash to gas" and (2) market alignment. These NARUC panel discussions have included experts from gas and electric utilities, RTO/ISOs, state commissions and other market participants each of whom has shared their experiences and suggestions on ways to solve the harmonization challenges. Among the various issues presented at those panel discussions, three areas of focus have stood out as fundamental areas in need of attention.

First and foremost, the clearest suggestion is a need for improved communication at all levels. Second, there is the concern of sufficient natural gas supply and the ability to secure sufficient gas for power generation when it is needed. Finally, the gas and electric markets currently operate on different time schedules and coordination of the two markets is needed.

COMMUNICATION

As one panelist explained, a very near critical situation in the Northwest arising from the gas and electric situation, the need for effective communication was abundantly clear. On the opposite coast, there have been occasions in New England concerning the ability to ensure grid reliability based on gas availability and communication between pipeline operators and electric generators. In New England, the issues involved gas deliverability to users at the end of the pipeline. In both instances, the key to successfully averting a full

blown power outage was effective communication. It is imperative to know who needs to communicate, with whom and when.

One communications challenge is the barriers that may exist between utility entities – either in house or across multiple utilities. Specifically, limits may exist as to what information utilities can share without violating market rules or corporate separation requirements. Establishing a greater degree of clarity and authority to share critical information in a timely fashion would help to reduce reliability concerns due to the two different markets.

Also, in an organized market, the grid operator can assist in ensuring the flow of energy, but remains limited in what can be done based on the information being provided by utilities. It seems a review of the scope and timing of information provided to and needed by RTO/ISOs may be in order. Even with clear, timely information there may still be issues that cause difficulties in market coordination and operation. As the FERC has posited, there are key questions that I fully believe should be further studied and answers determined, including: should natural gas pipeline and electric utility system operators be allowed to exchange information that is not publicly posted? If information is shared, is there a need for enhanced protections against the improper use of the material communicated and what protections would be appropriate? Is the answer the same if a natural gas pipeline or its affiliate sells or buys wholesale electric power?

FIRM CONTRACTS

An issue brought to the attention of state regulators is that of firm gas contracts and how a lack of firm contracts hinders better coordination. Principally the pointed question is this: if an electric utility signs a long-term contract which at the time of execution is reasonable, but during the contract period market conditions change, will the utility be denied full cost recovery due to "Monday morning quarterbacking" decisions or will the prudency test be applied at the time a contract is entered into? And when state commissions or FERC do not require utilities to execute a long-term contract, it only perpetuates the gas supply dilemma and does nothing to resolve it. In a time of changing generation source fuels, there may be need for a different approach to how regulatory bodies and utilities and power generators operate.

The ready supply of abundant, low cost natural gas makes the transition to natural gas fired electric generation more likely, though the need to balance generation fuel sources – coal, gas, nuclear, and renewables – remains a part of the overall decision making matrix. However, even knowing that, not all regions of the country can be treated the same. In New England, where the customers are at the proverbial and literal end of the gas pipeline, issues involving gas deliverability, pipeline capacity, and pipeline construction and cost allocation are key issues. In other parts of the country, gas is readily available but firm supply contracts are not in place limiting utilities from more fully embracing natural gas as

a generation fuel. Economically, it is difficult for electric generators to commit to firm contracts when expectations of running times may be quite low (i.e. the gas units may be required to run only during peak times). Further, the transition of fuels from coal or oil to natural gas and the rapid pace in which the transition is occurring further necessitates our prompt attention to this matter. In 2012, for the first time the generation mix changed from coal being the largest base load source of supply to natural gas fired generation. The impacts of EPA regulations like MACT, MATS, CAIR, CASPR on coal fired generation in addition to lower natural gas prices and higher coal prices has resulted in the closing of 5 GW of coal fired generation with approximately 40 GW in additional coal fired generation expected to shut down by 2015 (with some estimates of 60 GW at risk for retirement between 2013 and 2017). Additionally, other environmental regulations, including 316(b) and CO2 limits, will further impact coal generation retirements, and depending on final rule development and implementation, stands to also potentially impact natural gas generation.

As Commissioner Moeller has said on several occasions, the urgency of this issue has been only marginally diminished by a warmer winter and cooler summer in 2012, but delay does not mean resolution.

MARKET COORDINATION

The last issue universally agreed upon is the need for better market coordination between gas and electric markets. All participants in the panel discussions – RTOs, gas and electric

utilities, state regulators, and suppliers – agreed that the fundamental differences between the industries caused significant issues in the case of an emergency. For example, publication of electric schedules is often published late in the gas market timeframe.

Additionally, the gas and electric markets have developed differently and the businesses operate under entirely different structures. The electric grid is designed to serve peak demand for all customers in the region; the gas pipeline systems are individually designed to serve the demands of customers with firm contracts. These are not two closely aligned market models. At one level this returns us to the firm contract question. Without firm supply and delivery contracts, there is no requirement to deliver the gas commodity by the pipeline company. The other issue is that commitment timing, both for generation dispatch and pipeline capacity, is not synchronous and therefore could result in supply shortages at a time when gas is most needed. The incompatible schedules could result in substantial impacts to availability of energy supply and system reliability most likely at a time of increased demand and need by electric utility customers.

Finally, it should be noted that many of these issues are more federal in nature and the solutions may need to be resolved at the federal level. State commissions must be aware of the issues, engage in the search for solutions, and to work with the utilities under their jurisdiction to keep the problem solving process moving forward. What is more, state commissions – where necessary – should be willing to engage their legislature to ensure

that the state regulatory framework is conducive to problem solving, and also look at the regulatory climate to make sure it is also conducive to problem solving.

Thank you for the opportunity to share my thoughts on this critical issue, and I am happy to answer any questions you or members of the committee may have today.

FRED UPTON, MICHIGAN
CHAIRMAN

HENRY A. WAXMAN, CALIFORNIA
RANKING MEMBER

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Minority (202) 225–3641

April 3, 2013

The Honorable Phillip D. Moeller
Commissioner
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Dear Commissioner Moeller:

Thank you for appearing before the Subcommittee on Energy and Power on Tuesday, March 19, 2013, to testify at the hearing entitled "American Energy Security and Innovation: The Role of Regulators and Grid Operators in Meeting Natural Gas and Electric Coordination Challenges."

Pursuant to the Rules of the Committee on Energy and Commerce, the hearing record remains open for ten business days to permit Members to submit additional questions for the record, which are attached. The format of your responses to these questions should be as follows: (1) the name of the Member whose question you are addressing, (2) the complete text of the question you are addressing in bold, and (3) your answer to that question in plain text.

Also attached are Member requests made during the hearing. The format of your responses to these requests should follow the same format as your responses to the additional questions for the record.

To facilitate the printing of the hearing record, please respond to these questions and requests by the close of business on Wednesday, April 17, 2013. Your responses should be e-mailed to the Legislative Clerk in Word format at Nick.Abraham@mail.house.gov and mailed to Nick Abraham, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, D.C. 20515.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,

Ed Whitfield

Ed Whitfield
Chairman
Subcommittee on Energy and Power

cc: The Honorable Bobby L. Rush, Ranking Member,
Subcommittee on Energy and Power

Attachments

Attachment 1 – Member Requests for the Record

The Honorable Cory Gardner

Is the EPA consulting with FERC when they are requiring an analysis of pipeline need or capacity? Do you have an average time that it takes to site a pipeline in the U.S. on private land? And if you could get back to me on the federal land as well.

Answer: According to Commission staff: The EPA typically participates in the Commission's environmental review process through the submission of comments on specific projects. On occasion, it also acts as a cooperating agency on projects where it has permitting authority or special expertise. Comments from the EPA have sometimes questioned the need for a project. The Commission addresses those comments, and all comments in the record, in our environmental document (typically an Environmental Impact Statement or Environment Analysis) and/or Commission Order.

During the last five years, the average time for the Commission to act on all pipeline project applications is eight months. Many of these projects involve siting on both private and federal lands. Therefore, our staff does not differentiate projects by the type of land on which they propose to be located. In addition, our staff does not track how long it takes companies to receive other necessary permits or complete any eminent domain proceedings in order to begin construction. However, the Commission does not allow construction to proceed until all necessary federal authorizations have been issued. Most Commission orders give companies either one or two years to complete construction of an approved project, and most are able to comply within that time frame.

During the hearing, you also referenced rumors that there may be an effort in Colorado for a state-wide initiative to ban hydraulic fracturing. You asked if FERC would have an interstate commerce issue related to such a ban. I indicated at the hearing that I believed such a ban would be outside our jurisdiction, and continue to hold that view.

The Honorable Gene Green

And being from Texas, we stand shoulder to shoulder in protecting ERCOT. I just want to make sure – and we did have rolling blackouts in February of 2011. And it seemed like I heard that our wind power growth, which has been phenomenal in Texas, helped stabilize that situation. Is that the information FERC has?

Answer: Wind generation contributed to meeting the needs of the system during the February 2, 2011 event in ERCOT. Wind output met forecasting expectations and provided approximately 10 percent of the generation in the ERCOT region for the day.

Attachment 2 – Additional Questions for the Record

The Honorable Ed Whitfield

1. **The EPA's suite of power sector regulations is forcing thousands of megawatts of coal-fired generation to retire. This could have adverse impacts on reliability. Last Congress, in a hearing before this Subcommittee, FERC committed to better coordination with EPA and DOE regarding the reliability impacts of EPA's power sector regulations.**
    a. **Has this coordination among the agencies occurred? If yes, please provide the details with respect to how often the agencies have been meeting and the topics discussed. Please also provide an update with respect to how effective the coordination has been to address reliability planning, as well as your personal involvement (or that of your staff) in such discussions. If such coordination has not occurred or has not been effective in addressing reliability matters, please explain why.**

Answer: It depends on how you define "coordination." I have recently been told by agency staff that FERC, DOE and EPA hold monthly conference calls with the Regional Transmission Organizations (RTOs), the planning authorities most affected by the EPA regulations. According to staff, the RTOs discuss both short term and long term planning issues associated with grid reliability during these calls. During a typical call, an RTO provides information regarding generators that are planning to retrofit or retire their units in response to EPA regulations or other business decisions. RTOs also discuss areas of concern, including the timing and location of specific projects. While RTOs reported that some generators sought a fourth year extension from the EPA, no generators have requested a fifth year extension to date. I elaborate more on the "fifth year" concept below.

I am requesting a monthly update on the substance of the calls.

b. **Much has been discussed about the "fifth year" option as it relates to compliance with EPA's Utility MACT Rule. Based on discussions with EPA, DOE, the White House, or others, it is your sense that a clear path for the fifth year has been established should certain reliability-critical units be needed to run in order to avoid reliability impacts. Please provide any additional information of which you are aware regarding efforts being undertaken by FERC, DOE, EPA, or the White House related to establishing a path forward for the "fifth year" compliance option under the Utility MACT Rule.**

Answer: A clear path for the fifth-year has been created, should the need arise in order to maintain reliability. The Commission issued a policy statement on May 17, 2012, outlining how it will advise the EPA on requests for additional time for electric generators to comply with EPA's mercury and air toxics standards rule. Under the policy statement, generators submit informational filings to FERC. These informational filings are identical to requests to EPA for extra time for compliance. The Commission examines whether compliance with EPA's rule could result in a violation of a FERC-approved reliability standard or present other issues within the Commission's jurisdiction. In addition, as stated above, FERC, EPA, and DOE continue to discuss the potential for the fifth-year compliance option with the RTOs at regularly scheduled meetings. To date, no generator has submitted a request for an additional fifth year to comply with EPA's MACT rule, but I wouldn't have expected that at this early stage. Although I strongly supported the policy statement and FERC's approach it's important to remember these are EPA rules, not FERC rules.

However, as I stated at the hearing, based on discussions with generators and prior experiences, I do not believe the fifth year is a viable option until the fundamental conflicts between the Clean Air Act and the Federal Power Act are resolved by Congress. Until these conflicts are resolved, generators will be forced to choose which of these laws to violate and given that situation, I believe they will be extremely reluctant to request a fifth year.

2. **According to the North American Electric Reliability Corporation (NERC), 50-70 gigawatts of coal-fired generation may be retired over the next decade, with 90% of this coming within the next 5 years. This 3-5 year window aligns with the compliance deadlines for EPA's Utility MACT rule. In places like the Midwest some of this coal-fired generation will be replaced with natural gas-fired power plants.**
    a. **Do you believe that the short compliance timeframe for EPA's Utility MACT rule is compounding reliability concerns for regions heavily reliant on coal, such as the Midwest and Mid-Atlantic?**

Answer: Absolutely. As I have consistently stated, I am assuming these rules will eventually become effective, but by compressing the timeframe for compliance EPA will raise costs to consumers and potentially threaten reliability in certain load pockets. EPA must be extremely vigilant in its approach and must continue to expand its outreach to FERC, operators of the grid, generators, and state regulators. Some sort of "failsafe mechanism" should be considered in cases where there is just not enough time to build needed transmission upgrades, retrofit existing coal plants, repower existing generators, or construct new generation to replace retiring generating plants.

