

**DISCUSSION DRAFT ADDRESSING ENERGY
RELIABILITY AND SECURITY**

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY AND POWER
OF THE
COMMITTEE ON ENERGY AND
COMMERCE
HOUSE OF REPRESENTATIVES
ONE HUNDRED FOURTEENTH CONGRESS
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¹The information has been retained in committee files and also is available at <http://docs.house.gov/meetings/IF/IF03/20150519/103477/BILLS-114pjh-DiscussionDraftonTitleI-EnergyReliabilityandSecurity.pdf>.

DISCUSSION DRAFT ADDRESSING ENERGY RELIABILITY AND SECURITY

TUESDAY, MAY 19, 2015

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

The subcommittee met, pursuant to call, at 10:00 a.m., in room 2123 of the Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Members present: Representatives Whitfield, Olson, Barton, Shimkus, Pitts, Latta, Harper, McKinley, Kinzinger, Griffith, Johnson, Long, Ellmers, Flores, Mullin, Hudson, Upton (ex officio), Rush, McNerney, Tonko, Engel, Green, Doyle, Sarbanes, and Loeb sack.

Staff present: Nick Abraham, Legislative Associate, Energy and Power; Gary Andres, Staff Director; Charlotte Baker, Deputy Communications Director; Will Batson, Legislative Clerk; Allison Busbee, Policy Coordinator, Energy and Power; Patrick Currier, Senior Counsel, Energy and Power; A.T. Johnson, Senior Policy Advisor, Energy and Power; Tom Hassenboehler, Chief Counsel, Energy and Power; Michael Goo, Democratic Chief Counsel, Energy and Environment; Caitlin Haberman, Democratic Professional Staff Member; and Rick Kessler, Democratic Senior Advisor and Staff Director, Energy and Environment.

Mr. WHITFIELD. It is 10 o'clock, and so I would like to call this hearing to order.

Today, we are going to continue our discussion on our discussion draft, and the subject matter today is energy reliability and security. And we are going to have 2 panels of witnesses, and I will get to the specific introduction of the panels in just a moment, but at this time, I would like to recognize myself for a 5-minute opening statement.

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

The American people, throughout its history, have had a goal of having affordable, abundant, and reliable electricity, and we have been pretty successful at that. And today, we have an abundance of fuel. Unfortunately, electricity rates are continuing to go up, and electric reliability faces a number of challenges, both new and old. The rapid retirement of coal-fired generation, due in part to aggressive EPA regulations, means that this reliable source of base load

generation is being lost at a rate that is faster than it can be replaced. At the same time, mandates and incentives for renewable power have led to growth in sources like wind, but these energy sources pose great intermittency issues. And, as we learned at last week's hearing, hydropower and natural gas face significant permitting hurdles. Altogether, the Nation's electric grid, though still the best in the world, is aging and in need of extensive modernization.

The security of our electricity supply is also at risk. No one seriously doubts that there are those who wish to do America harm, and that includes the threat of physical or cyberattacks on our electricity system.

At our March hearing on 21st century electricity, we learned that as the grid becomes more reliant on information technology and digital communications devices, thousands of new grid access points are created, potentially increasing the avenues for outside attacks. And while these new threats need to be addressed, we can't forget about the old ones such as damage from severe weather, especially now that the ability of utilities to respond to emergencies is complicated by the growing list of environmental regulations. But where there is a challenge, there is also opportunity. Over the next decade alone, utilities plan to invest more than \$60 billion in transmission infrastructure through 2024 to modernize the grid. That is a lot of private sector jobs. And the application of the information revolution to the electric grid holds the potential for more efficient and cost-effective delivery and use of power, which will help homeowners as well as businesses. And we must not forget that we are in a global marketplace, and we are competing with nations around the world to produce jobs.

This discussion draft contains a number of measures to strengthen reliability and security and prepare the grid for the future. This includes provisions to resolve potential conflicts between grid reliability and environmental regulations, and to improve emergency preparedness and response. It requires a Department of Energy plan regarding the creation of a Strategic Transformer Reserve, and also establishes a volunteer program to harden the grid against cybersecurity threats. Other measures encourage State public utility commission and utilities to improve grid resilience and promote investments in energy analytics technology to increase efficiencies and lower the cost for ratepayers, while strengthening reliability and security. The discussion draft also requires FERC to work with each RTO to encourage a diverse generation portfolio, long-term reliability and price certainty for customers, and enhanced performance assurance during peak periods.

So we are really excited about this discussion draft, and our opportunity to pass this legislation to improve the conditions of our electricity in America.¹

[The prepared statement of Mr. Whitfield follows:]

¹The discussion draft has been retained in committee files and also is available at <http://docs.house.gov/meetings/IF/IF03/20150519/103477/BILLS-114pjh-DiscussionDraftonTitleI-EnergyReliabilityandSecurity.pdf>.

PREPARED STATEMENT OF HON. ED WHITFIELD

This subcommittee has devoted considerable attention to the issue of electricity affordability, and for good reason given that electric bills are on the rise and that new regulations threaten continued increases in the years ahead. Today, we will focus on something equally important to electricity costs, and that's electricity reliability and security. We have introduced a discussion draft on the subject that we plan to include in our bipartisan energy bill. The draft contains ideas designed to ensure that the lights stay on in the decades to come. I thank our witnesses and in particular the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation for their expertise and their vigilance on reliability and security concerns.

Electricity reliability faces a number of challenges, both new and old. The rapid retirement of coal-fired generation due in part to aggressive EPA regulations means that this reliable source of base load generation is being lost at a rate that is faster than it can be replaced. At the same time, mandates and incentives for renewable power have led to growth in sources like wind, but these energy sources pose great intermittency issues. And, as we learned at last week's hearing, hydropower and natural gas face significant permitting hurdles. Altogether, the Nation's electric grid, though still the best in the world, is aging and in need of extensive modernization.

The security of our electricity supply is also at risk. No one seriously doubts that there are those who wish to do America harm, and that includes the threat of physical or cyberattacks on our electricity system. At our March hearing on 21st century electricity, we learned that as the grid becomes more reliant on information technology and digital communications devices, thousands of new grid access points are created, potentially increasing the avenues for outside attacks.

And while these new threats need to be addressed, we can't forget about the old ones such as damage from severe weather, especially now that the ability of utilities to respond to emergencies is complicated by the growing list of environmental regulations.

But where there is challenge there is also opportunity. Over the next decade alone, utilities plan to invest more than \$60 billion in transmission infrastructure through 2024 to modernize the grid. That's a lot of private sector jobs. And the application of the information revolution to the electric grid holds the potential for more efficient and cost-effective delivery and use of power, which will help homeowners as well as businesses.

The discussion draft contains a number of measures to strengthen reliability and security and prepare the grid for the future. This includes provisions to resolve potential conflicts between grid reliability and environmental regulations, and to improve emergency preparedness and response. It requires a Department of Energy plan regarding the creation of a Strategic Transformer Reserve, and also establishes a voluntary program to harden the grid against cybersecurity threats.

Other measures encourage State public utility commissions and utilities to improve grid resilience and promote investments in energy analytics technology to increase efficiencies and lower costs for ratepayers while strengthening reliability and security. The discussion draft also requires FERC to work with each regional transmission organization to encourage a diverse generation portfolio, long-term reliability and price certainty for customers, and enhanced performance assurance during peak periods.

America was the first nation to electrify, and overall our system of generating and delivering power remains the best in the world. But to stay that way in the years ahead we need to better address existing and emerging threats, and I believe the ideas in this discussion draft are a good start.

Mr. WHITFIELD. And I will yield back the balance of my time, and I recognize the gentleman from California, Mr. McNerney, for a 5-minute opening statement.

OPENING STATEMENT OF HON. JERRY MCNERNEY, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. MCNERNEY. Thank you, Mr. Chairman. I just wanted to let the subcommittee know that the ranking member's plane has been delayed, so he will be here later this morning.

I had a chance to review the discussion draft. I think there are some very good provisions in it. We clearly need to look at our electrical infrastructure, our security, the reliability of it, can we meet the demands of the 21st century. And there is a lot of good opportunity and technology out there to help us get there, and we want to make sure that we put the right incentives in place, and that we give a roadmap that makes sense.

One or two of the provisions in—one or two of the sections I think are problematic; we need to discuss those in some detail, but by and large, the proposed bill looks favorable. And I am going to work with the ranking member to make sure that we have something that we can all agree on.

So with that, I am going to yield back. Anyone else on our side needs to—would like to—I would like to recognize the gentleman from Texas.

Mr. GREEN. Thank you, Mr. Chairman, and I will use all my 5 minutes for questions.

But Section 1201 resolves an issue in the Federal law between reliability and environmental protection, and that is one of the issues that we have worked on on a bipartisan basis. I am pleased that it includes issues that both my good friends, Congressman Pete Olson and Mike Doyle, and I have worked on, and the legislation resolves conflicts in Federal law that puts reliability and environmental protections at odds with each other. And I have said many times, the choice doesn't have to be either/or; it can be both, and we demonstrate it in this language.

And with that, I appreciate the Chair including that, and I will have some questions when I get my 5 minutes.

Thank you, and I will yield back.

Mr. MCNERNEY. Mr. Chairman, I yield back the remainder of my time.

Mr. WHITFIELD. Thank you very much.

Is there anyone else on our side that would like to make a statement? OK.

When Mr. Rush comes in we will give him an opportunity to make a statement at that time, if he has one.

So now we can proceed to our first panel. We are delighted to have on our first panel Mr. Michael Bardee, who is the Director of the Office of Electric Reliability over at FERC. And, Mr. Bardee, thanks very much for being with us today. We also have Mr. Gerry Cauley, who is the president and CEO of the North American Electric Reliability Corporation. Thank both of you gentlemen for being with us. We appreciate your expertise, and we look forward to your comments on this discussion draft, and look forward to working with you as we move forward.

So, Mr. Bardee, I will recognize you for a 5-minute opening statement.

STATEMENTS OF MICHAEL BARDEE, DIRECTOR, OFFICE OF ELECTRIC RELIABILITY, FEDERAL ENERGY REGULATORY COMMISSION; AND GERRY W. CAULEY, PRESIDENT AND CHIEF EXECUTIVE OFFICER, NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

STATEMENT OF MICHAEL BARDEE

Mr. BARDEE. Thank you, Chairman Whitfield, and members of the subcommittee. Thank you for inviting me to appear before you today. I am here today as a commission staff witness, and my remarks do not necessarily represent the views of the commission or any individual commissioner.

Section 1201 of the discussion draft seeks to resolve conflicts between the requirements of Federal Power Act Section 202(c) and environmental laws. I support the concept in Section 1201. Operating a power plant in compliance with Section 202(c) should not cause a violation of environmental laws.

Section 1202 of the discussion draft would require the commission, in coordination with NERC, to perform reliability analyses of major rules proposed or issued by other Federal agencies if they may impact an electric generating unit, and have an annual effect on the economy of \$1 billion or more. The number and type of rules that might be subject to this section is unclear; thus, it is difficult for me to foresee the ramifications of this section. Also, the commission has the expertise to evaluate these type of analyses, but generally has not maintained the tools and data to perform such analyses itself on the proposed timelines. If Congress gives the commission this responsibility, Section 1202 should be clarified so that planning authorities must timely conduct and provide the analyses and information requested by the commission. In this way, Section 1202 would rely primarily on their existing processes for identifying and addressing reliability issues, while allowing the commission to ensure consistent, objective analyses of these rules.

Section 1204 of the discussion draft would allow the Department of Energy, in certain circumstances, to require actions to address grid security emergencies. The commission has approved standards for cybersecurity, physical security, and geomagnetic disturbances. Last week, the commission proposed to approve, but required changes to, an additional standard for GMD events. Section 1204 would address concerns that the current processes for developing standards are too slow, too open, and too unpredictable for emergencies. But while Section 1204 authorizes requirements to protect against imminent danger, it should be clarified to also address restoration of grid reliability after an unforeseen attack or event.

Section 1208 would require the commission to direct each RTO and ISO with a capacity market or comparable market to demonstrate how it meets certain requirements. The requirements include integrated system planning practices, such as having a diverse generation portfolio and stable pricing for customers. In general, the commission prefers to rely on competitive forces when reasonable, but recognizes that traditional regulatory approaches are sometimes needed in wholesale electricity markets. Section 1208 takes a different approach and would impose on RTO and ISO capacity markets a broad overlay of traditional regulatory require-

ments. This approach may reduce the potential for these markets to provide consumers with the benefits achievable through competitive forces, and may cause unnecessary conflicts between Federal and State regulatory efforts. It would be preferable to not codify such an approach, and instead, allow the commission to adapt market rules over time with the goal of maximizing competitive forces.

In conclusion, thank you again for inviting me to testify today. I would be happy to answer any questions you may have.