3. **What challenges are impeding greater communication between the natural gas and electricity markets? What can FERC do to improve communication and coordination?**

Answer: The electric industry and the natural gas industry are very different, although these two industries are increasingly converging. The production of these forms of energy are fundamentally different, as is the delivery: natural gas moves at a relatively slow speed through pipelines, electricity moves at the speed of light. Each industry has its own lexicon of terms, and individuals usually have spent their entire careers in one industry or the other. A first step is for the industries to learn more about the fundamental nature of the other. As for operational communications, natural gas pipelines and RTOs and ISOs have expressed strong support for improving communications between the natural gas and electric industries. Regional initiatives are already making progress through direct information exchanges, creation of coordinating committees, and study groups with members from both industries participating. For example, work in New England is being led by the New England States Committee on Electricity (NESCOE) Gas-Electric Focus Group, which has facilitated monthly meetings to bridge communications gaps and identify and evaluate challenges from increased gas dependency in New England. ISO-NE, NYISO, PJM, MISO, Ontario IESO and TVA are conducting a multi-regional infrastructure analysis of natural gas and electric systems, including their operations, planning and interactions. MISO has also formed an Electric-Natural Gas Coordination Task Force that holds monthly meetings to improve cross-industry coordination. The Western Gas-Electric Regional Assessment Task Force is conducting a regional infrastructure assessment focused on the risks and the reliability of the integrated natural gas and electric systems.

However, both industries continue to express generalized concerns about being able to share information without running afoul of the Commission's standards of conduct regulations. At the Commission's

February 13, 2013 technical conference, participants came forward with specific communication issues for the Commission to consider. FERC staff is currently reviewing potential Commission actions that may facilitate improvements in communication and coordination between natural gas pipeline and electric transmission system operators. For example, staff is evaluating the Commission's current regulations that govern communications to determine if there are steps the Commission can take to provide greater certainty to natural gas and electric industry participants. Commission staff is also reviewing how non-public data may be protected from disclosure to protect competitors in both industries.

To ensure that the Commission remains fully informed of progress and improvements in communications, and gas-electric coordination generally, Commission staff has been tasked with making quarterly reports to the Commission. The first of these occurred on March 21, 2013.[1] In addition, the RTOs and ISOs will provide updates on their regional gas-electric coordination efforts to the Commission in May and in November.

The Commission also stands ready to address filings which address communications concerns. For example, last November, in Docket No. ER13-356-000, ISO-NE filed changes to its Information Policies to address information sharing with pipelines and proposed non-disclosure agreements between ISO-NE and the individual pipelines operating in the region. The Commission addressed this filing on an expedited basis. While additional work is needed to address all parties' concerns with protection of disclosed information, the Commission has allowed ISO-NE's revised Information Policies to go into effect on an interim basis for this past winter.

For about the last year, I have emphasized a sense of urgency on this matter given the rapidly evolving nature of natural gas and electric convergence. Compared to a year ago there is a much greater level of acknowledgement of these challenges, but FERC must continue its efforts to promote the efforts discussed above so that better communications policies and protocols can be in place before next winter's heating season begins.

4. **What authority does FERC have to ensure that electric power markets place an appropriate value on reliability so that generators have an incentive to hold pipeline capacity, dual fuel or whatever else is necessary to ensure that the lights do not go out?**

Answer: Under the Federal Power Act sections 205 and 206 the Commission has the authority to ensure that rates, terms and conditions of service are just and reasonable. This would include ensuring that the rates afforded to generators in the wholesale competitive markets are compensatory and not confiscatory.

In the context of RTO and ISO organized wholesale energy markets, participating generators receive payments for the services they provide (e.g., energy, capacity, ancillary services) as determined by the relevant competitive market framework. Both the payment a generator receives and the terms of a generator's obligation to offer its services are relevant to a generator's business decisions in deciding how to "firm up" its capacity to meet its obligations. RTO and ISO tariffs may set penalties for non-performance. Elements of an RTO's or ISO's organized wholesale electricity market are set forth in the tariff and are subject to FERC oversight pursuant to FPA sections 205 and 206. To the extent these tariff provisions do not provide sufficient incentives for generators to provide reliable service, the RTO

[1] http://www.ferc.gov/EventCalendar/Files/20130321152846-A-3-presentation-NEW.pdf

or ISO may file proposed changes with the FERC or the Commission may institute an investigation pursuant to FPA section 206. ISO-NE is currently exploring with its stakeholders revisions to its FERC-jurisdictional tariffs to address market performance.

In the context of wholesale markets not administered through an RTO or ISO, the Commission has jurisdiction over the rates, terms and conditions of the wholesale power sales at either cost-based or market-based rates. In these markets, the use of generation owned by a load serving entity to serve its customers is typically subject to regulation by state and local authorities. Sales by a third-party generator to a utility are typically negotiated bilaterally between the buyer and seller, at terms and conditions mutually agreeable to the parties.

5. **The abundance and low cost of natural gas from shale reserves is changing the dynamics of energy supply in the United States with some of the vulnerabilities associated with that change being exposed in the Northeast, particularly New England. Is there a need for legislative or regulatory action to accommodate such a shift in energy supply and demand?**

Answer: I have no suggestions for federal legislative action at this time.

Wellhead sales of natural gas were deregulated by Congress in 1989. As a result, since 1993 the wholesale sale and purchase of natural gas has taken place in an open, transparent, competitive market. The widespread consensus has been that this resulting competitive market has resulted in much better prices for consumers. Furthermore, under the Commission's current paradigm of open access transportation and storage services offered by interstate natural gas pipelines, consumers have access to abundant and competitively priced supplies of natural gas from thousands of sources throughout North America.

The Commission will continue to work diligently to support the formation of reasonable policies and market rules, for both natural gas pipelines and electricity markets, to ensure that all wholesale market participants have a safe, reliable and cost-effective supply of energy to serve their respective consumers' needs. We are examining the need for specific regulatory actions on a generic basis and will respond promptly to filings that ask for Commission review of specific proposals to modify the tariffs and market rules of RTOs, ISOs, and interstate natural gas pipelines as those filings are brought before the Commission.

I believe it is important for Governors and state agencies in the Northeast, and particularly New England, to recognize this urgent trend and the need for new pipeline capacity. To the extent that state laws or regulations affect the ability of pipelines to have a predictable timeframe and regulatory environment, I would recommend these states examine such laws or regulations to help assure that any proposed pipeline capacity is adequately and fairly considered in a reasonable timeframe.

The Honorable Mike Pompeo

Do you believe that FERC has statutory authority to consider climate change when conducting analyses under the National Environmental Policy Act in review of interstate natural gas lines permit applications? If the answer is yes, please identify (a) the scope of that consideration, (b) the relative importance of climate change as a factor when conducting permit application reviews, and (c) the expertise within the Commission to perform such an undertaking.

Answer: I support our existing authority to consider environmental impacts that have a specific causal relationship to the project under our consideration. In a decision issued June 12, 2012 the Second Circuit of the US Court of Appeals affirmed our approach. I have attached that decision. So where climate change is raised as an issue in the context of the Commission's environmental review under NEPA, it is addressed in the environmental document, and is subject to Commission review. (a) The scope of that analysis is determined by the size and location, and other characteristics of the proposed project. (b) The Commission treats all environmental issues as potentially significant, determines their relative importance based on the facts and circumstances of each case, and bases its findings on substantial, project-specific evidence. (c) The Commission's staff includes biologists, geologists, and other scientists who have the expertise necessary to address climate change issues.

The Honorable John D. Dingell

1. **It is my understanding that some coal-fired plants undergoing retrofits have been granted revised air permits and extensions in order to comply with EPA regulations such as the Mercury and Air Toxics Standard. For older coal-fired plants that will not be retrofitted, do you believe it will be necessary to allow them to continue operating past the compliance deadline of the Mercury rule in order to maintain reliability?**

Answer: In some cases, yes. It all depends on the physics of electricity flows and the impacts on very specific load pockets. The MATS rule takes effect April 16, 2015, less than two years from now. Only plants that will be retrofitted will be allowed to request an extension until April 16, 2016. As I have noted earlier, I do not consider the "fifth year" to be a viable option given that a generator would presently have to choose between violating the Clean Air Act or the Federal Power Act until Congress can resolve this fundamental conflict. Northern Ohio remains a reliability concern beginning in the summer of 2015. Other areas may also be at risk as we learn more about announced or potential plant closures.

2. **Do you believe renewable electricity generation, such as wind and solar, should be factored into resource adequacy?**

Answer: Yes, all generation resources are taken into account in resource adequacy studies, which typically use historical data and forecasts to determine the expected contribution of renewable generation. Resource adequacy studies are generally customized to reflect individual circumstances in each region, such as weather patterns and the type and location of resources to ensure deliverability of the energy produced. Thus, any region with wind and solar resources would include them as part of its resource adequacy assessment.

3. **In FERC's response to a letter signed by myself and members of the Michigan delegation, FERC indicated that it was in the process of preparing an environmental assessment on the issue of the Trunkline Mainline Abandonment Project. Has the EA been completed and, if not, when will it be?**
    a. **When do you anticipate FERC making a final decision on the project proposal?**

Answer: On February 22, 2013 the Commission issued the Notice of Schedule for the Environmental Review of the Trunkline Mainline Abandonment Project. The Environmental Assessment was issued for public comment on April 15, 2013.

The Honorable Edward J. Markey

1. **What ideas does the Commission have for promoting the development of additional natural gas pipeline capacity into New England?**

Answer: I believe the Commission's policies have been successful in getting significant pipeline infrastructure sited and built across the United States, although, there are a number of factors outside our control that drive infrastructure investment.
That being said, expansion of pipeline capacity is largely a market-driven exercise. Currently, there are significant pipeline projects to bring Marcellus Shale natural gas production to market. The principal pipelines serving New England have expressed willingness to expand if customers are willing to sign firm long-term contracts. The question then becomes what factors prevent (or could be made to incent) customers from making these commitments to support pipeline expansion into New England. This issue is being debated in New England and possibly other regions of the country and those discussions may provide additional ideas for developing pipeline capacity. I believe that continued regulatory certainty from the Commission on ratemaking and cost recovery will help bring infrastructure development where it's needed.

I believe it is important for Governors and state agencies in the Northeast, and particularly New England, to recognize the rapid pace at which their region is increasingly dependent on natural gas to generate electricity and the need for new pipeline capacity. To the extent that state laws or regulations affect the ability of pipeline developers to have a predictable timeframe and regulatory environment, I would recommend these states examine such laws or regulations to help assure that any proposed pipeline capacity is adequately and fairly considered in a reasonable timeframe.

2. **Firm, long-term natural gas supply contracts are viewed by many as key to establishing the financial assurance needed to build new natural gas pipeline capacity into New England. Yet with the nearby Marcellus formation recently becoming the most productive shale play in the country, many believe that natural gas producers and marketers – who stand to benefit greatly from enhanced pipeline access into New England markets – should assume some of the financial risks associated with this pipeline expansion. What is the precedent for producers and marketers bearing some of the financial burden of pipeline expansion? To what extant can and should producers and marketers share in the risks associated with pipeline expansion into New England?**

Answer: Producers and marketers have demonstrated their willingness to shoulder some of the burden related to pipeline expansions in the Northeast. Nearly every certificated, pending, or proposed project in this area has been supported mostly (or entirely) by producer and marketer contracts. These projects involved nearly every interstate pipeline in the region, including Transco, Dominion, National Fuel, Millennium, Empire, Columbia, Tennessee, Equitrans, and Texas Eastern. In addition, producers have assumed equity stakes in the proposed Constitution pipeline which is currently in the pre-filing process.

485 Fed.Appx. 472
This case was not selected for publication in the Federal Reporter.
United States Court of Appeals,
Second Circuit.

COALITION FOR **RESPONSIBLE GROWTH** AND RESOURCE CONSERVATION, Damascus Citizens for Sustainability, and Sierra Club, Petitioners,
v.
UNITED STATES FEDERAL ENERGY REGULATORY COMMISSION, Respondent,
Central New York Oil and Gas Company, Intervenor.

No. 12–566–ag. | June 12, 2012.