[The prepared statement of Mr. Bardee follows:]

**Summary of Testimony of Michael Bardee
Director, Office of Electric Reliability
Federal Energy Regulatory Commission
Before the Committee on Energy and Commerce
Subcommittee on Energy and Power
United States House of Representatives
May 19, 2015**

Summary

Chairman Whitfield, Ranking Member Rush, and Members of the Committee:

Thank you for this opportunity to appear before you today. My testimony will focus primarily on those parts of the Discussion Draft that relate to the Commission's authorities.

I support the concept underlying section 1201 of the Discussion Draft, that operating a power plant in compliance with an order under Federal Power Act section 202(c) should not result in a violation of an environmental law.

The Commission generally has not maintained the tools and data to perform the analyses required under section 1202, particularly not on the proposed timelines. If Congress decides to give the Commission this responsibility, section 1202 should be expanded to clarify that NERC, its regional entities and other planning authorities must timely conduct and provide to the Commission analyses and information as may be requested by the Commission. With that clarification, section 1202 would rely primarily on their existing processes for identifying and addressing reliability issues, adjusted as appropriate for the circumstances. In this way, the Commission could rely on the resources and capabilities of these entities while ensuring consistent, objective analyses of major rules affecting generating units.

With respect to cyber and physical security, section 1204 of the Discussion Draft would address concerns that the current processes are too slow, too open and too unpredictable to ensure responsiveness in emergencies. However, while it authorizes emergency requirements to protect against imminent danger, it is not clear that it authorizes requirements for restoration of grid reliability after an unforeseen attack or event.

Finally, the Commission prefers to rely on competitive forces when reasonable, but recognizes that traditional regulatory approaches are sometimes necessary in wholesale electricity markets. Section 1208 takes a different approach, and would impose on RTO and ISO capacity markets a broad overlay of traditional regulatory requirements. This approach may reduce the potential for these markets to provide consumers with the benefits achievable through competitive forces and may cause unnecessary conflicts between federal and state regulatory efforts. It would be preferable to not mandate such an approach legislatively, and instead to allow the Commission to adapt market rules over time with the goal of maximizing competitive forces, while using other approaches when competitive forces are insufficient.

**Testimony of Michael Bardee
Director, Office of Electric Reliability
Federal Energy Regulatory Commission
Before the Committee on Energy and Commerce
Subcommittee on Energy and Power
United States House of Representatives
May 19, 2015**

Introduction

Thank you for this opportunity to appear before you to discuss energy reliability and security. My name is Michael Bardee. I am the Director of the Office of Electric Reliability of the Federal Energy Regulatory Commission (FERC or Commission). I am here today as a Commission staff witness, and my remarks do not necessarily represent the views of the Commission or any individual Commissioner.

My testimony will focus primarily on those parts of the draft legislation that resolve conflicts between environmental regulations and Department of Energy emergency reliability orders (section 1201), require analysis of the reliability impacts of major federal regulations affecting electricity generation (section 1202), address grid security emergencies resulting from cyber or physical attacks or geomagnetic storms (section 1204), and require consideration of performance assurance in regional transmission organizations (section 1208).

Background

Before turning to the provisions of the Discussion Draft, it is important to note that the Commission's role on reliability is defined by Congress, and generally consists of approving proposed reliability standards for the Bulk-Power System, if they meet the statutory criteria, and then enforcing or overseeing enforcement of those standards. This authority is in section 215 of the Federal Power Act. Section 215 requires the Commission to select an Electric Reliability Organization (ERO) responsible for proposing, for Commission review and approval, new reliability standards or modifications to existing reliability standards. The Commission has

certified the North American Electric Reliability Corporation (NERC) as the ERO. The ERO may delegate certain responsibilities to “Regional Entities,” subject to Commission approval.

The reliability standards apply to the users, owners and operators of the bulk power system and become mandatory in the continental United States only after Commission approval. If the Commission disapproves a proposed standard or modification, the Commission must remand it to the ERO for further consideration. The Commission, upon its own motion or upon complaint, may direct the ERO to submit a proposed standard or modification on a specific matter but the Commission does not have the authority to modify or author a standard itself. The ERO is authorized to impose, after notice and opportunity for a hearing, penalties for violations of the reliability standards, subject to Commission review and approval. The Commission also can enforce the reliability standards directly.

Resolving Environmental and Grid Reliability Conflicts

Section 1201 of the Discussion Draft seeks to avoid conflicts between requirements imposed under environmental laws and by the Department of Energy under Federal Power Act section 202(c). Essentially, section 1201 says that compliance with the latter will not be considered a violation of the former. I support the concept underlying section 1201.

To help ensure that the electric grid remains reliable, Federal Power Act section 202(c) allows the Department of Energy to require a power plant to run in certain emergency circumstances. Ideally, FPA section 202(c) will not need to be invoked, but experience demonstrates that orders under section 202(c) are sometimes necessary. However, in certain circumstances, operating a power plant in compliance with FPA section 202(c) order can result in a violation of the Clean Air Act (or other environmental laws). In this sense, federal law could

require a power plant owner to choose between violating either the environmental law(s) or the Federal Power Act. The law should not require such a choice.

Reliability Analysis for Certain Rules Affecting Electric Generating Facilities

Section 1202 of the Discussion Draft would require the Commission, in coordination with the ERO, to perform and issue reliability analyses of major rules proposed or issued by other federal agencies, if they may impact an electric generating unit(s) and have an annual effect on the economy of \$1 billion or more. The analyses would have to consider effects on reliability and resource adequacy; fuel diversity; wholesale power markets; and energy delivery and infrastructure.

The number and type of rulemakings that might be subject to this section is unclear. Thus, it is difficult for me to foresee and understand the ramifications of this proposal from the perspective of Commission workload or otherwise.

As I stated before, the Commission's role on reliability generally consists of approving proposed reliability standards for the Bulk-Power System, if they meet the statutory criteria, and then enforcing or overseeing enforcement of those standards. The Commission's exercise of its rate jurisdiction also, at times, has effects on reliability issues. As part of these responsibilities, the Commission has developed the expertise to review and evaluate the type of extensive analyses described in section 1202, but the Commission generally has not maintained the tools and data to perform such analyses itself, particularly not on the proposed timelines.

If Congress decides to give the Commission this responsibility, certain modifications of section 1202 would be appropriate. First, section 1202(b)(2) requires the initiating agency to provide the Commission relevant data, modeling and assessments, and this should be expanded to clarify that the ERO, regional entities and others also must "timely conduct and provide

analyses and information as may be requested by the Commission.” This should include entities such as regional transmission organizations (RTOs) and independent system operators (ISOs), the ERO, regional entities and reliability coordinators that collectively perform the functions needed to plan, operate and assess the reliability of the bulk power system. With the clarification I am suggesting, section 1202 would allow the Commission to rely primarily on these existing processes for identifying and addressing reliability issues, adjusted as appropriate for the circumstances. Under such a process, the Commission could rely on the resources and capabilities of these entities while ensuring consistent, objective analyses of major rules affecting generating units. Even so, the future workload from this section may require additional resources at the Commission, beyond its current levels in this area.

Section 1202 also should be modified so that our work is done “in consultation with” the ERO, instead of “in coordination with” the ERO, to recognize our statutory role in overseeing the ERO. This also would be consistent with other provisions in the Discussion Draft, such as section 1205’s requirement that the Department of Energy develop a Strategic Transformer Reserve Plan, “in consultation with” the ERO.

Section 1202 also should require the initiating agency to notify the Commission when it issues a covered proposed or final rule, since the Commission otherwise might not know of a covered rule issued by another agency. Also, section 1202’s reference to considering “local electric reliability and resource adequacy” (emphasis added) could be construed as broadening the Commission’s role beyond the bulk power system, and the reference to fuel diversity could be construed as conflicting with the Commission’s traditional role of preventing undue discrimination instead of favoring particular fuels or technologies; both of these references may warrant further consideration. Finally, the deadlines for the Commission to issue its analyses (90

days after a proposed rule and 120 days after a final rule) are not reasonably achievable and should be extended.

Critical Infrastructure Security

Section 1204 would allow the Secretary of Energy to address grid security emergencies if the President provides a written directive or determination identifying a grid security emergency. Section 1204 also would exempt certain Critical Electric Infrastructure Information from disclosure, and require the Commission to establish standards for and authorize the voluntary sharing of such information among various entities.

As I will explain, the Commission's current authority is not adequate to address cyber or other national security emergencies on the electric grid. These types of emergencies pose a serious risk to our Nation's electric grid, which undergirds our government and economy and helps ensure the health and welfare of our citizens.

An important part of the Commission's responsibility to oversee the development of standards for the bulk power system involves security-related standards. For example, standards for cyber-security have been mandatory since July 2010. In 2013, the Commission approved a new version of the cyber-security standards, which broadened the scope of the covered systems and included a tiered approach for applying different requirements to high-, medium- and low-impact cyber assets. The Commission also directed the ERO to develop certain modifications for, e.g., transient devices such as laptops, and the Commission is now reviewing the ERO's recently-proposed modifications.

The Commission also has directed the ERO to develop, in two stages, standards to address the impact of geomagnetic disturbances on the electric grid. The first stage required real-time operational practices for addressing a geomagnetic disturbance. The Commission

approved the ERO's proposal for this stage. Earlier this year, the ERO submitted a proposal for the second stage, which would require owners and operators of the Bulk-Power System to conduct initial and subsequent assessments of the potential impact of benchmark GMD events and to mitigate those impacts through equipment modifications or other means. Last week, the Commission proposed to approve the ERO's second stage standard and also proposed to direct certain modifications to that standard. The Commission is seeking comments on its proposal and, after receiving the comments, will decide on further actions.

Finally, in March 2014, the Commission directed the ERO to propose standards on physical security that require owners and operators of the Bulk-Power System to perform a risk assessment to identify their critical facilities; evaluate potential threats to, and vulnerabilities of, those facilities; and develop and implement a security plan to protect against attacks on those facilities. In November 2014, the Commission approved NERC's proposed physical security reliability standard, and directed NERC to make one modification.

It is important to recognize that reliability standards must be developed by the ERO through an open, inclusive, and public process. NERC's procedures for developing standards allow extensive opportunity for stakeholder comments. The process is intended to develop consensus on both the need for, and the substance of, the proposed standard. Although inclusive, the process is relatively slow, open and unpredictable in its responsiveness to the Commission's directives. (The ERO was able to submit a physical security standard within the 90 day deadline imposed by the Commission, but this process still may not work quickly enough to avoid imminent danger.)

In my view, FPA section 215 is inadequate for emergency action. This is true of both cyber and physical emergencies. The procedures used under section 215 for the development

and approval of reliability standards do not provide an effective and timely means of addressing urgent cyber or other national security risks to the bulk power system. Certain circumstances, such as those involving national security, may require immediate action. Also, the open and inclusive process required for standards development is not consistent with the need to protect security-sensitive information.

Section 1204 of the Discussion Draft would address these issues. Section 1204 would allow the Secretary of Energy to issue orders for emergency measures whenever the President issues a written directive or determination identifying a grid security emergency. The emergency could involve cyber or physical attack (including an EMP attack) or a geomagnetic storm. Also, section 1204 provides an exemption from disclosure for Critical Electric Infrastructure Information. Without this, the grid may be more vulnerable to attack. Section 1204 also provides for cost recovery, since it is important that utilities be able to recover costs they incur to mitigate emergencies.

Section 1204 may warrant modification or clarification in limited respects. First, while it authorizes emergency requirements to protect against imminent danger, it is not clear that it authorizes requirements for restoration of grid reliability after an unforeseen attack or event. One way to clarify this point would be to revise section 1204 (on page 11, line 2) to address “the occurrence or imminent danger” of an emergency and (on page 12, line 9) to allow the Secretary to “protect or restore” the reliability of the electric grid. Second, while section 1204 requires the Commission to establish a cost recovery mechanism in certain circumstances, it does not make clear whether this mechanism should be developed under our existing rate authority for public utilities or through a more comprehensive mechanism beyond our existing rate authority, e.g., including non-public utility “users.”

Reliability and Performance Assurance in Regional Transmission Organizations

Section 1208 would require the Commission to direct each regional transmission organization (RTO) and independent system operator (ISO) with an existing capacity market or comparable market to demonstrate how it meets certain requirements. The requirements include certain integrated system planning practices such as having a diverse generation portfolio and stable pricing for customers, as well as a sufficient supply of physical generation facilities with reliability attributes such as being able to operate each day for not less than 30 days.

The Commission has sought for many years to foster the development of competitive markets for wholesale electricity. As stated in our current Strategic Plan (page 7):

When competitive markets exist and there are assurances against the exercise of market power, FERC leverages competitive market forces to promote efficiency for consumers while taking measures to make those markets more efficient. When competitive market conditions do not exist and competitive forces are inadequate to protect consumers, FERC relies on traditional rate-setting authority and tools such as cost-of-service ratemaking.

The Commission also has stated that marketplace competition benefits energy consumers by encouraging diverse resources, spurring innovation and deployment of new technologies, improving operating performance, and exerting downward pressure on costs. In short, the Commission prefers to rely on competitive forces when reasonable, but recognizes that traditional regulatory requirements are sometimes necessary in wholesale electricity markets.

Section 1208 takes a different approach, and would impose on RTO and ISO capacity markets a broad overlay of traditional regulatory requirements. This approach may reduce the potential for these markets to provide consumers with the benefits achievable through competitive forces. While the Commission recognizes the need to approve or require rules for capacity markets to encourage an adequate supply of resources at reasonable prices, the breadth of requirements in section 1208 may unduly impair the competitive aspects of these markets, to

the ultimate detriment of consumers. It would be preferable to not mandate such an approach legislatively, and instead to allow the Commission to adapt market rules over time with the goal of maximizing competitive forces to benefit consumers, while using other approaches when competitive forces are insufficient to result in adequate resources at a reasonable cost.

Section 1208 also may cause unnecessary conflicts between federal and state regulatory efforts. For example, section 1208 would require RTO and ISO capacity markets to have a “diverse and flexible generation portfolio,” but the Commission and states may differ on the proper components of (and their percentages in) such a portfolio. If so, section 1208 is unclear on how such differences should be addressed. Similarly, regulators may differ on which facilities can generate “during emergency and severe weather conditions,” since this phrase may or may not include drought-prone hydropower facilities; coal facilities dependent on winter-impaired deliveries of coal by rail or barge; or natural gas facilities affected by wellhead freeze-offs.

Finally, Section 1208 requires the RTOs and ISOs and the Commission to evaluate contractual terms for both fuel certainty and stable pricing. This requirement places the RTOs, ISOs and the Commission in the position to second guess the business decisions that market participants have made. The Commission prefers to allow market rules to create an incentive for a market participant to take actions that best manage its risks while meeting system needs.

Strategic Transformer Reserve

As noted above, section 1205 would require the Secretary of Energy to develop a strategic transformer reserve plan, in consultation with the ERO. This section should be modified to also require consultation with the Commission.

Conclusion

The reliability and security of the electric grid is of primary importance to the Commission. Thank you for inviting me to testify today on the Discussion Draft. I look forward to working with you in the future on these issues and would be happy to answer any questions you may have.

Mr. WHITFIELD. Thank you very much.
Mr. Cauley, you are recognized for 5 minutes.

STATEMENT OF GERRY W. CAULEY

Mr. CAULEY. Thank you, Chairman Whitfield, and good morning to the members of the committee.

I am very pleased to be here today to testify concerning the energy reliability and security discussion draft. My name is Gerry Cauley, and I am the president and CEO of the North American Electric Reliability Corporation. I have dedicated the last 35 years of my career to the reliability and security of the power grid, and at this point, I can say there has never been a time where I have been more concerned about reliability and security than today.

The threat of cyber and physical attacks on the grid by nation-state terrorist groups and criminal actors is at an all-time high. I believe the first line of defense in securing the grid is robust information-sharing regarding threats and vulnerabilities. Any one entity, public or private, cannot see a complete picture of all security threats and activities. Unfettered sharing of information among entities responsible for protecting the grid, both industry and Government, helps us better understand how to protect the grid. However, sensitive grid security information must be effectively safeguarded from public disclosure that could allow information to fall into our adversaries' hands.

I am also concerned about potential future risk to reliability and adequacy of power supplies that might be introduced by Government regulations and rules that cause a dramatic transformation in how we produce electricity for our customers. As suggested in the draft, such rules should be subject to rigorous electrical and market analysis to avoid unnecessary risks to future reliability and adequacy of electricity supply. As noted in a recent NERC report, it can take many years to build transmission lines and gas infrastructure to safely accommodate a large transformation of our power generation supply.

I also appreciate the recognition in the draft language regarding the role of the Nation's Electric Reliability Organization. As the ERO, NERC assures the reliability of power system through mandatory standards, rigorous compliance monitoring and enforcement, and reliability assessments. We also operate the Electricity Sector Information Sharing and Analysis Center, and conduct continent-wide security exercises. NERC appreciates the recognition in the draft language of the ERO's important role in security and reliability assessments.

In the remainder of my time, I would like to touch on a few specific points within the draft language with regard to Section 1202 on reliability analysis of major rules. NERC has been conducting grid reliability assessments for 45 years, and we are expert at it. We perform annual long-term assessments, as well as assessments of emerging issues, such as impacts of environmental regulations, integration of renewable resources, interdependencies with natural gas, and geomagnetic disturbances. The bill's reliability analysis section identifies a role for FERC in coordination with the ERO to conduct an independent reliability analysis and propose new rules. And we have three comments on this section. Essentially, we sup-

port the proposal. NERC would be pleased to work with FERC on reliability analysis of proposed new rules that propose potential challenges to resource adequacy or reliability.

And agreeing with my colleague's comments, second point, the language triggering a reliability review for any major rule that may impact even a single electric generating unit could sweep in a larger than necessary number of reviews. And we would suggest broader criteria focusing only on the most important significant proposed rules would be more practical.

And finally, we would be more—we think it would be helpful to have a bit more time than the 90-day and 120-day proposals for the analysis.

Referring to Section 1204 on grid security, with regard to emergency authority language, NERC is supportive of legislation clarifying Federal Government authority during grid emergencies. Specifically, we appreciate being part of the DOE consultation process when considering emergency orders that is contemplated in the draft. With regard to information-sharing, NERC supports the intent of the draft language to promote robust sharing of security information, and the safeguarding of sensitive information. However, a significant amount of information-sharing already exists, and should be allowed to continue. Our cybersecurity standards require reporting of certain cyberthreats and incidents. Our ES-ISAC provides a venue for sharing a voluntary cyber and physical security information across the entire electricity sector. It is important to provide key protection sought by the draft for critical electric infrastructure information, including Federal and State FOIA exemptions, the language proposing FERC regulations governing and handling nondisclosure of CEII could be helpful.

Finally, the draft does not address incentives and protections for sharing of critical cyber and physical security threats and vulnerabilities that are outside the bounds of CEII.

I look forward to your questions. Thank you.

[The prepared statement of Mr. Cauley follows:]

**Testimony of Gerry W. Cauley, President and Chief Executive Officer
North American Electric Reliability Corporation
Before the Subcommittee on Energy and Power
of the House Energy and Commerce Committee
Hearing on May 7 Energy Reliability and Security Discussion Draft
May 19, 2015**

Introduction

Good morning Chairman Whitfield, Ranking Member Rush, members of the Subcommittee and fellow panelists. Thank you for the opportunity to testify concerning the *May 7 Energy Reliability and Security* discussion draft ("Discussion Draft"). My name is Gerry Cauley, and I am President and CEO of the North American Electric Reliability Corporation (NERC). We are a not-for-profit international regulatory authority whose mission is to assure the reliability of the bulk power system in North America. NERC's jurisdiction includes users, owners, and operators of the bulk power system, which serves more than 334 million people.

In 2007, NERC was designated the Electric Reliability Corporation (ERO) by the Federal Energy Regulatory Commission (FERC) in accordance with Section 215 of the Federal Power Act (FPA), enacted by the Energy Policy Act of 2005. NERC develops and enforces Reliability Standards; annually assesses seasonal and long-term reliability; monitors the bulk power system through system awareness; and educates, trains, and certifies industry personnel. Through the Electricity Sector Information Sharing and Analysis Center (ES-ISAC), NERC performs a critical role in real-time situational awareness and information sharing to protect the electricity industry's critical infrastructure against vulnerabilities. NERC's area of responsibility spans the continental United States, Canada, and the northern portion of Baja California, Mexico.

Overall, NERC appreciates the recognition of the role of the ERO and its inclusion in several key components of the draft legislation. NERC takes our responsibility for the reliability and security of the bulk power system seriously and appreciates the Committee's focus on these important topics.

My testimony today will address two sections of the Discussion Draft: 1) Section 1202, "Reliability Analysis for Certain Rules That Affect Electric Generating Facilities," and 2) Section 1204, "Critical Electric Infrastructure Security." I am also prepared to address Section 1205, providing for a Strategic Transformer Reserve.

Reliability Assessment of Major Rules

Section 1202(b)(1) requires FERC in coordination with NERC as the ERO to conduct an independent reliability analysis of proposed and final major (\$1 billion economic impact) rules that "may impact" electric generating units. This analysis, along with "any relevant special assessment or seasonal or long-term reliability assessment completed by the ERO" is to be published within 90 days of issuance of a proposed rule, and within 120 days of issuance of a final rule. As directed by Section 215(g) of the FPA, NERC conducts periodic assessments of the reliability and adequacy of the North American Bulk Power System. NERC also performs special assessments related to the reliability implications of major federal rulemakings, including proposed environmental rules such as the Clean Power Plan.

By identifying and analyzing emerging reliability issues, NERC is able to provide informed recommendations and support a learning environment for industry to pursue improved reliability performance. NERC's assessments also enable federal and state regulators and stakeholders to address reliability concerns as rules are developed. NERC's assessments, along with the associated technical analysis, help us improve resource and transmission planning methods, planning and operating guidelines, and NERC Reliability Standards.

Annually, NERC conducts both long-term and seasonal reliability assessments. The **Long-Term Reliability Assessment** reviews the adequacy of the Bulk Electric System in the United States and Canada over a 10-year period. This report projects electricity supply and demand, evaluates transmission system adequacy, and discusses key issues and trends that could affect reliability. The **Summer and Winter Assessments** consider the adequacy of electricity supplies in the United States and Canada for the upcoming summer and winter peak demand periods.

NERC also conducts **Special Assessments** on a regional, interregional, or interconnection-wide basis, as needed. For example, we recently published two reports concerning the potential reliability impacts of the Environmental Protection Agency's Clean Power Plan. In November 2014, NERC released its first CPP report, the *Initial Reliability Review*, which focused on the four "Building Block" assumptions in the proposed CPP. Last month, we issued the *Phase I* report, which reviews resource and transmission adequacy considerations of the proposed CPP. Further CPP reliability assessments are planned after the final CPP rule is issued this summer and as State Implementation Plans are developed. In 2010, NERC reviewed the cumulative

impacts of several pending EPA rulemakings, including hazardous air pollutants, cooling water intake, and coal waste rules. Other special assessments have reviewed gas/electric coordination, integration of variable energy resources, and geomagnetic disturbances.

NERC will continue to assess the reliability implications of changing federal policies as part of its general reliability assessments. Accordingly, NERC would be pleased to coordinate with FERC on reliability assessments of rules that pose real or potential challenges to resource adequacy or the reliability of the BPS. NERC offers two comments on the language of 1202(b) as drafted:

1. As written, the test for a rule that triggers a reliability analysis is very broad. Numerous major federal rules "may impact" an electric generating unit or units. NERC's expertise is focused on the reliability of the bulk power system, and we can most directly provide assistance on impact statements on rules that pose or could pose adverse reliability consequences.

2. The 90 days allowed for preparation of a reliability assessment on a proposed rule is very short. More time would be helpful to provide useful analysis. The 120 days allowed for analysis of a final rule may also be too short, but the final rule analysis can be built off prior analysis of the proposal and thus may be completed in the time frame provided, unless the final rule is significantly different from the proposed rule.

Grid Security – Emergency Authority and Critical Information Sharing (Section 1204)

Grid security is a core priority for NERC and industry. NERC has decades of experience working with industry and government to protect our shared infrastructure and is constantly reevaluating threats and taking steps to protect the system.

The nuclear power and electric industries are the only critical infrastructure sectors to have mandatory and comprehensive cybersecurity standards. FERC has recently approved NERC Critical Infrastructure Protection Version 5 standards (CIP) which become enforceable beginning on April 1, 2016, related to cyber security. The CIP Version 5 standards include new cybersecurity controls and extend the scope of the systems that the CIP Reliability Standards protect. Additionally, in November of last year, FERC issued Order No. 802 approving Reliability Standard CIP-014-1 – Physical Security. Under CIP-014-1, applicable entities are required to identify their critical facilities, evaluate the security risks and vulnerabilities to those identified facilities and implement measures to mitigate the risk of physical attack. CIP-014-1 has staggered enforcement dates with compliance obligations beginning on October 1, 2015.

Standards are one piece of this complex, dynamic, and comprehensive approach to grid security and reliability. NERC also operates the Electricity Subsector Information Sharing and Analysis Center (ES-ISAC) which provides situational awareness, incident management, coordination and communication capabilities within the Electricity Subsector through timely, reliable, and secure information exchange. The ES-ISAC issues alerts, advisories and recommendations pertaining to security matters and threat mitigation information. The ES-ISAC, in collaboration with the

Department of Energy and the Electricity Subsector Coordinating Council (ESCC), serves as the primary security communications channel for the Electricity Subsector and enhances the subsector's ability to prepare for and respond to cyber and physical threats, vulnerabilities and incidents.

In November of this year, NERC will conduct the third Grid Security Exercise ("GridEx III"), which includes sector-wide participants from the U.S., Mexico and Canada. This geographically distributed exercise was designed to execute the Electricity Subsector's crisis response to simulated coordinated cybersecurity and physical security threats and incidents, to strengthen utilities' crisis response functions and to provide input for lessons learned, engaging industry personnel and senior leadership. Finally, NERC uses other tools to fulfill this mission, including guidelines, training, assessments and alerts. This multi-pronged approach supports a secure and reliable bulk power system for North America.