Synopsis
Background: Environmental organizations petitioned for review of orders of the United States Federal Energy Regulatory Commission (**FERC**), granting Certificate of Public Convenience and Necessity (CPCN) for natural gas pipeline project under Natural Gas Act, 137 **FERC** P 61121, and denying organizations' request for rehearing of certificate order, 138 **FERC** P 61104.

Holdings: The Court of Appeals held that:

[1] **FERC** took "hard look" at possible effects of project, and
[2] **FERC's** cumulative impact analysis was adequate.

Petition denied.

West Headnotes (2)

[1] **Environmental Law**
Mining; oil and gas

Federal Energy Regulatory Commission (**FERC**) took "hard look" at possible effects of building and operating 39 mile natural gas pipeline through three Pennsylvania counties in determining that environmental impact statement (EIS) was not required under National Environmental Policy Act (NEPA); **FERC** had prepared environmental assessment (EA) and issued finding of no significant impact (FONSI), its 296–page EA had thoroughly considered issues, and certificate order authorizing action had carefully reviewed concerns raised by comments and rehearing order had addressed organizations' concerns and further explained **FERC's** basis for issuing FONSI. 5 U.S.C.A. § 706(2)(A); Natural Gas Act, § 7(c), 15 U.S.C.A. § 717f(c); National Environmental Policy Act of 1969, §§ 2, 102(2)(C)(i), 42 U.S.C.A. §§ 4321, 4332(2)(C)(i); 40 C.F.R. §§ 1501.3, 1508.9(a)(1).

[2] **Environmental Law**
Mining; oil and gas

Federal Energy Regulatory Commission's (**FERC**) cumulative impact analysis was adequate in issuing Certificate of Public Convenience and Necessity authorizing natural gas producer to build and operate 39 mile natural gas pipeline through three Pennsylvania counties; **FERC** had analyzed development of Marcellus Shale natural gas reserves and included discussion of Marcellus Shale development in its environmental assessment (EA), discussed incremental effects of project on forests and migratory birds, and taken concrete steps to address environmental concerns raised by environmental organizations and others. 5 U.S.C.A. § 706(2)(A); Natural Gas Act, § 7(c), 15 U.S.C.A. § 717f(c); National Environmental Policy Act of 1969, §§ 2, 102(2)(C)(i), 42 U.S.C.A. §§ 4321, 4332(2)(C)(i); 40 C.F.R. §§ 1501.3, 1508.9(a)(1).

***473** Petition for review of two orders of the United States Federal Energy Regulatory Commission ("**FERC**").
UPON DUE CONSIDERATION, IT IS HEREBY ORDERED, ADJUDGED, AND DECREED that the petition is **DENIED.**

Attorneys and Law Firms

Deborah Goldberg (Hannah Chang, Bridget Lee, on the brief), Earthjustice, New York, New York, for Petitioners.

Karin L. Larson, Attorney (Michael A. Bardee, General Counsel, Robert H. Solomon, Solicitor, Holly E. Cafer, Attorney, on the brief), United States Federal Energy Regulatory Commission, Washington, D.C., for

Respondent.

Robert J. Alessi (Jeffrey D. Kuhn, on the brief), DLA Piper, New York, NY. (William F. Demarest, Jr., Michael A. Gatje, Husch Blackwell LLP, on the brief), Washington, D.C., for Intervenor.

PRESENT: RALPH K. WINTER, DENNY CHIN, CHRISTOPHER F. DRONEY, Circuit Judges.

Opinion

SUMMARY ORDER

We assume the parties' familiarity with the facts and procedural history, which we reference only as necessary to explain our decision to deny the petition.

Petitioners **Coalition** for **Responsible Growth** and Resource Conservation, Damascus Citizens for Sustainability, and Sierra Club (collectively, the "**Coalition**") seek review of: (1) a Certificate of Public Convenience and Necessity (the "Certificate Order") granted by **FERC** pursuant to Section 7(c) of the Natural Gas Act, ***474** 15 U.S.C. § 717f(c), to the Central New York Oil and Gas Company ("Central NY Oil") and (2) an order denying the **Coalition's** Request for Rehearing of the Certificate Order (the "Rehearing Order").

The Certificate Order authorizes Central NY Oil to build and operate the MARC I Hub Line Project natural gas pipeline—39 miles long and 30 inches in diameter—to run through Bradford, Sullivan, and Lycoming Counties, Pennsylvania, and to build and operate related facilities.

Under the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4321–4347, a federal agency proposing a "major Federal action[ ] significantly affecting the quality of the human environment" must prepare a detailed statement about the environmental impact of the proposed action—an environmental impact statement ("EIS"). 42 U.S.C. § 4332(2)(C)(i); *Nat'l Audubon Soc'y v. Hoffman,* 132 F.3d 7, 12 (2d Cir.1997). If an agency is uncertain as to whether the action requires an EIS, it must prepare an environmental assessment ("EA") that ["b]riefly provide[s] sufficient evidence and analysis for determining whether to prepare an [EIS]." 40 C.F.R. §§ 1501.3, 1508.9(a)(1). If the agency finds that an EIS is not necessary, the agency will issue a finding of no significant impact ("FONSI"). 40 C.F.R. § 1508.9(a)(1).

In reviewing a decision whether to issue an EIS, this Court must consider: (1) "whether the agency took a 'hard look' at the possible effects of the proposed action" and (2) if the agency has taken a "hard look," whether "the agency's decision was arbitrary or capricious." *Nat'l Audubon Soc'y,* 132 F.3d at 14; *see also* 5 U.S.C. § 706(2)(A) (court may set aside an agency's decision not to require an EIS only upon a showing that it was "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law"). Under NEPA, this Court's role is to "insure that the agency considered the environmental consequences" of the federal action at issue. *Town of Orangetown v. Gorsuch,* 718 F.2d 29, 35 (2d Cir.1983) (citation omitted); *see also Robertson v. Methow Valley Citizens Council,* 490 U.S. 332, 351, 109 S.Ct. 1835, 104 L.Ed.2d 351 (1989) ("NEPA merely prohibits uninformed—rather than unwise—agency action").

[1] Here, in considering Central NY Oil's application, **FERC** prepared an EA, issued a FONSI, and concluded that an EIS was not required. We conclude, based on our review of the administrative record, that **FERC** took a "hard look" at the possible effects of the Project and that its decision that an EIS was not required was not arbitrary or capricious. Its 296–page EA thoroughly considered the issues. The Certificate Order carefully reviewed the concerns raised by the comments. The Rehearing Order addressed petitioners' concerns and further explained **FERC's** basis for issuing the FONSI.

[2] The **Coalition** argues that **FERC's** cumulative impact analysis was inadequate. We disagree. **FERC's** analysis of the development of the Marcellus Shale natural gas reserves was sufficient. **FERC** included a short discussion of Marcellus Shale development in the EA, and **FERC** reasonably concluded that the impacts of that development are not sufficiently causally-related to the project to warrant a more in-depth analysis. In addition, **FERC's** discussion of the incremental effects of the project on forests and migratory birds was sufficient. **FERC** addressed both issues in the EA and has required Central NY Oil to take concrete steps to address environmental concerns raised by petitioners and others. For example, in the Certificate Order, **FERC** required Central NY Oil to comply with its Riparian Forested Buffer Enhancement Plan to address forest fragmentation. In ***475** Environmental Condition 17 of the EA, **FERC** required Central NY Oil to prepare and execute a Migratory Bird Impact Assessment and Habitat Restoration Plan. The environmental concerns identified by commenting parties, including the Environmental Protection Agency, were considered and addressed by **FERC** in the EA and the Rehearing Order.

Accordingly, we hold that **FERC** properly discharged its **responsibilities** under NEPA. We have considered all of petitioners' remaining arguments and conclude that they are without merit. The petition for review is **DENIED.**

Parallel Citations

2012 WL 2097249 (C.A.2)

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF THE COMMISSIONER

April 17, 2013

The Honorable Ed Whitfield, Chairman
Subcommittee on Energy and Power
House of Representatives
Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, D.C. 20515-61115

Dear Representative Whitfield:

Thank you for your April 3, 2013 letter which contained additional questions for the hearing record on "American Energy Security and Innovation: The Role of Regulators and Grid Operators in Meeting Natural Gas and Electric Coordination Challenges." Please find enclosed my responses to your questions. I want to thank you again for the opportunity to appear before the Subcommittee on Energy and Power on March 19, 2013 to discuss the challenges associated with increased gas-electric interdependence.

Sincerely,

Cheryl A. LaFleur

cc: The Honorable Bobby Rush, Ranking Member
Subcommittee on Energy and Power

The Honorable Ed Whitfield

1. **The EPA's suite of power sector regulations is forcing thousands of megawatts of coal-fired generation to retire. This could have adverse impacts on reliability. Last Congress, in a hearing before this Subcommittee, FERC committed to better coordination with EPA and DOE regarding the reliability impacts of EPA's power sector regulations.**

    a. **Has this coordination among the agencies occurred? If yes, please provide the details with respect to how often the agencies have been meeting and the topics discussed. Please also provide an update with respect to how effective the coordination has been to address reliability planning, as well as your personal involvement (or that of your staff) in such discussions. If such coordination has not occurred or has not been effective in addressing reliability matters, please explain why.**

Answer: Yes, coordination among the agencies occurs on a regular basis. FERC, DOE and EPA hold monthly conference calls with the Regional Transmission Organizations (RTOs), the planning authorities most affected by the EPA regulations. The RTOs discuss both short term and long term planning issues associated with grid reliability during these calls. During a typical call, an RTO provides information regarding generators that are planning to retrofit or retire their units in response to EPA regulations or other business decisions. RTOs also discuss areas of concern, including the timing and location of specific projects. While RTOs reported that some generators sought a fourth year extension from the EPA, no generators have requested a fifth year extension to date. RTOs have stated that they do not expect such requests unless additional unexpected generator outages or other environmental concerns arise.

In addition, I co-chair the FERC-NARUC Forum on Reliability and the Environment with Commissioner Moeller and NARUC colleagues. This group meets three times a year to discuss potential impacts of the EPA regulations and how to ensure that reliability is protected. Senior representatives from EPA have attended every meeting of the Forum.

    b. **Much has been discussed about the "fifth year" option as it relates to compliance with EPA's Utility MACT Rule. Based on discussions with EPA, DOE, the White House, or others, it is your sense that a clear path for the fifth year has been established should certain reliability-critical units be needed to run in order to avoid reliability impacts. Please provide any**

Answer: In its Utility MACT Rule, the EPA has set out a path for obtaining a fifth year for compliance. EPA has stated that FERC is one of the entities whose advice it would solicit in making its decision to grant a fifth year for compliance. The Commission issued a policy statement on May 17, 2012, outlining how it will advise the EPA on requests for additional time for electric generators to comply with EPA's mercury and air toxics standards rule. Under the policy statement, generators submit to FERC as informational filings requests to EPA for extra time for compliance. The Commission examines whether compliance with EPA's rule could result in a violation of a FERC-approved reliability standard or present other issues within the Commission's jurisdiction. In addition, as stated above, FERC, EPA, and DOE continue to discuss the potential for the fifth year compliance option with the RTOs at regularly scheduled meetings. To date, no generator has submitted a request to FERC for an additional fifth year to comply with EPA's MACT rule.

2. **I understand that certain scheduling differences between the natural gas and electricity markets are creating some challenges. Can you expand upon some of these scheduling differences and what can be done to help reconcile these differences, if necessary?**

Answer: Natural gas pipeline capacity is nominated and scheduled for the forthcoming 24-hour period or "day," beginning at 9 am Central time, pursuant to business practice standards adopted by the North American Energy Standards Board (NAESB). This is standard pipeline industry practice. For the electric industry, each regional transmission organization (RTO) and independent system operator (ISO) that administers an organized energy market where generators bid to provide electricity has its own timelines for when a generator must bid and when the RTO or ISO confirms the generator's schedules for electricity production which begins to flow at midnight local time. These scheduling differences may result in challenges for generators because the timing of natural gas purchase and delivery arrangements is not synchronized with the timeframe for bidding into wholesale electric markets. For example, in the mid-Atlantic region, a generator would need to nominate pipeline capacity (i.e., inform the pipeline how much capacity it wants) by 9 am and then inform PJM, for example, at noon of its bid to supply energy into the day-ahead market. Typically the best time to procure gas supply and nominate pipeline capacity—when the markets are most liquid—passes before gas-fired generators know whether they have been scheduled in the day-ahead electric market.

In areas of the country where electricity is procured through bilateral transactions, there are still challenges presented by scheduling coordination between the electricity and gas industries. Electricity production must follow the demand curve, so electric generators must respond to changes in load. The often less predictable and more granular changes in gas demand for electricity generation can pose challenges to scheduling, even in regions with vertically integrated utilities with firm gas supply contracts.

Whether and if so, how, to reconcile the differences has been the subject of numerous meetings over the last several years. The Commission held five regional technical conferences in 2012 to examine key gas-electric coordination issues, including scheduling. During those conferences, some entities stated that they are able to accommodate the existing differences in natural gas and electric scheduling while others expressed concerns, but without specific details identifying what reforms could address the mismatch. A further technical conference is scheduled for April 25, 2013 with the purpose of further exploring concerns regarding gas-electric scheduling conflicts, considering whether adjustments to existing rules or practices are needed, and identifying specific areas in which additional guidance or regulatory changes could be considered.

3. **You testified that gas-electric interdependence issues are currently most visible in the New England area, which is highly reliant on natural gas-fired generation. Earlier this year, a cold snap in New England led to wholesale power prices that were 5 times higher than the previous year, spiking from $30 per megawatt-hour to nearly $150 per megawatt-hour. This spike was attributed in part to inadequate pipeline capacity, which drove up the cost of natural gas.**

    a. **What can FERC do to help mitigate problems like this from occurring in the future?**

Answer: As RTOs and ISOs develop solutions to address regional gas-electric independence issues, the Commission can act expeditiously on any proposed tariff changes they may submit to implement those solutions. For example, on November 13, 2012, ISO New England Inc. (ISO-NE) submitted changes to its Information Policy to allow for more granular information sharing between ISO-NE and the New England pipelines, and the Commission ultimately accepted those changes on an interim basis to address immediate reliability-related concerns for the winter.[1] Currently, the Commission has another filing pending before it in

[1] *ISO New England Inc.*, 142 FERC ¶ 61,058 (2013).

which ISO-NE and the New England Power Pool (NEPOOL) Participants Committee propose changes to the timing of its day-ahead energy market due to increasing reliance on natural gas-fueled generators at times when there is an increasingly tight availability of pipeline capacity.[2] This pending filing proposes to move up the timeline for day-ahead unit commitment and the resource adequacy assessment process in an effort to provide additional time to ensure that gas-fired generators may procure gas supplies and delivery services so that adequate generation capacity is available.

In addition, as discussed in response to question 2, the Commission held five regional Gas-Electric Coordination Technical Conferences to explore gas-electric interdependence issues. Following the conferences, Commission staff issued a report detailing discussions at the five regional conferences. In addition to providing a background on the issues, the report summarizes regional conferences and ongoing initiatives, as well as topics common to multiple regions. The Commission also issued an order directing staff to convene two additional technical conferences and directing staff and the RTOs and ISOs to report on coordination efforts and activities.

In response to that order, Commission staff recently held a Technical Conference on Communications between Natural Gas and Electric Power at our headquarters and has scheduled a Natural Gas and Electric Scheduling Technical Conference to be held on April 25. The Commission and its staff seek to support the progress being made by the industries on gas-electric coordination matters. Staff actively monitors and engages the industry regarding progress being made in each region, including ISO-NE, and reports to the Commission on a quarterly basis.

b. You testified that ISO-New England is working on market enhancements to better ensure the adequate supply of fuel for generation. Can you provide any details on what types of "market enhancements" ISO-New England is developing?

Answer: ISO-NE has communicated that it is currently pursuing a number of near-term, intermediate-term, and long-term initiatives in the region's stakeholder process to address reliability and market concerns related to gas-electric coordination.

I. Near-Term Changes:

A. Increasing Ten-Minute Non-Spinning Reserve to be procured in the Forward Reserve Market

[2] *See* Docket No. ER13-895-000 and ER13-895-001.

Permitting an additional amount of reserves to be procured in the Forward Reserve Market will help support the availability of reserves to meet the increased real-time reserve requirements. The market rule changes were filed on November 27, 2012, and the Commission accepted them on January 17, 2013 in Docket No. ER13-465-000.

B. Modifying generation resource auditing requirements and procedures

The audit requirements and procedure changes are intended to provide ISO-NE with a more accurate assessment of the 10- and 30-minute reserve capability of reserve resources, which should work in conjunction with the modifications to the real-time requirements to ensure sufficient reserve resources. The market rule changes were filed on November 6, 2012, and the Commission accepted them on January 9, 2013 in Docket No. ER13-323-000.

C. Allowing ISO-NE to share information concerning the scheduled output of natural gas-fired generation resources with the operating personnel of the interstate natural gas pipeline companies serving New England

These changes, mentioned in response to part (a) to this question, are intended to allow ISO-NE to better anticipate and address potential reliability problems in the event that there is insufficient fuel for all gas-fired generators to meet their schedules. The market rule changes were filed on November 13, 2012, and the Commission accepted them on an interim basis on January 23, 2013 in Docket No. ER13-356-002.

D. Accelerating the closing time of the Day-Ahead Energy Market

ISO-NE states that these changes, discussed in response to part (a) to this question, are intended to allow it to commit long lead-time resources earlier and to allow participants with gas-fired resources to learn their next-day commitments earlier so that they are able to procure gas based on those commitments. The market rule changes were filed on February 7, 2013, and they are pending before the Commission in Docket No. ER13-895-000 and ER13-895-001.

II. Intermediate-Term Changes:

A. Tightening the Forward Capacity Market Shortage Event Trigger

ISO-NE and stakeholders are discussing tightening the Shortage Event trigger in the Forward Capacity Market to ensure that a shortage event is triggered earlier in a period of reserve deficiency.

The current capacity market design provides financial incentives for resources to perform, and minimize the chance of generation outages during shortage event periods. However, these provisions only apply when available generation is far below the normal target level. According to ISO-NE, these provisions have not adequately indicated when the system is entering a heightened "at risk" period. To address this concern, ISO-NE proposes to initiate a shortage event trigger earlier, that is, during periods when the grid has a deficiency in total operating reserves rather than a deficiency only in 10-minute reserves. By triggering shortage events sooner, resources will have the incentive to perform during at-risk periods over a wider range of at-risk situations that can occur in New England's power system. ISO-NE plans on proposing market rule changes to address these modifications in August 2013.

B. Allowing market participants to change offers in real-time

Currently, participants are permitted to submit re-offers (i.e., to modify offers used in the day-ahead energy market) only during a two-hour period starting at 4:00 p.m. (ISO-NE proposes to changes this time w in pending Docket No. ER13-895-000 and ER13-895-001) on the day before the Operating Day. No re-offers are permitted during the Operating Day. ISO-NE plans to propose allowing offer changes to be made during the Operating Day, which will improve a market participant's ability to reflect in its energy market offer the cost of obtaining fuel in real time. Offers that are more reflective of actual fuel prices will improve energy market price signals and will permit a better match between those prices and the cost of procuring fuel in real-time. ISO-NE plans to propose the market rule changes during the first half of 2013.

C. Considering procurement of additional intra-day reserve capability

To address fuel dependence risk between now and when ISO-NE implements the longer-term Forward Capacity Market revisions, ISO-NE is considering procuring additional intra-day reserve capability. By providing incentives for additional capacity that can be committed and dispatched within the Operating Day, ISO-NE can reduce the reliability risks posed by intra-day operating problems and reduce the costs of out-of-merit dispatch. ISO-NE is evaluating the feasibility of intra-day reserve procurement and plans to review any required market rule changes with stakeholders during the first half of 2013.

III. Long-Term Changes:

A. Redesigning Forward Capacity Market performance penalties

ISO-NE is planning to propose Forward Capacity Market changes to provide market participants with greater incentives and the capital to meet their Supply Offer obligations. ISO-NE has recently issued a white paper reflecting its planned proposal to change the structure of the incentives and penalties that would apply when the system is short of reserves, and for the penalties to be large enough to justify investment to improve the reliability of a resource's fuel supply.[3] ISO-NE has begun receiving stakeholder feedback on this white paper and currently intends to propose market rule changes for stakeholder consideration in 2013. ISO-NE has indicated to Commission staff that it intends to file proposed rule changes at the end of 2013.

IV. ISO-NE and stakeholders are also addressing fuel adequacy issues related to reliability for the 2013/14 winter period, which may include administrative, out-of-market actions. After addressing issues for the upcoming winter season, ISO-NE and stakeholders will seek to address fuel adequacy issues related to reliability for the 2014/15 winter period and beyond through a more market-based, and less administrative, approach.

4. In addition to New England, you also mentioned that gas-electric interdependence issues may emerge in other regions as more gas is utilized for generation.

a. In what regions do you foresee this potentially becoming an issue? Why?

Answer: Based on the information presented at the various conferences the Commission has convened, the issue of gas-electric interdependence is not confined to New England. For example, at the central regional gas-electric coordination technical conference last summer, MISO identified concerns about gas-electric interdependencies and reiterated its concerns during FERC staff's February 13 technical conference on communications and information sharing. In follow-up written comments, MISO stated that allowing RTOs and natural gas pipelines to exchange confidential information would allow MISO to operate the system more reliably. During the Southeast regional technical conference, Florida

[3] Available at http://www.iso-ne.com/committees/comm_wkgrps/strategic_planning_discussion/materials/fcm_performance_white_paper.pdf

entities identified that they will need a third pipeline into the state to ensure that adequate gas capacity is available to meet the state's needs.

b. What is FERC doing to help find solutions for these regions so that they can avoid the difficulties facing the Northeast?

Answer: The Commission is taking an active role in drawing attention to the pressing issues, facilitating discussion of best practices and other ideas, and, as appropriate, issuing orders addressing specific reforms. After the Commission convened five regional technical conferences and solicited industry comment on a host of gas-electric coordination matters, it issued an order last November drawing attention to several more prominent matters and setting forth a roadmap for how the Commission planned to address the issues in the coming months. Commission staff is executing on this roadmap. It convened a conference on February 13, 2013 on communication matters and has scheduled a technical conference on gas-electric scheduling conflicts for April 25. To ensure the Commission is aware of developments and progress in improving gas-electric coordination around the country, staff has been tasked with making quarterly reports to the Commission. The first of these occurred on March 21, 2013.[4] In addition, the RTOs and ISOs will provide updates on their regional gas-electric coordination efforts to the Commission in May and in November.

During roughly this same period, the Commission has taken action on several natural gas pipeline matters of relevance to the issue of gas-electric coordination. For example, the Commission accepted three proposals that would allow customers, including natural-gas fired generators, additional opportunities to nominate natural gas.

5. You testified that gas-electric integration issues are most acute during the heating season in regions with a very high gas-utilization and a limited supply of non-gas generators. This hits on the issue of the importance of having fuel diversity in the generation portfolio, an issue we explored in a hearing just two weeks ago.

a. Do you believe having a diverse range of fuel resources available to generate electricity is important to providing affordable and reliable service to customers?

Answer: Yes.

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[4] http://www.ferc.gov/EventCalendar/Files/20130321152846-A-3-presentation-NEW.pdf

b. **I understand that FERC does not have jurisdiction over generation, but would you agree that an overreliance on anyone particular fuel source could be problematic from a reliability perspective?**

Answer: Yes.

6. **You testified that natural gas generators operating in competitive markets overseen by Regional Transmission Organizations are not typically required to enter into long-term firm contracts for natural gas.**
   a. **Why are long-term firm contracts important for reliability purposes?**
   b. **Is there a reason why utilities operating in competitive markets don't enter into more long-term firm contracts for natural gas?**
   c. **Are there market incentives or enhancements that could help facilitate greater use of long-term firm contracts for gas in competitive markets?**
   d. **Are long-term firm contracts for gas more prevalent in non-RTO markets? If so, why?**

Answer: As currently structured, natural gas pipelines build new infrastructure based on long-term firm gas transportation contracts. The Commission's regulations neither require nor bar any generator, including natural gas generators, from entering into long-term firm contracts for fuel. Therefore, in competitive wholesale electricity markets, generators make decisions that reflect their competitive position in the market place. Where it is cost-effective to do so, they may enter into long-term firm supply contracts. Where doing so would put them at a competitive disadvantage, those generators may rely on alternative products or services, including from gas marketers, or may obtain secondary firm gas transportation from the holders of the firm capacity for limited durations to ensure they can meet their supply obligations. Long-term firm contracts may be more prevalent in non-RTO markets because the cost of those contracts can be recovered through state-regulated retail rates.