While recognizing the robust and effective grid security protections already in place, NERC recognizes the need to address grid security emergencies as described by Section 1204. Specifically, Section 1204 would amend the FPA, providing the Secretary of Energy with authority to address the imminent danger of grid security emergencies. The discussion draft defines grid emergencies in a comprehensive manner, including a cyber or physical attack, electromagnetic pulse, or a geomagnetic storm event.

Prior to issuing an emergency order, Section 1204(b)(3) requires the Secretary of Energy to consult with the ERO (among others) to the extent practicable. We appreciate recognition of NERC's grid security role in the consultation process. By reference to the ERO, this consultation recognizes the expertise of the NERC for bulk power system reliability, and incorporates the information sharing capabilities of the ES-ISAC.

NERC is generally supportive of legislation clarifying federal government authority to address grid emergencies. It is important that the definition of a grid emergency be targeted to national, catastrophic instances and that such orders be limited in duration in order not to conflict with the system of alerts, advisories, and standards that are already in place to protect the grid on an ongoing basis.

Sharing of "Critical Electric Infrastructure Information"

Section 1204 would add FPA Section 215A(d) to protect and encourage voluntary sharing of Critical Electric Infrastructure Information (CEII). Section 215A(d)(1) protects CEII. And the regulations called for under Section 215A(d)(2)(A), (B), and (C) support appropriate labeling, handling, and management of this sensitive information. Together, these provisions would encourage information sharing.

Proposed Section 215A(d)(2)(D) directs FERC to provide standards authorizing voluntary sharing of critical electric infrastructure information with, between, and by the ERO, ISACs, and other entities.

As discussed above, NERC, federal and state governments and industry have numerous tools to facilitate robust information sharing. The ES-ISAC is a leading source for voluntary information sharing for many in the electricity subsector. In addition, NERC's current Critical Infrastructure Protection (CIP) standards, approved by FERC, provide for mandatory reporting of certain cyber information.

CIP Version 3 and CIP Version 5 (which will replace CIP Ver. 3 in 2016) are examples:

- NERC CIP-008-3 "ensures the identification, classification, response, and reporting of Cyber Security Incidents related to Critical Cyber Assets."
- Under requirement R1 of CIP-008-3, entities must develop a "Cyber Security Incident Response Plan." This plan must include, at a minimum:
 - A process for reporting Cyber Security Incidents to the ES-ISAC. Entities are required to report cyber security incidents to the ES-ISAC, which is linked directly to critical government agencies.
 - Procedures to characterize and classify events as Reportable Cyber Security Incidents.
 - Response actions, including roles and responsibilities of Cyber Security Incident response teams, Cyber Security Incident handling procedures, and communication plans.
 - A process for updating response plans, and testing and annual reviews of response plans at least annually.

Given these existing standards and the regulations provided by Section 215A(d)(2)(A), (B), and (C), Section 215(d)(2)(D) appears unnecessary and extends to numerous entities that already have procedures in place. This could potentially conflict with existing mandatory and enforceable standards, and existing critical information sharing mechanisms utilized by the ERO, regional entities and the ES-ISAC.

Further, the definition of "critical electric infrastructure" in proposed Section 215A is quite broad:

"a system or asset, whether physical or virtual, used for the generation, transmission, or distribution of electric energy affecting interstate commerce, the incapacity or destruction of which would negatively affect national security, economic security, public health or safety, or any combination of such matters."

This goes beyond the definition of "cybersecurity incident" in Section 215 of the FPA which addresses devices and communication networks essential to the reliable operation of the bulk power system, which expressly does not include facilities used in local distribution.

The consequences of these different definitions need to be carefully assessed to ensure that existing federal and state programs and mechanisms are not adversely affected.

Information Sharing has also been the subject of legislation passed by House and Senate Committees applicable to all critical infrastructure. We support the goal of these efforts to improve information sharing. As noted in these bills and contemplated in this legislation, it is important that there be no conflict with or undermining of the existing information sharing mechanisms.

Conclusion

NERC appreciates the recognition this bill provides on several important topics related to reliability and security. As the international electric reliability organization, consultation with Canada and Mexico throughout the bill is an important recognition of the interconnected nature of our North American grid.

Thank you for the opportunity to address the subcommittee on these important topics. NERC stands ready to assist the Subcommittee in its efforts to improve the security and reliability of our nation's electricity system.

Mr. WHITFIELD. Thanks, Mr. Cauley. We appreciate the testimony of both of you.

And at this time, I recognize myself for 5 minutes of questions.

I think all of us acknowledge that the electricity industry today faces a great deal of uncertainty, and the decisions that this Congress makes with bills like what we are trying to put together at this time are going to have a great impact going forward in the future. And I hope that we can make the right decision because the American people deserve it, and we want to be competitive in the global marketplace. And one of the real frustrating things for me personally has been how aggressive EPA has been, and they are focused on a clean environment, which is vitally important, but one of the areas that has bothered me and many others is that EPA seems to have been trying to take a lead in making a decision that reliability is not going to be affected in a meaningful way by any of these regulations. And we know that EPA has been more prolific in this administration than any time in recent memory, and those regulations are going to have a dramatic impact. And that is why we see so many lawsuits being filed, we are not sure what final rules are going to be coming out, so we have a lot of uncertainty.

But Section 1202 is designed to help address this reliability issue. And I was reading a statement just this morning from one of our witnesses, and he said that 1202, that this provision is unnecessary because FERC jurisdictional grid regions already are required to assess the impacts of environmental standards on grid operations.

So I would ask you two gentlemen if you would respond to that. I mean do you see some real advantage in having our Section 1202, or do you believe that maybe this witness is correct?

Mr. BARDEE. Chairman Whitfield, I would say that there is a fair amount of work done by the industry on these types of issues now through entities like NERC, through its regional entities, through the utilities. Whether Section 1202 is necessary or not I would leave to Congress, but if Congress feels like the commission should have the responsibility in that section, I would just want to make sure that we could do it in a reasonable time frame, and do it well. And I think it is important that those perspectives of what will be the impacts on reliability should be fully considered, and the ramifications explored before any final rule is issued.

Mr. WHITFIELD. And, Mr. Cauley, of course, you all have the responsibility on reliability, and we all appreciate everything that you are doing, but would you comment on my question?

Mr. CAULEY. Sure, Mr. Chairman. I would support the inclusion of that section in the final legislation. We do assessments all the time, and we have done them on environmental issues, we have done them on solar magnetic disturbances, essential reliability services, introduction of renewables, and most of the time these early warnings and assessments of issues coming up can be addressed. The industry is flexible, they can adapt, they can make investments and change. But I think we have seen sometimes the proposed change is too dramatic, and I think that is what I see in limited use, in limited cases, that that section would provide a backstop in the event that the proposed nonelectric rules were going to drive us into an untenable spot in terms of reliability risk,

whether it is resource availability or it is electric and gas infrastructure to support keeping the grid reliable several years down the road.

So I think as a backstop on extreme cases, it is necessary.

Mr. WHITFIELD. OK. And would you just briefly summarize the conclusion of NERC's recent Phase I report?

Mr. CAULEY. We published a report just in April, the second report on the 111(d) proposed rule, and we concluded that there would be a continued acceleration of retirement of coal units, and a dramatic shift of coal units from being base-loaded to being essentially peaking rarely used units. It is questionable about whether the economics would support them staying around under that little bit of use, and it—we think there might be incentives to retire them even further.

The shift to 70 percent or more of dependence on gas, we will—what we need to ensure is that there is adequate gas supply. Gas is a just-in-time fuel, and we need to make sure there is sufficient pipeline capacity and storage capacity to meet the coldest days and the peak load systems, that the energy is going to be there for electricity.

We also are concerned about maintaining a base of electric services, essential reliability services. Large rotating machines provide these electrical characteristics, inherently stability, inertia, voltage and frequency control. So we need to make sure that the policies are in place to make sure that they are still there.

So a number of other recommendations and suggestions, but we are concerned about the timing of the early portions of the targets that were proposed by EPA.

Mr. WHITFIELD. Thank you very much. My time has expired.

At this time, I recognize the gentleman from California, Mr. McNerney.

Mr. MCNERNEY. Thank you, Mr. Chair.

First, Mr. Cauley, on the Section 1206, which is—I am one of the coauthors on “Cyber Sense”—do you have other recommendations how to improve cybersecurity of our electric network?

Mr. CAULEY. Well, I think the proposal in 1206 is—can be helpful. One of the challenges we have is we have a global supply chain in our grid. So to have a process where vendors are vetted and equipment is vetted, and we can share that information, I think is very helpful. So I support that proposal.

I think the biggest issue for me is ensuring that the asset owners in the grid feel that they can share threat and vulnerability information; stuff that they are seeing on their systems, share it without threat of liability and without threat of compliance sanctions, when really, they are just trying to help us put together a bigger piece of the puzzle about what is happening. I think that is really essential.

Mr. MCNERNEY. So that might be a way to strengthen that section, then?

Mr. CAULEY. Yes.

Mr. MCNERNEY. Thank you.

Mr. Chairman, the section I think that is going to give us the most controversy is Section 1202.

And I have a couple of questions, Mr. Bardee, about that. Do you feel that Section 1202 will require FERC to interfere with State jurisdictions?

Mr. BARDEE. You know, I don't know that Section 1202 would cause us to interfere with State authorities and responsibility, and certainly, it would be our goal not to do so. If we were given that responsibility, I would see it as more trying to objectively assess the possible future impacts of a proposed rule, and then it would be a matter for the initiating agency to consider that input from us and others in deciding on a final rule, hopefully in a way that would not overstep interstate rules.

Mr. MCNERNEY. Well, do you feel that FERC and the DOE are already coordinating adequately with rule-generating organizations?

Mr. BARDEE. Excuse me, with who?

Mr. MCNERNEY. With rule—with agencies that generate the rules.

Mr. BARDEE. We certainly have been engaging with EPA, DOE, and the commission. Our staff have been meeting with EPA periodically as the Clean Power Plan has been developed, even before it was formally proposed. And my expectation is that that will continue so that EPA understands the perspectives that commission staff and DOE staff can offer to assist them in their decision-making.

Mr. MCNERNEY. Do you think that if Section 1202 is enacted, that it would enhance that cooperation, or would it change it, or would it make it worse?

Mr. BARDEE. I certainly don't think it would make it worse. I think it is hard to say whether it would make a significant difference in the amount of engagement between the agencies. I think the most important matter is that entities with that kind of a planning role continue to perform the work they have already, such as NERC, such as PJM, such as WECC, because they have the best tools and information to provide that input.

Mr. MCNERNEY. One of the other issues is the 90 days and 120 days. The 90 days for a proposal, and 120 from the actual rule. Do you think FERC has the resources to be able to respond, say, to the Clean Power Plan or the Mercury Air Toxic Standards, within that time frame—within those time frames?

Mr. BARDEE. I think it would be very difficult to meet a 90-day deadline on a proposed rule. Just to give a couple of examples, when EPA issued its proposed Clean Power Plan, PJM and MISO and ERCOT did not issue their analyses until November, which was about 5 months after the proposal came out. I don't know how long NERC's work took, Mr. Cauley could address it, but I think it was in the range of about 5 to 6 months. And whether that can be squeezed into a tighter time, maybe that is possible, but 3 months would be very challenging.

Mr. MCNERNEY. Mr. Cauley, do you want to follow up with that?

Mr. CAULEY. Well, we did publish our initial report in October. So from June to October. It does take—4 to 5 months is an extreme case. We have to collect a lot of data on individual generators and load forecasts across all regions that we look at, so it is a very

data-intensive, very detailed analytic process. So 90 days or 120 days both are very short for that kind of analysis.

Mr. MCNERNEY. OK, so an improvement in the bill might be to give, say, 6 months or something of that order then?

Mr. CAULEY. That is correct.

Mr. MCNERNEY. All right, thank you.

I yield back.

Mr. WHITFIELD. Gentleman yields back.

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

Mr. BARTON. Thank you, Mr. Chairman.

I want to ask Mr. Bardee, is it a true statement that electricity markets are regional rather than national?

Mr. BARDEE. I think it would be fair to say that the electricity markets are regional. There is some trading across regional boundaries, but primarily the markets are regional, in my view.

Mr. BARTON. OK. I would—Mr. Cauley, do you agree with that?

Mr. CAULEY. Yes, sir.

Mr. BARTON. OK. If that is the case, as we are coming up with this national bill, do we have the responsibility to allow for regional differences in these standards and requirements?

Mr. BARDEE. I think the way I would describe the Clean Power Plan is it is a state-centric proposal. There certainly have been a number of studies that have indicated significant benefits achievable from regional compliance efforts, economic benefits and reliability benefits, and I would hope that there is a way for the States to achieve some of those benefits, but right now, the proposal is State-based.

Mr. BARTON. OK. Well, here is my point I am trying to get at. Texas is an anomaly because of ERCOT. Two-thirds of our power generation and our consumption is intrastate, within the State, and is controlled by the State. It has to comply with FERC regulations, but it is independent. About $\frac{1}{3}$, we have transmission lines that cross State boundaries in the west and in the east, but for all intents and purposes, the bulk of the electricity market in Texas is an intrastate market. That is not the case in other States. They are almost, I think, all interstate markets, but in the Midwest and the Northeast, I believe I am correct that their demand curve is flat or declining. Is that correct?

Mr. BARDEE. I am not sure, sir, but I certainly am aware that load growth has not been as significant as it had been in the past. The——

Mr. BARTON. Well——

Mr. BARDEE [continuing]. Rate of increase has declined, certainly.

Mr. BARTON. You know, if you have to maintain a reliability criteria and protect against cyberthreats in a market that is stable, and the demand is either stable or declining, that is one thing, if you are in a market, I would say Florida, Texas, maybe California, I am not sure, Arizona, where there still is robust demand increase, that is an entirely different thing. Much different. And, in my opinion, we need to allow for those differences at the legislative level, but also at the regulatory level at FERC, and it is something that I haven't seen a lot of commentary on. We just assume that

the electricity market in the United States is one big market and it is all the same. That is not true. That is not true. It is totally different, and as we move forward with this legislative proposal, we need to allow for that. If we get it right at the legislative level, then there is at least some chance that we can get it right at the regulatory level too. And that is the main point that I wanted to make, Mr. Chairman, that this is—this—we need to look at it from a regional basis, and make some allowances to give the State regulatory agencies and the FERC with their partners at the North American Electric Reliability Corporation the ability to show some flexibility.

And I am going to yield back the balance of my time.

Mr. WHITFIELD. Yes. Well, thank you. I mean you make a—definitely a good point because we don't have a national market, we do have a very balkanized system, appreciate your comments.

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

Mr. TONKO. Thank you, Mr. Chair.

You state in your testimony, Mr. Bardee, that the Federal Power Act, Section 215, is inadequate for emergency action, and that the procedures outlined in this section, and I quote, “do not provide an effective and timely means of addressing urgent cyber or other national security risks to the bulk power system.” Is this primarily related to the issue of deliberative open processes for reliability standards development, or are you thinking of other barriers to effect and timely action as well?

Mr. BARDEE. What I was trying to describe was the current process which is open and very deliberative, and that can be a strength in the normal context of developing standards for traditional engineering concerns in the electric field. But in the context of cyberthreats or physical threats that we may face, it is difficult to envision that process working that quickly. Now, this past year, we directed NERC to provide a standard on physical security within 90 days, to send us a proposal within 90 days, and they well met that deadline, but even so, it is not clear that you could have that process work as quickly as you might need it in an emergency.

Mr. TONKO. Thank you for the clarification.

And, Mr. Bardee, again, I am concerned that the language in Section 1208 of the discussion draft places too many constraints on RTOs and ISOs and their choice of resources they might use to ensure grid reliability. Now, this section is not very forward-looking. It appears to equate base load power capability with reliability. We in New York and in the Northeast learned through the experience with Hurricane Sandy that systems like combined local or heat and power and micro grids provided power for some customers even when the grid went down. So as you know, new technologies are being added to the grid in greater efficiency, demand response programs, and renewable generation are all transforming the grid in very rapid fashion.

Now, it appears that this section would constrain the development of these new grid resources, and FERC's ability to integrate them into competitive markets. Might that be a concern?

Mr. BARDEE. Our concern with Section 1208 is that it could be construed as requiring us to set rules and impose standards that

could chill market participants from the choices they might otherwise make of their own free will.

Now, we understand that sometimes in capacity markets you do have to have certain boundaries to elicit a reasonable supply at adequate prices, but we think Section 1208 raises an undue risk of constraining the choices of market participants.

Mr. TONKO. So would it have impacted perhaps the outcome that was evident in greater New York with the impact of Hurricane Sandy?

Mr. BARDEE. I couldn't say for sure. I would say that depending on how something like a diverse generation portfolio is defined, what are the components of it and what are the percentages of it, it could be applied in a manner that would limit perhaps the development of distributed generation resources.

Mr. TONKO. And I would ask either of you, if the Strategic Transformer Reserve Plan had been in place, how many times might it have supplied equipment and response to an emergency over the past 5 to 10 years?

Mr. CAULEY. My belief is it would not have been instituted. There was a significant amount of transformer capability at individual companies. We also have a database for sharing transformers that can be swapped in emergencies. So at this point, with the number of transformer events, typically in the one or two levels, would never have kicked into the strategic level.

Mr. TONKO. Um-hum. And would it have helped in the cases of Hurricanes Katrina or Sandy, for example?

Mr. CAULEY. The large equipment, transformers in particular, were really not affected by the storms. The storm outages were predominantly trees and distribution, and local poles and lines, and not the heavy equipment inside of a substation.

Mr. TONKO. And I assume there would be costs associated with setting up and operating this transformer reserve program?

Mr. CAULEY. There would be costs, and I don't want to—just because it hasn't happened, we have large-scale cyberattacks, physical attacks, GMD. I understand the risk that it is trying to address, I just think it needs to be very carefully managed, what we are trying to achieve. It is a last resort backstop and cost needs to be a consideration.

Mr. TONKO. And, Mr. Barbee, any—Bardee, anything?

Mr. BARDEE. I think it is important to ensure that we have an adequate supply of spare transformers and other equipment. This could be a useful tool for achieving that goal. It depends on the extent of efforts industry is making and will make in the future, but I think it could be a good tool for ensuring we get there.

Mr. TONKO. I see my time has expired, so I will yield back, Mr. Chair.

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

Mr. OLSON. I thank the Chair. And welcome, Mr. Bardee and Mr. Cauley.

Our country is vast. Its size means a power crisis could happen anytime, anywhere. Hurricanes, tornadoes, earthquakes, floods, extreme heat, extreme cold. When that happens, DOE might order a coal or gas plant to stay online for a long time. We are talking

about a short-term order; a matter of days, where the plant needs to run full throttle. That is the last line of defense to a power crisis. But by following that order, the plant might slip past the clean air permits. That isn't a loophole; that is DOE working to keep the lights on, and yet the plant can be penalized by another agency for extending those limits. This has happened before. Right across the Potomac on short—it is runway 1 at DCA, a Virginia plant was ordered to run beyond its permits. They were fined.

The first section of this bill deals with this problem. I wrote this language with my friends, Mr. Doyle from Pennsylvania and my Texan, Mr. Green, to protect our grid and our environment. It has passed this committee twice without opposition. It has also passed the House twice without a no-vote. I am going to push that boulder up the hill one more time.

My question is, is this conflict still a threat, and could you discuss whether it is reasonable to trap a company between two regulators? You first, Mr. Bardee.

Mr. BARDEE. We never know when that circumstance might develop again, but it is possible that it occurs again, and for that reason I think it would be helpful to have legislation that prevents utilities from having to choose between violating their obligations under the Federal Power Act and under an environmental law. They shouldn't have to make that choice. When they are told to run for reliability purposes under the Federal Power Act, they should just do that.

Mr. OLSON. Mr. Cauley, your comments, sir?

Mr. CAULEY. I agree. I support that. I think FERC has been effective up to this point in the isolated cases where this issue has come up where they have granted must-run status. If the 111(d) rule as proposed last year were to go into effect, which I hope—hopefully that it is not, that there will be some changes, I think the frequency and breadth of those cases would be more frequent going forward.

Mr. OLSON. Yes. Back home, we had 2 power plants go out in Dallas, Fort Worth just because of ice. Put us into rolling blackouts/brownouts for about a 1-day period, so this is very important we get this right.

I want to follow, Mr. Bardee, dig deeper on a line of questioning from my colleague from New York about the physical and cybersecurity. In your testimony, the—you mentioned the process for setting standards is inclusive—now, I want to quote, “but slow, open, and unpredictable.” And you also said that there is “inadequate”—it is “inadequate for emergency action.” My question is this. Without this bill, does DOE and FERC, or anyone else, have reasonable emergency authority for the grid? Do you have it right now? What has changed—what needs to change?

Mr. BARDEE. I think this provision would be important for ensuring that the Federal Government could require the actions necessary in an emergency, whether that is cyber, physical, or other type of emergency. There are some authorities that could be used. Federal Power Act Section 202(c) that we just talked about has some value in certain emergencies. NERC has the authority to issue things like alerts and advisories, but they do not reach as

comprehensively as the proposed legislation in the discussion draft, which I think would be important.

Mr. OLSON. Thank you. Mr. Cauley, your comments, sir?

Mr. CAULEY. The words around standards being comprehensive and slow and deliberate and inclusive should not be an indictment of standards. Standards were not meant to deal with emergencies, and they don't. We did a physical security standard in 78 days. FERC approved it in 150 days. Standards were meant to be more enduring. Emergency powers do not exist, they are needed. We support legislation that addresses that. Emergency powers, in my view, are meant to deal with crisis issues. If—should one military facility have a priority over electricity customers in restoring power? Should one city be more strategic than another? The industry does not have the capability to make those decisions in insolation in a time of crisis.

Mr. OLSON. My time has expired. Yield back. Thank you.

Mr. WHITFIELD. At this time, I recognize the gentleman from Illinois for an opening statement. He was delayed because of a plane problem. So, Mr. Rush, you are recognized 5 minutes for an opening statement.

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

Mr. RUSH. Thank you, Mr. Chairman. Mr. Chairman, I look forward to the days that we can have a hearing on airplane reliability.

I want to thank you, Mr. Chairman, for holding this important hearing on grid reliability and security.

Mr. Chairman, with recent high-profile cyberattacks on both private and public domestic targets, including entertainment companies, financial firms, and even the White House earlier this year, it is high time that this subcommittee revisit this extremely important issue of grid security and resiliency.

Mr. Chairman, if recent history is any indication, then it is not a matter of if but when some threat, whether it be a national disturbance, an individual hacker, a rogue State, or even a well-known foreign power, challenges the resiliency of our Nation's energy infrastructure.

Mr. Chairman, this issue of grid reliability and security must be addressed in a bipartisan manner. As was done in the past with the Grid Act that was originally introduced by then-Congressman Markey and the Full Committee Chairman Upton, which passed the House in June of 2010.

Mr. Chairman, while there are some worthy provisions in the draft that helps move the ball forward, there is still some work to do on some sections of this bill. Specifically, I have concerns with Section 1202 which requires FERC to conduct an "independent reliability analysis" of any proposed or any major rule that may have "an impact on electric utility generating unit or units with a major rule defined as any rule estimated to cost more than \$1 million." It is important that this section is not used, Mr. Chairman, as a backdoor attempt to block critical elements of 2 EPA rules that were promulgated recently. The final Mercury Air Toxic Standards, MATS, or the proposed Clean Power Plan, CPP.

Mr. Chairman, FERC or DOE already routinely coordinate with other Federal agencies for proposed or final rules affecting the electric power sector, and it is not entirely clear if this provision could be used to prevent an agency from issuing a statutory mandated final rule. In a section that will require more than—more work as 2004, and it is—as it is unclear if DOE or FERC would have the authority to address vulnerabilities or threats to the grid before they happen and take preventive measures. It is also not clear if this language authorizes requirements for restoration of grid reliability after an unforeseen act or event or attack.

Under the previously mentioned Grid Act, a “grid security threat” was defined as a substantial likelihood of a malicious act or natural occurrence, while in the discussion draft, acts or events must pose an imminent danger to the grid in order to be considered; setting a much higher bar for regulatory action. In addition to these concerns, Mr. Chairman, we want to continue to work with the majority to ensure that the final draft, specifically Sections 1203, 1207, and 1208, does not rely so heavily solely on traditional sources of energy, but also promotes the deployment and use of renewable energy sources. As the EIA reports, Mr. Chairman, there has been a shift in electricity generation toward cleaner sources of electricity, with 13 percent of electric generations coming from renewable sources, including hydropower, in 2014.

Mr. Chairman, as renewable energy capacity continues to develop in the U.S. due to a range of emerging technologies and best practices, it is important that we integrate these renewable energy sources into the grid in order to boost fuel diversity, while also maintaining reliability.

So I look forward, Mr. Chairman, to today’s witnesses. And with that I yield back.

Mr. WHITFIELD. Gentleman yields back.

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

Mr. SHIMKUS. Thank you, Mr. Chairman.

This is a great hearing. Appreciate you all being here. We have great concerns about the change in base load generation based upon the focus of this administration on continuing to ratchet-down emission standards to a point where base load goes off-line, and that is kind of the basic premise of a lot of our concern about reliability.