Although procurement of long-term firm contracts is one way to expand natural gas infrastructure, it is not the only and may not be the most economical way to achieve reliability. With respect to natural gas, pipeline capacity can be contracted for on a short- or long-term basis and on a firm or interruptible basis. A long-term firm contract requires the customer to commit to paying for use of that capacity and in exchange the customer has the right to use that capacity, typically without interruption. During peak periods this can be particularly valuable because some

pipeline capacity in some regions may be constrained and pipelines may not be able to provide service to shippers who do not have firm transportation contracts. However, contracting for long-term firm pipeline transportation capacity may not be the only method to ensure reliability. If a natural gas-fired generator expects to run for only a limited number of hours, it may be more economical for that generator to pay other market participants, such as gas marketers or other shippers, to provide the gas supply and pipeline delivery service needed by those gas-fired generators rather than obtain long-term firm pipeline service. During peak periods, when other natural gas consumers are using all available pipeline delivery capacity, back-up alternative fuel supplies may be used to help ensure reliability. The Commission works to ensure that energy markets provide appropriate price signals to ensure safe, reliable and cost-effective service to meet the needs of all consumers. Market participants are exploring ways to help ensure that there is adequate fuel security for electric generators to protect reliability..

The Honorable Mike Pompeo

Do you believe that FERC has statutory authority to consider climate change when conducting analyses under the National Environmental Policy Act in review of interstate natural gas lines permit applications? If the answer is yes, please identify (a) the scope of that consideration, (b) the relative importance of climate change as a factor when conducting permit application reviews, and (c) the expertise within the Commission to perform such an undertaking.

Answer: Yes. The Commission is required by NEPA to examine the environmental consequences of proposed actions. Commission staff receives comments from interested parties and conducts studies to determine in each case which environmental issues are relevant. The Commission could examine climate change to the extent that it is shown to be affected by the proposed project, and if there is evidence in the record that quantifies such impacts and provides the basis for mitigation measures or other action. The Commission's staff includes biologists, geologists, and other scientists who have expertise to determine the environmental impacts of proposed projects.

The Honorable Edward J. Markey

1. **What ideas does the Commission have for promoting the development of additional natural gas pipeline capacity into New England?**

Answer: In general, I believe the Commission's policies have been successful in getting significant pipeline infrastructure sited and built across the United States, however, there are a number of factors outside our control that drive infrastructure investment.

As currently structured, expansion of pipeline capacity is largely a market-driven exercise. New natural gas infrastructure is built based on solicitation of interest by market participants to enter into long-term firm gas transportation contracts. Currently, there are significant new proposed pipeline projects to bring Marcellus Shale natural gas production to market. Additionally, the principal pipelines serving New England have expressed willingness to expand if customers are willing to sign firm long-term contracts. The question then becomes what factors prevent (or could be made to incent) customers from making these commitments to support pipeline expansion into New England. This issue is being debated in New England and possibly other regions of the country and those discussions may provide additional ideas for developing pipeline capacity. We understand that ISO New England is working on a proposal to incentivize electric generators to increase their fuel security. The Commission is closely following the various pipeline proposals and potential market enhancements intended to help improve fuel security, which may include additional natural gas pipeline capacity into New England.

2. **Firm, long-term natural gas supply contracts are viewed by many as key to establishing the financial assurance needed to build new natural gas pipeline capacity into New England. Yet with the nearby Marcellus formation recently becoming the most productive shale play in the country, many believe that natural gas producers and marketers – who stand to benefit greatly from enhanced pipeline access into New England markets – should assume some of the financial risks associated with this pipeline expansion. What is the precedent for producers and marketers bearing some of the financial burden of pipeline expansion? To what extant can and should producers and marketers share in the risks associated with pipeline expansion into New England?**

Answer: Producers and marketers have demonstrated their willingness to shoulder some of the burden related to pipeline expansions in the Northeast. Nearly every certificated, pending, or proposed project in this area has been supported mostly or entirely by producer and marketer contracts. These projects involved nearly every interstate pipeline in the region, including Transco, Dominion, National Fuel, Millennium, Empire, Columbia, Tennessee, Equitrans, and Texas Eastern. In addition, producers have assumed equity stakes in the proposed Constitution pipeline which is currently in the pre-filing process. At a technical conference last

summer, we were informed by market participants that producers and marketers have, as appropriate, shared in the risk of expanding needed natural gas infrastructure, but will often expand the pipeline only to the closest liquid point – not to the electric generation facility. Commenters, including the American Clean Skies Foundation in a June 2012 report, have described innovative contracting structures that would share the risk between sellers and buyers of natural gas.

3. **In a recent case, you posed the idea of convening a technical conference at FERC to consider the "overall effectiveness of different capacity market designs in attracting capital, meeting challenges such as gas-electric interdependence, and accommodating different power supply choices." Please explain the basis for this proposal and what you hope to accomplish through the convening of such a conference and whatever process follows thereafter?**

Answer: Since I have been on the Commission, we have issued a substantial number of orders related to disputes about specific design elements of capacity markets in the organized market regions. Because these markets are subject to frequent litigation, conversations with interested stakeholders are generally forbidden by the rule prohibiting ex parte communications. I believe that a FERC technical conference on capacity market design could enable a structured, on-the-record conversation among a broad range of market participants, market operators, state regulators and other stakeholders from different regions that currently operate or are considering capacity markets. As I noted in my concurrence, the conversation might include a discussion of capacity market fundamentals, including whether the current market designs attract the capital necessary to ensure forward reliability in light of gas-electric interdependence issues and state renewable portfolio standards. The discussion at the conference could inform Commission consideration of specific cases in the future or could support affirmative policy development by the Commission.

4. **You state in your opinion that one of the matters that the technical conference should consider is the "effectiveness of different capacity market designs." In New England, the Commission recently approved the inclusion as part of the capacity market design of a minimum-offer price rule, and has not permitted any exemptions from that regimen. Do you anticipate consumer-owned utilities that want to build new energy- and environmentally-efficient gas or renewable generation and use it to meet the utility's capacity obligations will be able to do so under the minimum offer price regimen? Are you concerned that the minimum-offer rule could lead to these types of resources more frequently failing to "clear" in the New England forward capacity**

Answer: Please note that, since this matter is currently pending before the Commission in a contested proceeding (Docket No. EL13-34-001), I am unable to comment on the merits of these issues at this time. I would be pleased to discuss these issues once they are no longer before the Commission.

5. **In the PJM RTO, unlike New England, the Commission has approved categorical, exemptions from that region's minimum-offer rule for most resource types other than gas-fired resources. At the same time, the Commission has indicated that all "uneconomic entry" suppresses capacity market prices. How does the Commission distinguish the price suppression that it considers to be consistent with just-and-reasonable rates from the price suppression that results in unjust and unreasonable and must be prevented?**

Answer: Please note that, since this matter is currently pending before the Commission in contested proceedings (Docket Nos. EL13-34-001 and ER13-535-000, ER13-535-001), I am unable to comment on the merits of these issues at this time. I would be pleased to discuss these issues once they are no longer before the Commission.

Clair J. Moeller
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Wednesday, April 17, 2013

Chairman Ed Whitfield
Subcommittee on Energy and Power
Committee on Energy and Commerce
United States House of Representatives
2125 Rayburn House Office Building
Washington, DC 20515-6115

Dear Chairman Whitfield:

Thank you for the opportunity to testify before the Subcommittee on Energy and Power on March 19, 2013, at the hearing entitled: "American Energy Security and Innovation: The Role of Regulators and Grid Operators in Meeting Natural Gas and Electric Coordination Challenges."

Enclosed are my responses to the follow-up questions from you and Mr. Dingell. Please let me know if you have any further questions. MISO looks forward to continuing to work with the Committee.

Respectfully,

Clair J. Moeller
Executive Vice President, Transmission and Technology

Responses to Chairman Whitfield Questions

1. As environmental modifications and outages related to Utility MACT compliance occur over the next few years, combined with the build-out of new gas generation, what concerns do you have about the sufficiency of labor, technology supply, materials, etc.?

In May of 2012, The Brattle Group completed a study for MISO titled Supply Chain and Outage Analysis of MISO Coal Retrofits for MATS[1]. The study evaluated the feasibility of the large number of simultaneous environmental retrofits and new generation construction expected as asset owners work to comply with the Mercury and Air Toxics Standards (MATS).

Two of the key findings of this study include:

1) MATS will require retrofit and new build activities that exceed the historical industry maximum in the Midwest by 51%-162% based on MISO's projected retrofit requirements and individual plant owner announcements.

2) MATS will require a ramp up in labor, engineering, equipment, and construction that is likely to introduce substantial bottlenecks locally or nationally. The potential demand for skilled labor is a specific concern.

The study also noted that certain emissions control technologies, such as activated carbon injection (ACI) and dry sorbent injection (DSI) require less time for implementation, whereas retrofit projects using other technologies, including wet and dry flue gas desulfurization (FGD), baghouse/fabric filter, electrostatic precipitator (ESP), and selective catalytic reduction (SCR) require 3-4 year lead times.

The most recent MISO Quarterly Survey of asset owners' compliance strategies with MATS found that ACI and DSI account for over 60% (as a % of total capacity) of the retrofits needed in the MISO footprint. Of the total work required for installation of emissions control technology, almost 80% had been scheduled as of March 2013. The complete breakdown of work required, scheduled and contracted, as well as outages scheduled, can be found in Figure 1.

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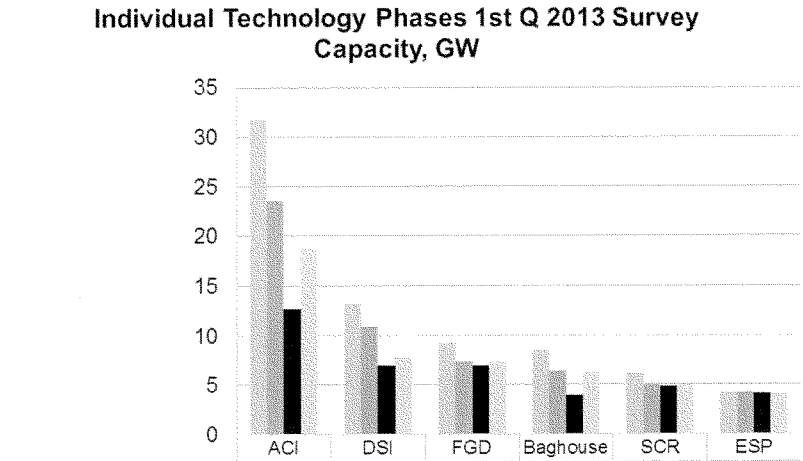
[1] The study can be found at the following link: https://www.misoenergy.org/Library/Repository/Communication%20Material/Key%20Presentations%20and%20Whitepapers/Supply%20Chain%20and%20Outage%20Analysis%20of%20MISO%20Coal%20Retrofits%20for%20MATS.pdf.

Figure 1. Individual Technology Phases from the 1st Quarter 2013 Survey (Capacity, GW)



	ACI	DSI	FGD	Baghouse	SCR	ESP
Work Required (GW)	31.7	13.2	9.2	8.5	6.1	4.2
Work Scheduled (GW)	23.5	10.9	7.4	6.4	5.0	4.2
Work Contracted (GW)	12.7	6.9	6.9	3.9	4.8	4.1
Outage Scheduled (GW)	18.8	7.7	7.4	6.2	5.0	4.1

While MISO does have concerns about the sufficiency of skilled labor and other supply chain impacts, based on the findings from Brattle, we are focused on maintaining system reliability during this transitional period. This means working closely with our Stakeholders to accommodate outages required for retrofits and ensuring that we have adequate resources to meet demand during outage periods.

a. Isn't there an overlap of what is needed to accomplish adding the necessary environmental controls to coal plants and the building of new natural gas plants – especially labor?

It is foreseeable that the labor pool for power plant construction and for retrofit and retirement of coal generation facilities will have some overlap. The Brattle study compared projected labor needs against the current labor supply for each craft, and found that boilermakers are the most likely bottleneck:

> "As many as 7,590 boilermakers (or 40% of boilermakers currently employed nationally) could be needed to complete the projected retrofits and new generation construction by 2015. This potential demand is more than four times the number of boilermakers (1,850) currently employed in the Utility System Construction Industry. Therefore, meeting the projected demand for boilermakers will likely require a combination of adjustments on the supply side, including training new labor, relocation, extending work hours, and attracting craft labor from other industries," p43, see footnote 1.

Responses to Chairman Whitfield Questions

b. From your studies, is it possible to get this work done in time to maintain the reliability of the electric grid?

Based on the results of our most recent Quarterly Survey, it is evident that most of the planned retrofit work and associated outages are being scheduled and contracted on a timely basis. While there is still some uncertainty about retrofit and retirement timelines, we continue to work closely with our Stakeholders during this transitional period to ensure reliable system operation.

c. Across the MISO footprint, how much will the installation of environmental controls for coal plants and the construction of new natural gas-fired plants and pipeline infrastructure cost?