So under the—I was going on the Web site—FERC’s responsibility is numerous things, independent agency, but obviously, on an independent agency that regulates the interstate transmission of blank, blank, blank, and electricity, which is a responsibility which you all have. So I think part of the testimony, Mr. Bardee, kind of surprises us when, in your opening statement, you say that FERC lacks the tools and data to complete the reliability analysis. It is my understanding, based upon your mission statement, that is what you are supposed to do. So why do you make that statement? Isn’t that part of the mission statement of FERC, to regulate the interstate transmission of electricity? And why do you say that, right now, you don’t have the tools and data to be able to complete the reliability analysis that is, I think, mentioned in 1202?

Mr. BARDEE. What I meant by that, sir, is we do have the staff with the expertise to be able to perform that kind of analysis, but we do not maintain fully current models, fully current data that will allow us to do that without requesting assistance from others to update us and provide us with the current models that they use—the planning authorities use—and the most up-to-date data.

Mr. SHIMKUS. And who are you referring to by the planning—

Mr. BARDEE. Planning authorities generally would be entities such as PJM; in the west, WECC, the Western Electricity Coordinating Council; in the Southeast, Southern is the planning authority. In a similar way, NERC functions as capable of performing the same types of analyses.

Mr. SHIMKUS. But EPA completes a resource adequacy and reliability analysis for its regulations, but you all say that you lack the tools and the data. So—

Mr. BARDEE. Well—

Mr. SHIMKUS. Let me just—I will just finish. Is EPA better positioned to complete the reliability analysis than you all are?

Mr. BARDEE. No, we—sir, we are fully capable of doing that work, but if we were tasked to perform that kind of analysis, we would certainly prefer to turn first to the planning authorities and say please assist us, and then we will review your work, we may ask you to perform additional analyses, we may perform supplemental work of our own. We can do that work, but they do that work day in and day out and we do not. We just have that capability to perform it as-needed. And at times, we need to reach out and get information to assist us in performing that.

Mr. SHIMKUS. And can you help provide for the committee the—what the FERC proposed in its 2016 budget for that—for the Office of Reliability, and also the number of employees that are currently in that Office of Reliability?

Mr. BARDEE. Yes, sir.

Mr. SHIMKUS. Thank you very much.

Mr. CAULEY, you mentioned the involvement in the ESI-ISAC, so I want to make sure I got that right. Can you explain your role in that, and which other agencies and stakeholders NERC collaborates with?

Mr. CAULEY. I am the corporate CEO and heavily involved directly. I have two officers of the company who manage that for us. We coordinate with the entire industry. We have about 1,500 organizations that are registered users with the ISAC. We interface on a daily basis with DHS, the NCCIC, DOE, NSA, FBI, and others, to share information.

Mr. SHIMKUS. And so you are testifying that it is a good model for voluntary information-sharing. This discussion draft, does this compliment the work at ES-ISAC?

Mr. CAULEY. My sense is it doesn't really address it. The focus on information-sharing in the draft is focused on CEII information, which is system planning and study information that is filed with FERC or comes available to FERC, but there is a wealth, many more times more information that is shared unilaterally among the industry that never goes to FERC—

Mr. SHIMKUS. Thank you very much. That—

Mr. CAULEY [continuing]. That is not really addressed in the draft.

Mr. SHIMKUS. Yes, that testimony is very helpful and we appreciate that.

And I yield back.

Mr. WHITFIELD. Gentleman yields back.

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

Mr. GREEN. Thank you, Mr. Chairman.

Director Bardee, as I stated a few minutes ago, Section 1201 resolves an issue in Federal law between reliability and environmental protection. Director Bardee, does FERC have any concerns that additional conflicts may arise as more environmental rules are promulgated?

Mr. BARDEE. It is certainly possible that future conflicts will arise, as they have in the past, and for that reason I think the goal, the intent of Section 1201 is an appropriate one to find a way to resolve those conflicts so the utilities aren't stuck with an unenviable choice.

Mr. GREEN. OK. Should Congress be on the lookout for conflicts? Section 1207 amends the Section 111(d) of the Public Utility Regulatory Policies Act, or PURPA, and includes States shall consider language. What role should PURPA play in markets?

Mr. BARDEE. I think PURPA has served a role in the past, but the appropriate role going forward is not something I would be prepared to offer an opinion on at this point in time, sir.

Mr. GREEN. OK. My understanding, within the last decade, the only real change in PURPA has been the "States shall consider" language. Are you of—either—are either of you aware of any broad changes in PURPA since the EPAC '05?

Mr. BARDEE. I am not aware of any, sir. Not significant changes.

Mr. GREEN. Is PURPA still effective legislation, or should there be an effort to readdress PURPA in our committee?

Mr. BARDEE. I could not say at this time, sir. I have not focused on that in my recent career.

Mr. GREEN. OK. Section 1208 of the discussion draft amends the Federal Power Act by adding a new section. Have Regional Transmission Organizations, RTOs, or Independent System Operators, ISOs, already performed the action under Section 1208?

Mr. BARDEE. The RTOs and ISOs have certain market rules to ensure that they achieve their functions reliably, and those goals, in the capacity markets, for example, include ensuring that they have a reasonable set of resources to meet those needs. They have each taken different ways to do that, and the commission has allowed that flexibility for each to approach their task as they and their market participants thought appropriate. And I think having that flexibility has been beneficial.

Mr. GREEN. Would FERC requirements bring any additional benefits to the market?

Mr. BARDEE. Our goal has been, for many years now, to allow competitive forces to produce those benefits wherever possible, and to use more traditional tools only when those competitive forces were not sufficient.

Mr. GREEN. OK. Mr. Chairman, I don't have any more questions. Thank you, and I yield back.

Mr. WHITFIELD. Gentleman yields back.

At this time, I recognize the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. LATTA. Thank you, Mr. Chairman. And thanks for our panel for being with us this morning. It is a very important issue.

I know many in this committee have heard me talk about what my district looks like in northwest and west central Ohio with just about 60,000 manufacturing jobs, and how important it is to have that base load capacity every day to turn those machines on to put so many tens of thousands of people to work.

And, Mr. Bardee, if I could ask this question to you regarding Section 1208, and I understand your concern about having Congress legislate instead of having FERC use the current regulatory structure to operate within the markets, but I also have heard again about the concerns surrounding the reliability and base load generation going forward, as well as the inability of some market structures to function properly. These concerns of many in the community believe that some legislation may be needed. Could you discuss some ways that we could work together to address these concerns in the legislation?

Mr. BARDEE. Certainly, I and others at the commission could work with the committee staff to see if there were appropriate legislative changes. My main concern would be to avoid codifying things that might have unforeseen harmful effects on those markets and restraining competition.

Mr. LATTA. Could you maybe just enumerate what that might be?

Mr. BARDEE. Excuse—

Mr. LATTA. Could you enumerate what that might be? You say you would be concerned on some of the codifications.

Mr. BARDEE. I don't have any specific suggestions right now on what would be appropriate to codify, but I would certainly be willing to discuss that with the committee staff.

Mr. LATTA. OK. Mr. Cauley, if I could ask you. Again, it is very important because, regarding the discussion draft that is before us today, why is it important that the definition of the grid emergency be limited in scope and duration?

Mr. CAULEY. Pardon me? Could you repeat the question?

Mr. LATTA. Yes. Why would—why is it important that the definition of the grid emergency be limited in scope and in duration?

Mr. CAULEY. Well, I think first, the industry is very adept at recovering the system in an emergency situation, and deploying resources and equipment to get the system back. And I think there are rare occasions and hopefully short duration occasions where we are facing a true national crisis, whether it is a large-scale cyber or physical attack or coordinated terrorist event, which could exceed on an interim basis the capability and the coordination of resources of the industry leadership. So I think those kinds of things are needed in a short period of time, but we should resist thinking that the Government or Department of Energy would run the grid for months or, you know, operationally take over the grid. I think

the leadership of the industry is very capable of taking—doing the operational aspects.

Mr. LATTI. Let me just follow up. You know, when we are talking about these grid emergencies, and I have had some discussions in regards to the electromagnetic pulse and geomagnetic storms and other, you know, terrorist-type actions or malicious acts that could happen, do we—you know, are we prepared right now do you think, Mr. Cauley, to meet those situations?

Mr. CAULEY. We continue to get more prepared all the time. We have a very robust set of cybersecurity standards going into their fifth generation, very adaptive to the evolving threats situation. We have a new physical security standard that will safeguard the highest priority critical stations, that will—the first enforcement date for that is October. We have a new standard on GMD, withstand capability, so solar storms. We have—we are setting up that all equipment has to withstand a 100-year storm. So we are making progress in those areas. We do not have specific rules at this point regarding EMP, but we are making progress on what we perceive as the three active threat areas that we are focused on at this point.

Mr. LATTI. Let me ask on the EMP, how concerned are you on those and that occurring?

Mr. CAULEY. Well, I am concerned. There are different forms of EMP. The nuclear blast form seems to be a very catastrophic national defense issue. It is very difficult for the power industry to defend against that as a civilian industry. In terms of a threat to substations, the handheld, vehicle-mounted EMP devices appear at this point to be a less imminent threat than physical attacks like shootings and bombs and cyberattacks, and those kinds of things, that we are working hard to protect against at this point.

Mr. LATTI. Well, thank you very much.

And, Mr. Chairman, I see my time has expired, and I yield back.

Mr. WHITFIELD. At this time, I recognize the gentleman from Pennsylvania, Mr. Doyle, for 5 minutes.

Mr. DOYLE. Thank you, Mr. Chairman. And I want to thank you and the ranking member for holding this hearing on grid reliability. And I want to thank both you gentlemen for testifying today.

Mr. Bardee, I was glad to see your support for, as you say, the concept behind Section 1201 of this discussion draft. It is something that I strongly support too; that we need to make sure that we keep the lights on for our constituents. It seems to be the main goal of the energy industry; providing power to people when they need it.

As many of the members of the committee know, we have been working with Congressman Olson and Green on this legislation for 3 years now to reach a compromise that eventually passed this committee last session by voice vote, and later passed the House by a voice vote.

Many of the questions that I have have already been asked, I just want to go over a couple of things. So you gentlemen both agree that it is important that we give the industry some clarity regarding what they are supposed to do in an emergency situation, is that correct?

Mr. BARDEE. Yes, sir.

Mr. DOYLE. And do you think Section 1202 accomplishes that goal, or is there something more that—you know, as you read the section, do you think it gets us where we need to be when we have those emergency situations?

Mr. BARDEE. Sir, I don't have an opinion on the exact wording of this section. It certainly is aimed at addressing the concern that you have identified, and I support, of providing clarity. Whether others think there might be, you know, slightly different wording that would be appropriate, I would defer to them.

Mr. DOYLE. Um-hum. Mr. Cauley?

Mr. CAULEY. And we would agree exactly. The purpose and intent is right, the general direction is right, but specific language we don't have an opinion on.

Mr. DOYLE. Great. No, I understand. I heard both of you gentlemen express concern over a 90-day period that can conduct the reliability assessment. I just wanted to be clear what are you recommending? Obviously, you think 90 days is much too short of a time. Were you advocating—did I hear you say 120 days, or longer than that?

Mr. CAULEY. I think one thing in that section of the draft, hopefully when it is concluded, will be more flexible in terms of understanding that not every conflict between reliability and other rules is going to be equal. Sometimes it might be regional, sometimes it might be a national issue, sometimes it might be very complex. A very short assessment period is 4 months. Extremely short with a limited scope. More complex ones, 6 months would be a minimum time to do a competent job.

Mr. DOYLE. Do you agree with that?

Mr. BARDEE. I would agree, sir.

Mr. DOYLE. So a 4-to-6-month time frame, you are saying, makes a lot more sense than—and 90 days is just not practical. And let me just finally ask because, as I said, many of these questions have been asked already, but I want you both to just answer, you know, what really concerns you in terms of the greatest challenges that we are facing on grid reliability and security? What scares you that we either aren't paying attention to or aren't resourcing properly or, you know, what should we be focused on in terms of that? What do you see as those—the greatest challenges that we face on reliability and security?

Mr. CAULEY. I will suggest two areas. One is a dramatic reform and transformation of the grid under the current environmental rules. There is a lot of change anticipated, a lot of shifting to new resources, new kinds of controls and dispatch, underlying infrastructure and transmission and gas pipelines to support that. So the concern is making sure that we have done the analysis, that we know where we are going is safe, that we have the right resources, that we can withstand extreme droughts and heatwaves and cold weather, and not disappoint electricity customers. The second area that I worry about most is in the cyber and physical security area, and just making sure that our mounting defenses are good enough and we are staying ahead of the game with our adversaries.

Mr. BARDEE. I would just add two more sort of subcomponents of what Mr. Cauley has just emphasized. As the grid continues to transform, I think we need to focus on 2 issues significantly. One is, the growing dependence on natural gas means that we need to look and ensure that we have an adequate infrastructure, whether it be pipelines or dual fuel facilities or onsite storage, those kinds of techniques for ensuring that we can use the gas when we need to. And the other component that I would add is what has been called essential reliability services; things like voltage support and frequency support. As we change the resources that we rely on, we need to make sure we have the right tools in place, the right metrics, and the right standards.