Costs for compliance with the Mercury and Air Toxics Standards (MATS) in the MISO footprint are estimated at $8.9B (overnight construction cost). This number is based on results of MISO's most recent Quarterly Survey and only covers the cost of retrofits, not the costs of construction of replacement capacity.

Costs for construction of new natural gas-fired plants assuming a one-to-one replacement of projected coal capacity retirements with gas-fired generation is estimated as follows:

From (10.4 GW of coal retirements) x ($676M/GW) = $7.03B (assuming all coal replaced with Combustion Turbines, or CTs)

To (10.4 GW of coal retirements) x ($1023M/GW) = $10.6B (assuming all coal replaced with combined cycle units, or CCs)

The 10.4 GW figure is based on the most recent MISO Quarterly Survey results, including all capacity that has reported it will retire along with those that have replied as "TBD (To Be Determined)", and excluding the capacity that did not respond. The $676M/GW figure is the overnight construction cost for a new combustion turbine, and the $1023M/GW figure, likewise, for combined cycle units, both based on modeling assumptions for MISO's 2013 MISO Transmission Expansion Plan (MTEP13), which have been approved MISO Stakeholders. As the actual generation built in coming years will likely be a combination of CTs and CCs, this range provides a rough estimation of costs for the construction of new natural gas-fired plants. The figure will vary based on individual plant costs, the level of retirements, and the performance of existing and projected generation, as well as other factors.

Costs for natural gas infrastructure expansion to accommodate a projected increase in gas-fired generation in the Midwest, as calculated in the Phase I[2] gas study commissioned by MISO and completed in 2012, are estimated at $3B:

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[2] MISO's Phase I Gas Study, found at https://www.misoenergy.org/Library/Repository/Communication%20Material/Key%20Presentations%20and%20Whitepapers/Natural%20Gas-Electric%20Infrastructure%20Interdependency%20Analysis_022212_Final%20Public.pdf. The modeling assumptions for this study included a $4.50/MMBtu gas price and 12.6 GW of coal capacity retirements in 2015 in the MISO footprint.

> "It is conceivable, based on recent pipeline expansion projects, that the cost to accommodate the needed lateral and mainline expansion projects in the MISO region and the need for additional gas storage and LNG could easily exceed $3.0 Billion," p12.

The Phase I study recognizes, and subsequent conversations with the natural gas industry further confirm, the dynamic nature of gas pipeline flow patterns regionally and nationally—and the impact of these flows on future expansion. Additionally, MISO acknowledges that various operational and contractual characteristics of natural gas transportation and delivery infrastructure may allow for additional flexibility not accounted for in the estimations of costs as identified in the Phase I Study.

2. MISO's analysis shows a shortfall in generation in the MISO footprint in the 2013-2016 timeframe (3.5 GW summer and 11.7 GW winter).

a. What is the primary reason for this?

MISO models the adequacy of projected generation resources to meet projected demand in order to better plan for future system operation. To capture a range of likely future system conditions, we use a range of model inputs, including moderate ("50/50"[3]) and high ("90/10"[4]) forecasts of load. These load forecasts are one of many factors considered in the modeling process. Others include expected retirements and expected new generation resources, as well as maintenance periods and potential unit de-rates. Increased certainty of the model inputs translates to increased certainty of the results--and to an improved ability to plan for future system conditions. MISO's most recent forecasts of resource adequacy[5] highlight the uncertainty in near-term resource adequacy projections. For example, in Figure 2, under a 50/50 load forecast, MISO will potentially see a summer surplus in 2016 of 2 GW of capacity, and a winter surplus of 1 GW. Compare this to a 90/10 load forecast in Figure 3, and 12 GW and 9 GW shortfalls, in 2016 summer and winter, respectively. In both load forecast scenarios, the assumption is made that as much as 16 GW of gas-fired generation will experience de-rates (will have reduced ability to generate), in addition to 9 GW of typical winter maintenance and de-rates. This assumption takes into account the uncertainty of fuel supply for those gas-fired generators without backup fuel on-site or firm gas transportation contracts.

These numbers differ from previous resource adequacy modeling results due to updated data and additional considerations of uncertainty – and are subject to change as more information becomes available. The takeaway from these numbers is that uncertainty in the forward look *could* result in a shortfall. We're working to address that uncertainty and ensure that we have adequate resources going forward.

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[3] A 50/50 forecast is the mean value in a normal probability distribution, meaning there is a 50 percent chance the load will be higher or lower than the forecast.

[4] A 90/10 forecast is an industry standard for forecasting high load conditions. It means that there is a 10 percent chance that the actual load will exceed the forecast load.

[5] MISO's March 27th, 2013, presentation on Resource Adequacy Impact of EPA Implementation, https://www.misoenergy.org/Library/Repository/Communication%20Material/Power%20Up/EPA%20Compliance%20Update.pdf.

Responses to Chairman Whitfield Questions

Figure 2. Projected Resource Adequacy under 50/50 Load Forecast

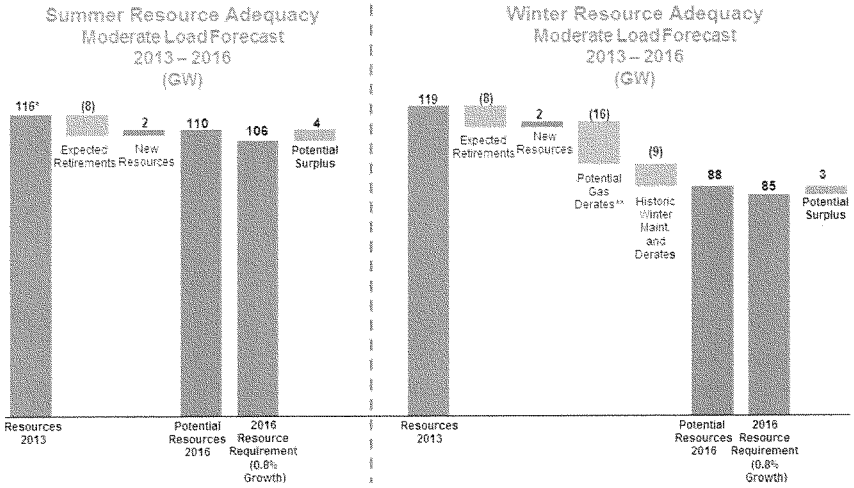
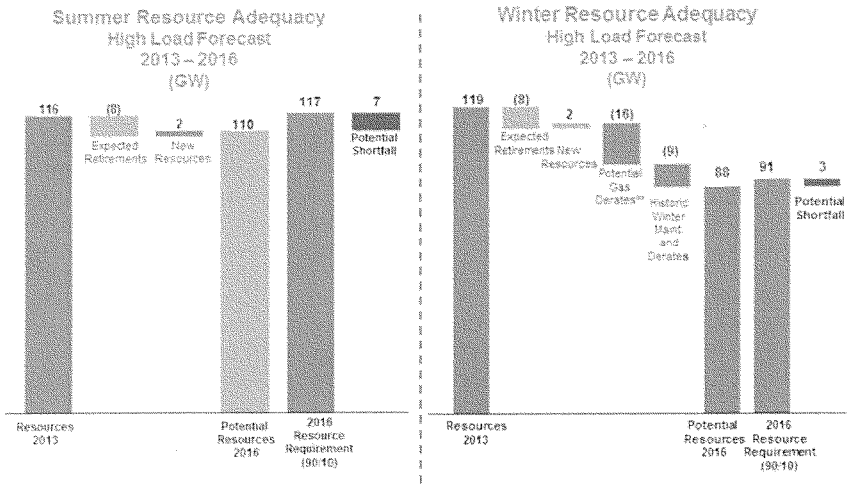


Figure 3. Projected Resource Adequacy under 90/10 Load Forecast



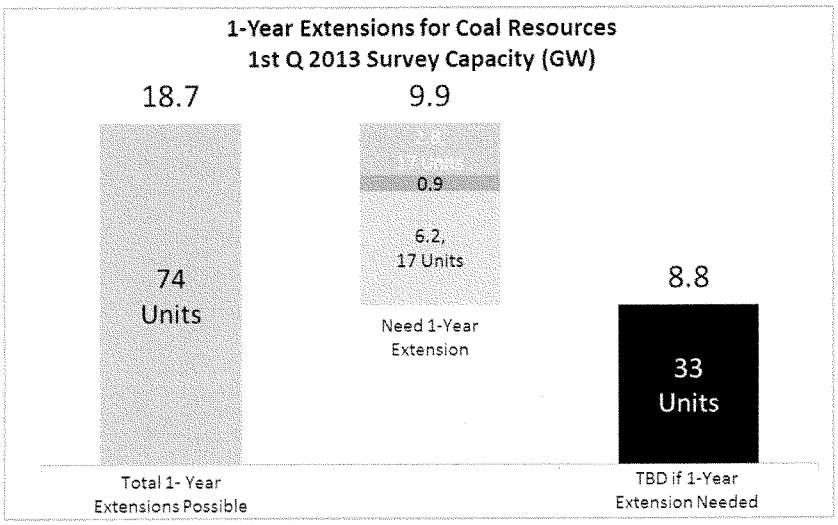
Responses to Chairman Whitfield Questions

b. Would more time for Utility MACT compliance help?

More time may be needed. The timeline for approval and construction of new mainline gas pipelines is on the order of 3 to 5 years, and for new laterals[6], 1 to 2 years. However, construction of new gas infrastructure will only occur with long-term, firm commitments from customers and there is currently little to incent generation owners to invest in firm fuel contracts. While added time for compliance with the Environmental Protection Agency's Mercury and Air Toxics Standards (i.e. 1-year extensions) will be helpful in accommodating and planning for retrofits of coal facilities, the issue of increasing demands upon the gas infrastructure in the Midwest remains.

Through MISO's 1st Quarter Survey of 2013, we've learned that almost 10 GW (41 units) of coal capacity in MISO needs a 1-year extension for compliance with MATS. Of this figure, over 7 GW (24 units) have pending or approved extension applications. Another 33 units have yet to determine whether they will require an extension. The figure below shows the breakdown of 1-year extensions as reported in the 1st Q 2013 Survey.

Figure 4. Findings from MISO's 1st Q 2013 Survey



In total, almost 50 GW of coal capacity in the MISO footprint are impacted by MATS—or about 38% of total MISO Market Footprint capacity. We are currently working to ensure adequate maintenance

[6] Generally, laterals are pipelines providing service to a specific end-use customer (e.g. to serve a gas-fired power plant) and are smaller in diameter than mainline pipelines.

margins during this transitional period and beyond, by coordinating outages and communicating with Stakeholders. Even though the 1-year extensions will provide some cushion for dealing with these changes, we are still facing a significant amount of uncertainty. Many asset owners have yet to report their compliance strategies or to schedule outages for retrofits. Also, as gas-fired generation begins to serve more of the demand previously met by coal-fueled power plants, questions about fuel supply add uncertainty.

c. What about those units that have announced retirement or will be mothballed? Is more flexibility needed for those units?

We recently revised our generator retirement processes to better accommodate retirement and mothball decisions driven by MATS. These processes should provide adequate flexibility for generators to comply.

3. What will happen after 2015-2016 if there is a reliability problem? Can you order generators to run even though they may be seeking to retire an uncontrolled unit? If you ask generators to run for reliability purposes, and they say "no", how might any resulting impacts be addressed?

A brief description of MISO's generator retirement process is helpful here. If an asset owner has made a definitive decision to retire or suspend operation of a particular unit, that asset owner must submit a form called Attachment Y (found in Section 38.2.7 of the MISO Tariff) at least six months prior to the planned date of retirement or suspension. Next, the host transmission owner is notified, a study is scoped, and MISO performs a reliability assessment. If the results of the reliability assessment indicate that the retirement of this generator will result in reliability criteria violations, the unit is designated as a System Support Resource (SSR). MISO then meets with Stakeholders to review the violations, and solicits alternatives including, but not limited to: system re-dispatch, system switching or reconfiguration, demand-side management, new or re-powered generation, and transmission projects. If mitigation cannot occur prior to the unit change of status, a System Support Resource (SSR) contract may be used. This contract provides a financial mechanism to make a generation resource "whole", i.e. to cover the costs of keeping a unit available for reliability purposes, until the time when an alternative solution is implemented.