Mr. DOYLE. Thank you. Mr. Chairman, I see my time is expiring, but I would say that I think it would be shortsighted for us to put all our eggs in any one fuel basket, and we have a lot of work to do on energy infrastructure.

Thank you for the time.

Mr. WHITFIELD. Thank you very much.

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

Mr. GRIFFITH. Thank you very much. And appreciate you all being here for the hearing.

You just had a discussion in regard to the timelines that are built into the bill, and indicated that you all would need more time to do your analyses, isn't that correct?

Mr. CAULEY. Yes. Yes, sir.

Mr. GRIFFITH. And, Mr. Bardee?

Mr. BARDEE. Yes, sir.

Mr. GRIFFITH. And I certainly appreciate that and hope that we will incorporate that into the final draft. That being said, the Clean Power Plan requires the States to come up with I think it is 13 months, but less than a year and a half. After the plan is a final rule, the Clean Power Plan requires the States to come up with their plan, which then must be—begin implementation by 2020. Doesn't that seem to be rather short? If it is going to take you all, the experts in this, more than 90 or 120 days to come up with an analysis of the plan, doesn't it just scream out that reason would call that the States need more time to come up with their plan as well?

Mr. BARDEE. Certainly, I have heard representatives for States express their need for more time, and as you have heard here today, we have expressed a need for more time if we are given the responsibilities described in the legislation.

Mr. GRIFFITH. And I certainly appreciate that and understand that you do need more time. I also note that—Mr. Cauley, that NERC's recommendations in the 2 reports that have come out have both addressed that concern, not just on your behalf, but on concern of the industry and grid reliability, that there is more time needed to address the reliability concerns and infrastructure deployment, more time to accommodate reliability enhancement, more time to develop coordinated plans to address shifts in generation. Is that a fair statement of your position?

Mr. CAULEY. That is true, and I think you have touched on the planning and preparation is difficult. Some States might require

legislation. It is broader, it includes energy efficiency and renewables. So we have—actually have the easy job of just doing the reliability analysis. I think it is very complex at each individual State, and it is going to be a challenge under those time constraints.

Mr. GRIFFITH. And I do appreciate that. It is one of the reasons why I think your report highlights another important reason why we need to pass the Ratepayer Protection Act, which would require that the challenges—the legal challenges, I don't think they pass the muster. I think they fail in the courts on the Clean Power Plan. I don't think they have the authority under 111(d). But it requires that the issue be resolved before they can move forward, and that also would buy everybody a little bit more time to prepare if that is the direction we are going in.

Now, that being said as well, one of the things that your report showed, Mr. Cauley, your November report, in there you said, potential issues are most acute in areas where power generators rely on interruptible natural gas pipeline transportation. Could you elaborate on that for just a minute for me?

Mr. CAULEY. Well, my concern is that the business model for gas is different than the business model for electricity. In the gas industry, if you pay for a pipeline and you pay for capacity in a pipeline, you can have it and use it on a firm basis. The difficulty is you don't want to pay for the entire year for those 3 days when you have the extreme cold in the middle of winter. So in the electricity side we have an obligation to serve and we must provide electricity. The disconnect is we don't see that same business model on the delivery of gas. So somehow those two disconnects have got to be dealt with.

Mr. GRIFFITH. And you really don't have that problem if you are dealing with coal because they can just load some ore on a train or a truck, isn't that correct?

Mr. CAULEY. Well, that is why fuel diversity is a benefit because some resources will have fuel onsite, and gives us some security, you know, even if the rivers are frozen or something like that. If there is a pile there, we can get to it.

Mr. GRIFFITH. Right. And your reports also indicate that, again, remember, we are talking about a plan coming out sometime this summer, States have to have their plan done in 2016, and then compliance beginning in 2020, and yet in many areas of the Nation there aren't sufficient gas pipelines. As a result of that, in my region we have controversy over 2 pipelines that are now getting started, and they are laying out the plans and so forth. But I think your report indicated sometimes it takes 5 to 6 years just to get that up and running. And—am I not correct—is that correct?

Mr. CAULEY. That is correct. In most cases, it does.

Mr. GRIFFITH. And then that puts us beyond the 2020 start date to comply for the States, so it makes it very difficult for the States then to be able to use or to count on the natural gas that is not yet there, if it is just in the planning stages. And I would also note, because my time is running out, it also means that we don't have time for the clean coal technologies which the Department of Energy indicate are probably going to be viable, at least 1 or more, by 2025 to incorporate those into the State plans that have to be done under the Clean Power Plan by next year, isn't that correct?

Mr. CAULEY. That was the intent of our report, to highlight the physical constraints of getting there to the early years of the targets.

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

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

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

Let me first say it is vital that we work together in a bipartisan way, so I thank you for this, to improve the reliability, resilience, and security of our electric grid.

Today, the U.S. electric power system consists of approximately 390,000 miles of transmission lines, including more than 200,000 miles of high-voltage lines, connecting to more than 6,000 power stations and 45,000 substations. Now, a report last year by the National Governors Association found that 70 percent of the Nation's transmission lines and transformers are at least 25 years old, and 60 percent of circuit breakers are at least 30 years old. And it is noted that much of the infrastructure was designed in the 1950s, making this system, and I quote, "vulnerable to disruption."

Mr. Tonko asked a question about Hurricane Sandy. I want to go back to Superstorm Sandy, because that is a powerful example of one of those disruptions. Sandy swept through my district and the surrounding region in October 2012, knocking out power to over 8 million people. Some New Yorkers, including my district, waited more than 2 weeks for their lights to turn back on, struggling the whole time to keep their families safe and warm and fed. To protect against this type of outage in the future, New York is working to design and implement an initiative called Reforming the Energy Vision, or REV, and among other things, REV is designed to take pressure off the grid by promoting the generation of distributed power, such as solar, wind, combined heat and power, energy storage, and other systems, at customer locations. This would essentially turn electric utilities into a new kind of entity which, instead of distributing electricity themselves, would effectively direct traffic by coordinating distribution of electricity produced by a multitude of smaller entities.

So let me ask you gentlemen, are you familiar with the REV initiative in New York, do you think its distributed generation model should be replicated in other regions, would the draft legislation we are discussing today encourage or discourage the use of this model?

Mr. BARDEE. Sir, I am somewhat familiar with the initiative, and I think from my perspective, working at the commission, our goal would be to not impede New York's ability to do that and let them make those choices, as other States can choose for themselves what types of resources they think appropriate.

Mr. CAULEY. I also am familiar a bit from afar. During Superstorm Sandy, the bulk power grid actually performed very well and remained intact during the storm. The vast majority of the impacts were at the distribution level, as I said, power lines down the streets and so on. I think anything that can be done to build resilience through the grid at both the distribution and the bulk power side is helpful. I just do believe that it needs to be balanced in terms of reliance on a strong interconnected grid is help-

ful, but also having resources and backup capability at individual customers' critical loads is very important as well.

Mr. TONKO. Thank you very much. I think it is a good initiative, and we will—time will, of course, tell, but I think it is innovative and something that we should move towards.

In addition to managing demand and strengthening our grid to protect against power outages, I believe we must also look at ways to restore power if and when a disruption does occur. What do you believe are the most important things we can do to enable a rapid restoration of power?

Mr. CAULEY. I think we look at Sandy as probably the most recent learning experience, and in many respects, the restoration was executed superbly in terms of moving of trucks and equipment and resources across long distances, and getting equipment back together. I think what I took away in a number of reports is sometimes we have to make sure that we are focused on the human toll during an event. People can't charge their devices, they can't find gas, in some cases food may be hard to acquire, so I think that was a great learning from Sandy that it is not just getting the lights back on and the poles back up as quickly as possible, but how do you help the public cope during that event, and how do you make sure gas stations and other key resources have power that they need to supply citizens.

Mr. BARDEE. I think the only thing I would add is in terms of design resiliency, there are things you can do in terms of the hardening of existing facilities. There are also techniques, and these were brought out to light by Hurricane Sandy. So I think those are also important aspects of how to address these going forward.

Mr. TONKO. You know the slogan, the perfect storm, this actually was the perfect storm, or most imperfect storm, but it was just something that, unfortunately, we can learn from it because a lot of people obviously suffered from it.

Thank you, gentlemen. Thank you, Mr. Chairman.

Mr. WHITFIELD. At this time, I recognize the gentleman from Missouri, Mr. Long, for 5 minutes.

Mr. LONG. Thank you, Mr. Chairman.

Mr. Cauley, during your question-and-answer session here today, you said that hopefully there will be some changes to 111(d) before implementation. What type of changes would you like to see in 111(d)?

Mr. CAULEY. I am hopeful, only because I have listened in public to statements by senior officials at EPA, so I have no particular information, but I think in terms of timing of the targets to make a more progressive transition. Ideally—

Mr. LONG. More progressive?

Mr. CAULEY. More—not in a political sense, but in a—

Mr. LONG. Well, I know not the political sense, but I am talking about more rapidly, progressive?

Mr. CAULEY. But to slow them down and phase them in more gently so that—essentially, the way the original proposal was its targets were, on average, you had to be 80 percent of the way there in the first year. That was too steep of a hill to climb, I think, physically in terms of reliability. So our suggestion in terms of timing would be to make the compliance targets more gradual, more

phased-in over a period of time to allow us to make sure that the infrastructure is there, gas and transmission and the dispatch capability is there to meet those targets.

Mr. LONG. OK. Yes, I—on progressive, I didn't mean to imply politically, but I thought you were wanting to speed up the process—

Mr. CAULEY. No, slow it down—

Mr. LONG [continuing]. But the opposite is true?

Mr. CAULEY [continuing]. On the front end.

Mr. LONG. Yes, OK. Also for you, Mr. Cauley, the EPA's proposed rule includes interim targets beginning in 2020. Based on this rule, 11 States have achieved—11 States must achieve 75 percent of the total goal for the first interim date of 2020. And my State of Missouri has to achieve over 60 percent total goal by then. What impact do you think the sudden change by States to meet the 2020 interim targets will have on reliability issues?

Mr. CAULEY. Well, it creates challenges in terms of—if some units may be forced to retire, they are no longer economic, and particularly coal and base load units—

Mr. LONG. And I might add we get 85 percent of our electricity from coal in Missouri.

Mr. CAULEY. Some of those units might not retire, but might not be available to operate but at very limited times. In regions where gas—natural gas supply is an issue, going from less than 30 percent dependence on gas to 70 percent dependence creates a huge new demand on gas utilization, and whether the gas is going to be there every day in the cold days in the winter is going to be a challenge.

Mr. LONG. OK. Also for you, Mr. Cauley, the—when NERC puts out an alert, what is the general response time of the utility sector?

Mr. CAULEY. The alerts vary. There is a level 1, 2, and 3, and we can set whatever response time is appropriate for the situation. A level 3 is the most urgent, and it requires a mandated response from the entities. Level 1 is an advisory heads-up, and level 2 is a recommended set of actions, but does not require a response back that it was completed.

Mr. LONG. OK, thank you.

And for you, Mr. Bardee, I understand you have concerns regarding the timing for FERC to complete its required analysis within the 90 days of being proposed. Wouldn't you agree that having such a report would be beneficial to those members of the public submitting comments on the proposed rule?

Mr. BARDEE. I think the analyses that we have seen, for example, in the context of the Clean Power Plan are certainly informative and useful, and I am sure the public has benefitted from seeing that information.

Mr. LONG. OK. What role should FERC have in the review of State implementation plans, and what about in review of Federal plans?

Mr. BARDEE. You know, the commissioners wrote a letter to EPA just this past week addressing that point, and what they indicated was that they felt they needed to be careful not to overstep their role and intrude on the authority and responsibility of States. But having said that, they indicated that the existing processes would

be the starting point for how to address the reliability implications of those plans. And that could be supplemented with any additional guidance or work that the commissioners felt appropriate.

Mr. LONG. To save me trying to run that down, could you provide my staff with a copy of that letter?

Mr. BARDEE. Yes, sir.

Mr. LONG. OK, thank you all.

And, Mr. Chairman, I yield back.

Mr. WHITFIELD. Gentleman yields back.

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

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

Director Bardee, on the previous version of the Grid Act grid security threat was defined as a substantial likelihood of a malicious act or natural occurrence, while in the discussion draft, acts or events must pose an imminent danger to the grid in order to be considered for action, setting a much higher bar for regulatory action. In your opinion, does Section 1204 make it clear that DOE or FERC have the authority to address vulnerabilities or threats to the grids—grid before they happen, and can take preventive measures? Also, you had recommendations for clarifying that this language authorizes requirements for restoration of grid reliability after an unforeseen act or event. Can you also talk about these recommendations that you have?

Mr. BARDEE. The section would authorize the Department of Energy to take these actions, not the commission, and it would address grid security emergencies, as you have indicated, defined as an imminent danger. Whether that gets to vulnerabilities is not clear to me. I don't think it would include a vulnerability unless it also posed an imminent danger. But I think, nonetheless, the authority in that provision would be a beneficial one and would allow the Department, the Secretary of Energy, to take action in an emergency, or after an emergency—well, let me put it this way. I would hope that the provision would be clarified to allow the Secretary to take action after an unforeseen attack or event. I think that is as important as being able to take action to protect against an—a foreseen imminent danger.