If there are potential reliability issues in 2015-16 due to uncontrolled[7] unit retirements, the uncontrolled unit could choose to install necessary controls under an SSR agreement to maintain system reliability. However, the SSR process cannot require an uncontrolled unit to install controls or to run if they don't add required controls. The MISO Tariff requires the uncontrolled unit to make good faith efforts to seek any available waivers or exemptions from environmental regulatory requirements in order to permit the uncontrolled unit to continue to qualify for SSR status. If uncontrolled unit retirements and mitigation plans cannot be implemented and available waivers or exemptions cannot be obtained in time, there is the potential for reliability issues. If an event which may cause a reliability issue had the potential to occur, it would be necessary to curtail customer demand or firm system use to maintain overall reliability of transmission system.

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[7] "Uncontrolled" units do not have pollution controls installed to satisfy MATS requirements; "controlled" units do.

Responses to Chairman Whitfield Questions

4. Can the State regulators in the MISO footprint order their utilities to build new generators to meet any potential shortfall? Please explain.

Of the 11 states in the MISO Midwest footprint, 10 have the authority to regulate resource procurement, whether new generation or power purchase agreements, for example, over their investor owned utilities (IOUs) to meet ratepayer demand. In general, IOUs are only obligated to procure capacity on behalf of their ratepayers.

Responses to Mr. Dingell Questions

Panel II

Questions for Mr. Clair Moeller, Executive Vice President, Midwest Independent Transmission System Operator (MISO)

1. Is more time needed for compliance under the mercury rule to give time for new gas infrastructure and generation to be built?

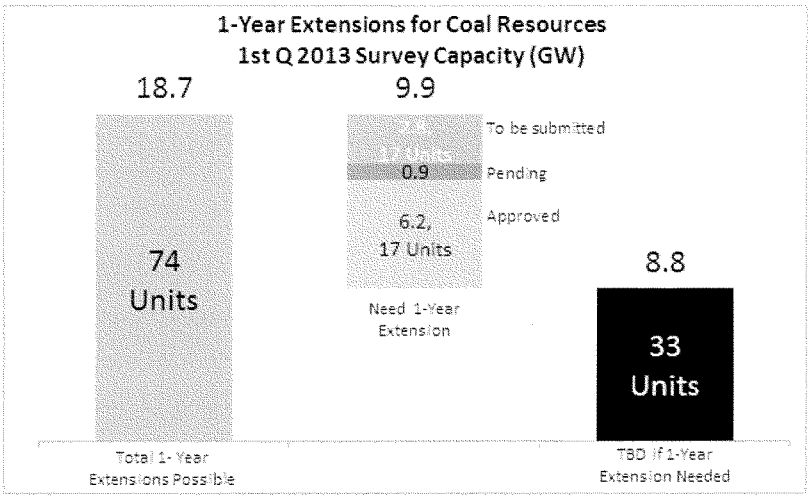
More time may be needed. The timeline for approval and construction of new mainline gas pipelines is on the order of 3 to 5 years, and for new laterals[8], 1 to 2 years. However, construction of new gas infrastructure will only occur with long-term, firm commitments from customers and there is currently little to incent generation owners to invest in firm fuel contracts. While added time for compliance with the Environmental Protection Agency's Mercury and Air Toxics Standards (i.e. 1-year extensions) will be helpful in accommodating and planning for retrofits of coal facilities, the issue of increasing demands upon the gas infrastructure in the Midwest remains.

Through MISO's 1st Quarter Survey of 2013, we've learned that almost 10 GW (41 units) of coal capacity in MISO needs a 1-year extension for compliance with MATS. Of this figure, over 7 GW (24 units) have pending or approved extension applications. Another 33 units have yet to determine whether they will require an extension. Figure 1 shows the breakdown of 1-year extensions as reported in the 1st Q 2013 Survey.

[8] Generally, laterals are pipelines providing service to a specific end-use customer (e.g., to serve a gas-fired power plant) and are smaller in diameter than mainline pipelines.

Responses to Mr. Dingell Questions

Figure 1. Findings from MISO's 1st Q 2013 Survey



In total, almost 50 GW of coal capacity in the MISO footprint are impacted by MATS—or about 38% of total MISO Market Footprint capacity. We are currently working to ensure adequate maintenance margins during this transitional period and beyond, by coordinating outages and communicating with Stakeholders. Even though the 1-year extensions will provide some cushion for dealing with these changes, we are still facing a significant amount of uncertainty. Many asset owners have yet to report their compliance strategies or to schedule outages for retrofits. Also, as gas-fired generation begins to serve more of the demand previously met by coal-fueled power plants, questions about fuel supply add uncertainty.

2. In your testimony you note that given the nature of pipeline contracts with utilities, some natural gas fired plants cannot run to provide additional generation during certain peak events. Do you believe there are changes to be made to ensure utilities have contracts in place that provide the supply they need to run longer?

Yes, there are changes that need to be made to ensure a reliable fuel supply for generators operating in the MISO footprint.

MISO is currently discussing the issue of fuel supply and its relation to reliability with its Stakeholders and members of the natural gas industry via MISO's Electric and Natural Gas Coordination Task Force. Additionally, we're working through the Task Force to better characterize the issues surrounding 1) the misalignment of the Gas Day and the Electric Day, 2) coordinated operations and communications between the Gas Industry and the Electric Industry, and 3) market signals that help ensure reliability.

Discussions around all of these issues feed into the overall conversation on ensuring availability of generation resources. Finally, we are examining 1) our planning models to determine how to incorporate the risk associated with fuel supply, and 2) our market constructs to determine ways to incentivize reliable fuel supply across the generation fleet.

MISO strives for reliable, safe and cost-effective operation. Efficiently reducing uncertainty and risk associated with fuel supply is in line with this goal.

3. With improved weather forecasting and the increased use of wind to generate electricity, do you believe this and other forms of renewable electricity should be included in resource adequacy predictions?

Yes. MISO currently takes into account characteristics of all generation resources it models in its resource adequacy forecasts, including renewable resources. The intermittency of wind resources is captured in MISO's resource adequacy planning process through the use of historical performance of the fleet of wind farms in the MISO footprint. The methodology used by MISO to calculate the capacity accreditation for wind resources is described in the attached article, "Determining Capacity Credit for Wind Used in MISO Resource Adequacy". This document explains how we account for the variability of wind resources, while recognizing their value as part of the generation resource mix in the MISO footprint. Specifically, we employ a two-step methodology that consists of 1) a probabilistic approach to calculate the MISO system-wide Effective Load Carrying Capability[9] (ELCC) value for all wind resources in the MISO footprint and 2) a deterministic approach using specific information about the location of each wind resource to allocate the single system-wide ELCC value across all wind in the MISO footprint, in order to determine a wind capacity credit for each wind node. The method accounts for variation in wind resources both geographically and temporally, and uses actual historical power output as a basis for setting the capacity rating of wind resources—which is currently 13.3% of rated capacity.

Finally, MISO recently incorporated the concept of Dispatchable Intermittent Resources (DIRs) into its Market construct. Wind resources registered as DIRs can be dispatched up and down as needed, providing another tool for MISO Operators to meet load and respond to changes in system operating conditions. Improved weather forecasting translates to improved wind resource forecasts—which helps MISO more accurately anticipate the amount of wind that will be online and available to meet demand.

[9] Effective Load Carrying Capability (ELCC) is defined as the amount of incremental load a resource, such as wind, can dependably and reliably serve, while considering the probabilistic nature of generation shortfalls and random forced outages as driving factors to load not being served.

Determining Capacity Credit for Wind Used in MISO Resource Adequacy

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***Abstract*— With increasing wind penetration on the MISO system a process was developed to determine the capacity value of wind resources. This paper demonstrates the method developed at MISO to calculate the system-wide capacity value of wind resources and illustrates how the capacity credit is designated to the individual wind sites.**

Keywords - Effective Load Carrying Capability; Wind Capacity Credit; Resource Adequacy; MISO

I. INTRODUCTION & BACKGROUND

The primary objective of resource adequacy is making sure there is enough generation capacity available when needed. The MISO is a Regional Transmission Organization and Independent System Operator in the United States that covers approximately 1.05 million square kilometers (406 thousand square miles), serves over 40 million people and comprises 135,000 MW of generation of which currently 11,000 MW is wind, Fig. 1. The MISO also operates a $27.5 billion annual energy market that incorporates 1,975 Commercial Pricing Nodes (CPnodes). MISO is currently adding 1,000 MW of wind on its system every year and it is expected to have 25,000 MW by 2025. As more and more new wind resources are being integrated into the MISO footprint and used in meeting the resource adequacy requirements the capacity value to assign this intermittent resource has taken on ever increasing importance. This paper discusses the techniques and processes used to accurately evaluate and assign the correct value of capacity for the wind resources.

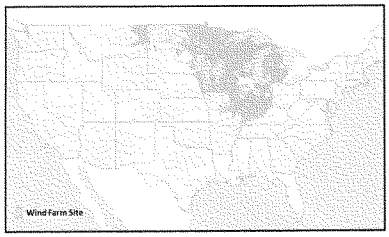

Figure 1. MISO Market Footprint

Since 2009 MISO has embarked on a process to determine the capacity value for the increasing fleet of wind generation in the system. The MISO process as developed and vetted through the MISO stakeholder community consists of a two-step method. The first-step utilizes a probabilistic approach to calculate the MISO system-wide Effective Load Carrying Capability (ELCC) value for all wind resources in the MISO footprint. The second-step employs a deterministic approach using specific information about the location of each wind resource 'period metric' to allocate the single system-wide ELCC value across all wind CPnodes in the MISO system, to determine a wind capacity credit for each wind node.

As the geographical distance between wind generation increases, the correlation in the wind output decreases, as shown in Fig. 2. This leads to a higher average output from wind for a more geographically diverse set of wind plants, relative to a closely clustered group of wind plants. Due to the increasing diversity and the inter-annual variability of wind generation over time, the process needs to be repeated annually to incorporate the most recent historical performance of wind resources into the analysis. So for each upcoming planning year the wind capacity credit values in MISO are updated to account for both the stochastic nature of wind generation and the ever increasing integration of new resources into the system. The sections of this write-up and current results illustrated here are broken down to describe the details of the two-step method adopted by MISO for determining wind capacity credit for the 2012 planning year.

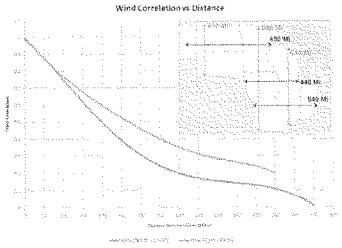

Figure 2: Wind Output Correlation to Distance Between Wind Sites

II. STEP-1: MISO SYSTEM-WIDE WIND ELCC STUDY

A. *Probabilistic Analytical Approach*

The probabilistic measure of load not being served is known as Loss of Load Probability (LOLP) and when this probability is summed over a time frame, e.g. one year; it is known as Loss of Load Expectation (LOLE). The accepted industry standard for what has been considered a reliable system has been the "Less than 1 Day in 10 Years" criteria for LOLE. This measure is often expressed as 0.1 days/year, as that is often the time period (1 year) over which the LOLE index is calculated.

Effective Load Carrying Capability (ELCC) is defined as the amount of incremental load a resource, such as wind, can dependably and reliably serve, while considering the probabilistic nature of generation shortfalls and random forced outages as driving factors to load not being served. Using ELCC in the determination of capacity value for generation resources has been around for nearly half a century. In 1966, Garver demonstrated the use of loss-of-load probability mathematics in the calculation of ELCC [1].

To measure ELCC of a particular resource, the reliability effects need to be isolated for the resource in question, from those of all the other sources. This is accomplished by calculating the LOLE of two different cases: one "with" and one "without" the resource. Inherently, the case "with" the resource should be more reliable and consequently have fewer days per year of expected loss of load (smaller LOLE).

The new resource in the example shown in Fig. 3 made the system 0.07 days/year more reliable, but there is another way to express the reliability contribution of the new resource besides the change in LOLE. This way requires establishing a common baseline reliability level and then adjusting the load in each case "With" and "Without" the new resource to this common LOLE level. A common baseline that is chosen is the industry accepted reliability standard of 1 Day in 10 Years (0.1 days/year) LOLE criteria.

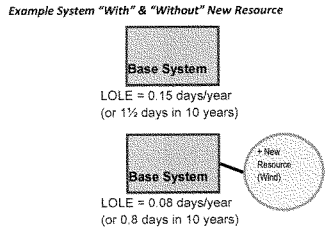

Figure 3. Example System "With" and "Without" New Resource

With each case being at the same reliability level, as shown in Fig. 4, the only difference between the two cases is that the load was adjusted. This difference is the amount of ELCC expressed in load or megawatts, which is 300 MW (100 – -200) for the new resource in this example. Sometimes this number is divided by the nameplate rating of the new resource and then expressed in percentage (%) form. The new resource in the ELCC example Fig. 4 has an ELCC of 30% of the resource nameplate.

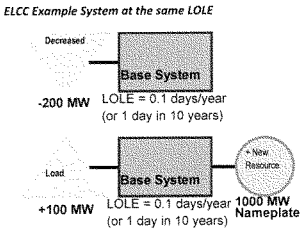

Figure 4. ELCC Example System at the same LOLE

The same methodology illustrated in the simple example of Fig. 4 was utilized as the analytical approach for the determination of the system-wide ELCC of the wind resource in the much more complex MISO system. For each historic year studied there were two types of cases analyzed, ones with and ones without the wind resources. Each case was adjusted to the same common baseline LOLE and the ELCC was measured off those load adjustments. Using ELCC is the preferred method of calculation for determining the capacity value of wind [2].

B. *LOLE Model Inputs & Assumptions*

To apply the ELCC calculation methodology MISO uses the Multi-Area Reliability Simulation (MARS) program by GE Energy to calculate LOLE values with and without the wind resource modeled. This model consisted of three major inputs:

1. Generator Forced Outage Rates (FOR)
2. Actual Historic Hourly Load Values
3. Actual Historic Hourly Wind Output Values

Forced outage rates are used for the conventional type of units in the LOLE model. These FOR are calculated from the Generator Availability Data System (GADS) that MISO uses to collect historic operation performance data for all conventional unit types in the MISO system as well as the capacity throughout the country.

To incorporate historical information the actual 2005-2011 historical hourly concurrent load and wind output at the wind CPNodes is used to calculate the historic ELCC values for the wind generation in the MISO on a system-wide basis. The last two columns in Table I illustrate the ELCC results for the 7-years of MISO historic data.

C. *MISO System Wide ELCC Results*

MISO calculated ELCC percentage results for historic years 2005 through 2011 and at multiple scenarios of penetration levels, corresponding to 10 GW, 20 GW and 30 GW of installed wind capacity. This creates an ELCC penetration

characteristic for each year, as illustrated by the different curves in Fig. 5. The initial left most data point for each curve is at the lowest penetration point on each characteristic curve and represents the actual annual ELCC for that year; and the values are shown in the right column in Table I. The values along each year's characteristic curve at the higher penetration levels reflect what that year's wind resource would have as an ELCC if more capacity had been installed in that year, over the same MISO footprint. The high end 30 GW level of penetration (approximately 30% on x-axis of Fig. 5) is an estimate of the amount of wind generation that could result in MISO, as the Load Serving Entities (LSE) collectively meet renewable resource mandates of the various MISO States. Fig. 5 illustrates the ELCC versus penetration characteristic of seven historical years, and how those characteristics, from multiple years, were merged to set an on-going wind capacity credit percent.

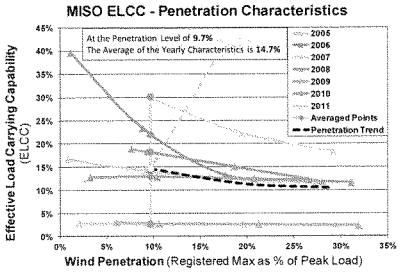

Figure 5: Seven Years of Historical ELCC Penetration Characteristics

The end of a 2nd Quarter is the convention used to set the capacity going into the next planning year. The penetration level at the end of the 2nd Quarter 2011 was 9.7%. Specifically as a percentage, the 2011 penetration level is the 2nd Quarter 9,996 MW in column-4 of Table I divided by the 102,804 MW peak load in column-1. The vertical line in Fig. 5 illustrates where the most recent historical 9.7% penetration level intersects each year's ELCC characteristic curve. The average of these seven intersect values is the 14.7% system wide ELCC assigned for the upcoming planning year 2012.

MISO Historical Wind ELCC Values

Year	MISO Peak Load (MW)	Registered Wind Max Capacity (MW)	Historical Wind Penetration (%)	System-Wide ELCC (MW)	System-Wide ELCC (%)
2005	109,473	908	0.8%	152	16.7%
2006	113,095	1,251	1.1%	495	39.6%
2007	101,600	2,065	2.0%	57	2.8%
2008	96,321	3,086	3.2%	395	12.8%
2009	94,185	5,636	6.0%	173	3.1%
2010	107,171	8,179	7.6%	1,548	18.9%
2011	102,804	9,996	9.7%	3,007	30.1%

The ELCC characteristic of each year can be represented by a trend line equation that has an R^2 coefficient of no less than 0.9996. This is the basis for achieving accuracy with sparse or few years of data. Alternative attempts to directly find a composite suitable single-trend-line curve to represent the aggregate 28 ELCC characteristic points of all seven years, met with poor R^2 coefficients in the range of 0.04 to 0.11. Fig. 6 shows the resulting trend line along with the associated equation and R^2 coefficient. While the trend line appears to represent a reasonable fit when compared to the dashed black line for the penetration trend in Fig. 5, the R^2 value of 0.1106 indicates that the process would be mathematically inferior.

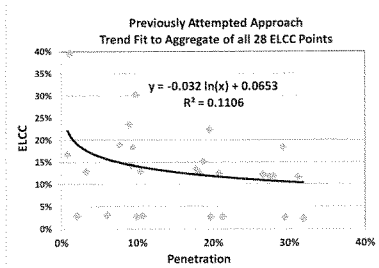

Figure 6. Penetration Trend by Fitting to all 28 ELCC Calculated Points

III. Step-2: Wind Capacity Credit by CPnode Calculation

A. *Deterministic Analytical Technique*

Since there are many wind CPnodes throughout the MISO system (143 in 2011), a deterministic approach involving an historic-period metric is used to allocate the single system-wide ELCC value of wind to all the registered wind CPnodes. While evaluation of all CPnodes captures the benefit of the geographic diversity, it is important to assign the capacity credit of wind at the individual CPnode locations, because in the MISO market the location relates to deliverability due to possible congestion on the transmission system. Also, in a market it is important to convey the correct incentive signal regarding where wind resources are relatively more effective. The location and relative performance is a valuable input in determining the tradeoffs between constructing wind facilities in high capacity factor locations, that in the case of the MISO are located in more remote locations far from load centers, and requiring more transmission investment versus locating wind generating facilities at less effective wind resource locations that may require less transmission build-out. Fig. 7 illustrates that the most economical solution in the MISO is a combination of both remote and local wind resources.

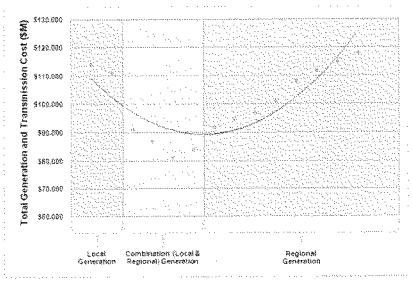

Figure 7. Conceptual Wind Generation Siting Cost Curve

The system-wide wind ELCC value of 14.7% times the 2011 installed registered wind capacity of 9,996 MW results in 1,469 MW of system-wide capacity. The 1,469 MW is then allocated to the 143 different CPnodes in the MISO system. The historic output has been tracked for each wind CPnode over the top 8 daily peak hours for each year 2005 through 2011. The average capacity factor for each CPnode during all 56 (8-hours x 7-years) historical daily peak hours is called the "$PKmetric_{CPnode}$" for that CPnode. The capacity factor over those 56 hours and the installed capacity at each CPnode, are the basis for allocating the 1,469 MW of capacity to the 143 CPnodes. MISO has developed business practice rules for the handling of new wind CPnodes that do not have historic output data, and for CPnodes with less than 7-years of data.

Tracking the top 8 daily peak hours in a year is sufficient to capture the peak load times that contribute to the annual LOLE of 0.1 days/year. For example, in the LOLE run for year 2011, all of the 0.1 days/year LOLE occurred in the month of July, but only 4 of the top 8 daily peaks occurred in the month of July. Therefore, no more than 4 of the top daily peaks contributed to the LOLE. Other years have LOLE contributions due to more than 4 days, however 8 days was found sufficient to capture the correlation between wind output and peak load times in all cases. If many more years of historical data were available, one could simply utilize the single peak hour from each year as the basis for determining the $PKmetric_{CPnode}$ over multiple years.

B. *Wind CPnode Equations*

Registered Maximum (RMax) is the MISO market term for the installed capacity of a resource. The relationship of the wind capacity rating to a CPnode's installed capacity value and Capacity Credit percent is expressed as:

$$(\text{Wind Capacity Rating})_{CPnode\ n} = RMax_{CPnode\ n} \times (\text{Capacity Credit }\%)_{CPnode\ n} \quad (1)$$

Where $RMax_{CPnode\ n}$ = Registered Maximum installed capacity of the wind facility at the CPnode n. The right most term in (1), the $(\text{Capacity Credit }\%)_{CPnode\ n}$ can be replaced by the expression (2) :

$$K \times (PKmetric_{CPnode\ n}\%) \quad (2)$$

Where "K" for Year 2011 was found by obtaining the PKmetric at each CPnode over the 7 year period, and solving expression (3):

$$K = \frac{ELCC}{\sum_{1}^{143} RMax_{CPnode\ n} \times PKmetric_{CPnode\ n}} \quad (3)$$

This results in the sum of the MW ratings calculated for the CPnodes equal to the system wide ELCC 1,479 MW. The values in (3) are:

ELCC = 1,469 MW

$\sum RMax_{CPnode\ n} \times PKmetric_{CPnode\ n}$ = 1,803 MW

Therefore: K = 0.8148 = 1,469 / 1,803

C. *Wind CPnode Capacity Credit Results & Examples*

The individual PKmetric's$_{CPnode}$ of the CPnodes ranged from zero to 39.9%. The individual Capacity Credit percent for CPnodes therefore ranged from zero to 32.5%, by applying expression (2)

Example 1) For the best performing CPnode through 2011 data, the 39.89% PKmetric drives the capacity credit equal to:

32.5% = 39.9% x 0.8148, and therefore 32.5% times that CPnode's RMax would equal the Unforced Capacity (UCAP) rating for the best performing CPnode.

Example 2) For the CPnode nearest the nominal 14.7% capacity credit through 2011 data, the 18.2% PKmetric drives the capacity credit equal to:

14.8% = 18.2% x 0.8148, and therefore 14.8% times that CPnode's RMax would equal the UCAP rating for that CPnode.

Fig. 8 shows how the system wide 14.7% ELCC value compares with the individual capacity credit percentages for the 143 CPnodes sorted in ascending order. The UCAP rating for each CPnode would equal the installed RMax capacity of the CPnode times the CPnode's capacity credit percent.

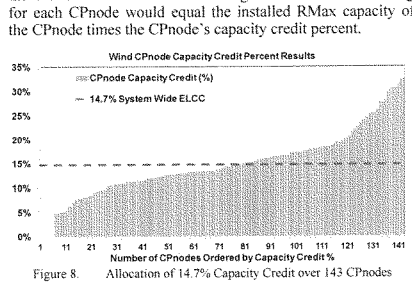

Figure 8. Allocation of 14.7% Capacity Credit over 143 CPnodes

IV. CONCLUSIONS

The MISO capacity credit method uses actual historical power output as a basis for setting the capacity rating of wind resources. While MISO is currently limited to applying seven

years of historical power outputs from the wind resources; by applying the developed ELCC and merging techniques the results are converging and are reflective as if one had more years of historical data available for the process. Fig. 9 illustrates the method over a range of limited data results. The left most point on the x-axis is the system wide result while utilizing only one year of data, the second point represents having two years of historical data available for the process. Progressively, the seventh point illustrates where MISO is currently at with seven years of data, and a projection sensitive to penetration is shown. As data from each new successive year becomes available, the subsequent capacity credit for successive years is expected to stabilize, and be more exclusively driven by penetration.

While the process discussed here represents a consistent and repeatable way to calculate the MISO market needs, MISO will continue to track and consider adjustments that may be required to deal with further aspects of common mode failure of wind generation. The MISO believes that the capacity credit for wind will be near 10% as the system approaches 25,000 to 30,000 MW of installed wind generation.

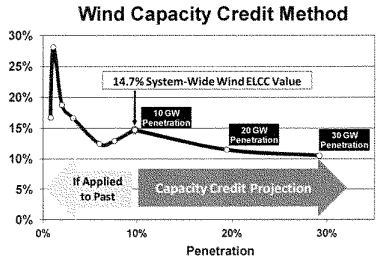

Figure 9. Applying Capacity Credit Method Starting with 2005 data

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