Mr. RUSH. Mr. Cauley, do you have any remarks?

Mr. CAULEY. Yes, I support the direction of that section in the draft, and I agree with your point that the emergency may become apparent beforehand, and maybe we can prevent it. It may be how do you respond during an attack, and then how do you recover after the fact. And I think we should be clear in the language that it would potentially have that authority during that entire span before, during, and after, as needed. So thank you.

Mr. RUSH. In your testimony, Mr. Bardee, you note that for years FERC has sought to foster the development of competitive markets for wholesale electricity that benefit energy consumers by encourage the diverse resources, spurring innovation and deployment of new technologies. How does Section 1208 differ in its approach?

Mr. BARDEE. Section 1208 would have the RTOs, the ISOs, and the commission address whether those markets met certain parameters such as a diverse generation portfolio, stable pricing for customers, pricing adequacy for resources. And those are all consider-

ations typically considered by States when they do integrated resource planning. But in the context of the wholesale markets, the commission has tried to rely more on competitive forces when those forces were sufficient, and the kinds of techniques I have just mentioned and that are included in Section 1208 could be applied—could construed in ways that would constrain those forces—those competitive forces unnecessarily, and that would concern us.

Mr. RUSH. Does the legislative mandate drafted in Section 1208 maximize competition in order to best benefit consumers?

Mr. BARDEE. Well, certainly, our goal under the Federal Power Act, as we administer it now, would be to do so; to maximize competitive forces within those markets for the benefit of consumers. And I would hope that our authority to do that is not constrained in ways that reduce those benefits.

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

Mr. WHITFIELD. Gentleman yields back.

At this time, I recognize the gentlelady from North Carolina, Mrs. Ellmers, for 5 minutes.

Mrs. ELLMERS. Thank you, Mr. Chairman. And I would like to thank you also for this subcommittee hearing, and your staff for the hard work that they have done on this discussion draft. It is—as we all know, it is no secret that our grid infrastructure is aging and needs modernization. A more secure, reliable, and resilient grid is a matter of national security, and I am pleased to see the leadership of this committee on this matter.

Mr. Bardee, I would like to ask you a question first. In November of last year, FERC issued Order number 802 approving the reliability standard which relates to physical security. Can you briefly explain on this new—what this new physical security standard is?

Mr. BARDEE. Sure. The proposal sent to us by NERC and that we approved basically had 3 steps in it. The first was for the affected utilities to identify their critical facilities. The second was to then assess the threats and vulnerabilities that those facilities may face. And the third step was to develop a plan to mitigate those threats and vulnerabilities. Right now, the industry is working very hard to meet the first task; identifying their critical facilities. That is due to be completed in October, and then the other steps follow in sequence over time.

Mrs. ELLMERS. Um-hum. And when we are talking about industry, are we also talking about the electricity sector?

Mr. BARDEE. Yes.

Mrs. ELLMERS. Yes, OK. Just to be clear. And is compliance mandatory?

Mr. BARDEE. Compliance is mandatory.

Mrs. ELLMERS. It is mandatory. Thank you.

Mr. Cauley, thank you for being here as well. And since becoming officially designated Electric Reliability Organization, established by Congress in 2005, what would you say has been ERC's most significant contribution to ensuring reliability?

Mr. CAULEY. Well, I think there are many, but I think the mandatory standards and enforcement capability, we have a very comprehensive regime of compliance audits and reviews, has had a very significant improvement on the bulk power performance.

Mrs. ELLMERS. Um-hum.

Mr. CAULEY. We have seen things like vegetation management issues that cause—were the triggering events for the 2003 black-out, have essentially gone to zero—

Mrs. ELLMERS. Um-hum.

Mr. CAULEY [continuing]. And so there are a number of areas where we have seen significant improvement and performance across-

Mrs. ELLMERS. Um-hum.

Mr. CAULEY [continuing]. Electric industry.

Mrs. ELLMERS. What do you feel—what else can be done in order to improve upon this?

Mr. CAULEY. Well, we do a lot of other things. We are moving into an area of technical analytics where we can get a lot of detailed—

Mrs. ELLMERS. Um-hum.

Mr. CAULEY [continuing]. Performance information. I think we are getting much smarter in the last few years about what causes equipment to fail and why do events happen. So we are getting that information out—

Mrs. ELLMERS. Um-hum.

Mr. CAULEY [continuing]. In terms of lessons learned and recommendations to industry.

Mrs. ELLMERS. And there again, when we consider industry, what more can industry do to improve upon this as well, and what part do they play?

Mr. CAULEY. Well, industry has been working very closely with us. We have a number of technical—

Mrs. ELLMERS. Um-hum.

Mr. CAULEY [continuing]. Committees. We—another example is the polar vortex and the cold weather, there was a lot more—

Mrs. ELLMERS. Um-hum.

Mr. CAULEY [continuing]. There in a couple of events and we survived the most recent version of that with a lot of the information we were able to get out; why does instrumentation freeze up, what kind of exposure problems were we seeing. So we have been working with industry to turn that information—

Mrs. ELLMERS. Um-hum.

Mr. CAULEY [continuing]. Back around. What I find is that most of the time in most issues, industry will do the right thing because they are interested in serving their customers as much as anybody else, if they know what it is that they have to do.

Mrs. ELLMERS. Great, thank you so much.

Mr. Chairman, I yield back the remainder of my time.

Mr. WHITFIELD. Gentlelady yields back the balance of her time.

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

Mr. FLORES. Thank you, Mr. Chairman, and I appreciate the opportunity to be part of this hearing.

Mr. Bardee, in your testimony you discuss the concern that the overlay of regulatory requirements in competitive markets may reduce the potential for these markets to provide consumers with the benefits achievable through competitive forces. Basically, I think what that report says is that we should let the electricity markets work in a free fashion and not distort them, in other words, not

picking winners and losers. And my question is this. Can we infer based on the testimony that FERC does not approve of the wind production tax credit or State renewable requirements, or other similar actions that impair the ability of a competitive market to behave like a truly competitive market?

Mr. BARDEE. I actually don't have an opinion on those particular issues, but certainly, the goal of the commission is to rely on competitive forces and prevent undue discrimination. That is our—one of our core responsibilities under the Federal Power Act, and we seek to do that so that all resources are able to compete in the wholesale markets.

Mr. FLORES. OK. Thank you. And, Mr. Bardee—or, excuse me, Mr. Cauley, you noted that FERC has recently approved the NREC [sic] Critical Infrastructure Protection Version 5 standards which become enforceable on April 1 of next year, related to cybersecurity. First question is, can you briefly expand on the new Version 5 cybersecurity standards?

Mr. CAULEY. Well, these are dramatically different. First off, they cover the entirety of the bulk power system, not just the high priority, highest voltage equipment. They require a risk-based controls approach, which means set up the systems to monitor, patch, keep up your defenses, as opposed to a sort of checklist-type approach. And those are the predominant changes, and it is prioritized, so we will have the most extensive controls on the highest voltage, highest critical equipment, and because of cost considerations and balancing risk, the lowest priority parts of the system will receive some amount of controls and assurance but not as extensive.

Mr. FLORES. OK. So the electricity sector is certainly subject to the standards. Is compliance mandatory?

Mr. CAULEY. Yes, it is with everyone.

Mr. FLORES. OK. Mr. Chairman, that is all my questions. Thank you, and I yield back the balance of my time.

Mr. WHITFIELD. Gentleman yields back.

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

Mr. MCKINLEY. Thank you, Mr. Chairman.

Couple of questions back on the—Section 1202 dealt with the major rule in the billion-dollar threshold. In the last two Congresses, we have been dealing with the threshold level of \$100 million, and we have lowered that to \$50 million for the reason that at \$100 million, 98.5 percent of all rules fall under the \$100 million classification. So I am curious, how many will fall above \$1 billion annually?

Mr. BARDEE. I don't have a sense of that, sir. It is just hard for me to know. I will tell you that from my experience at the commission, I can't think of a rule that would cross that threshold. Perhaps going back years ago to when we required open access, but I would have to go back and look at that.

Mr. MCKINLEY. OK. Just curious because I don't think this is even going to apply at a billion dollars on that, so thank you, based on what we know from the Rain Act.

Secondly, Moeller from FERC was here several times, and made comments in 13 and 14. Both times he was saying from FERC that

if we don't do something drastic here in Washington, we are going to see rolling brownouts in the Midwest by the year 2017. I—we asked that question of Ms. Miles that was here last week and she refused to comment. Do you have a comment about that? Is that an accurate statement, if we don't do something, we are going to see some brownouts? I heard you talk a little bit about gas pipeline networking and like—but given that the long length of time it takes to get that permitting and—are we facing that in the Midwest? Do you agree or disagree with Moeller's comments?

Mr. BARDEE. Certainly, there will be work to do if EPA adopts a final rule for the Clean Power Plan, along the lines of developing infrastructure like I mentioned earlier, the gas infrastructure and also the electric infrastructure. Looking at the information that is available on the plan as it has been analyzed over recent months, I think some States will have little difficulty complying with the plan. States like California or some of the States in the RGGI Program. On the other end of the spectrum, a State like Arizona would have significant challenge in doing that.

Mr. MCKINLEY. Well, so does this mean—do you agree with Moeller's statement that we could have problems by—in 2017 if we don't do something?

Mr. BARDEE. I think looking at the body—

Mr. MCKINLEY. It is a yes or no—

Mr. BARDEE [continuing]. Of analysis—

Mr. MCKINLEY. Should be a yes or no. I am sorry—we only have 5 minutes, we have to keep our responses as short as possible. So do you agree or disagree with Moeller?

Mr. BARDEE. I would say, sir, that the industry has a history of meeting the challenges presented to it, whether you look back at something like the acid rain issue or transitioning to open access, like we—

Mr. MCKINLEY. Well, this—thank you. This is Washington, I guess, we are not going to get that answer that I was looking for one way or the other.

Earlier this year, we had a panel up here that were talking about cybersecurity, and finally when I asked the question of all the issues that had been raised, where should we be prioritizing, and he sat—remember he sat at the very end seat, he said, on cybersecurity, he said, a high school kid could hack into our grid system in America within 4 days and shut our grid down. That ought to concern a lot of us about the capabilities or the vulnerabilities we have. Do you agree, both of you, that—how vulnerable we are with a high school kid being able to hack in and shut down our grid?

Mr. CAULEY. I am not sure I agree with that specific example, but I do have cybersecurity as our number 1 priority on protecting the grid.

Mr. MCKINLEY. OK. Let's—in the time frame that I have, just—if you were starting together—Mr. Bardee, if you started from scratch with this legislation, because there has been some criticism and there has been some positives said about this, if you had to start from scratch, what would be the number one thing that you think we should do on grid reliability? First thing that—if you had

to write a whole new bill, what would it be? What would be the first thing you would include in it?

Mr. BARDEE. I think I would start with Section 1204 on dealing with grid security emergencies. Of the issues in here, that would be my foremost—

Mr. MCKINLEY. OK, 1204.

Mr. BARDEE [continuing]. Recommendation.

Mr. MCKINLEY. OK, thank you.

And I am running out of time, so I yield back the balance of my time. Thank you very much.

Mr. WHITFIELD. Gentleman yields back.

At this time, I recognize the gentleman from Ohio, Mr. Johnson, for 5 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman.

Mr. Bardee, I represent an area of our Nation, a swath of our State, Appalachia, where energy and electric reliability is of critical importance. Many seniors live out in rural areas. When the power goes out, cell phone towers are gone, telephones don't work, these—many of these seniors have health issues, no way to get in contact with them. I have had manufacturers coming to me saying that they have been approached by the energy companies asking them to idol their plants for a period of time because there is not enough energy on the grid to meet peak demands. So electric reliability is a big issue. And when you look at power plants, they take a long time to build, so if we lose one to retirement, it can take perhaps bumping up on to a decade to get those power plants replaced.

Can you give me assurance today that we will have sufficient base load capacity available 10 years from now to assure electric reliability?

Mr. BARDEE. What I would say, sir, is, as I mentioned earlier, the industry has a demonstrated history of meeting the challenges given to it.

Mr. JOHNSON. No, I don't want a political correct answer. That is a very simple question. In your position, can you assure me that we are going to have enough base load capacity to ensure electric reliability 10 years from now?

Mr. BARDEE. I think the industry will do what it needs to do, sir.

Mr. JOHNSON. No, I am asking you your opinion.

Mr. BARDEE. We will do what we need to do to fulfill our—

Mr. JOHNSON. Is that a yes—

Mr. BARDEE [continuing]. Responsibilities.

Mr. JOHNSON [continuing]. Or—is that a yes?

Mr. BARDEE. I think all of us are committed to maintaining reliability, sir.

Mr. JOHNSON. OK. All right. Well, let me ask you another question then. Would you explain—because what I have heard you say is that you won't say yes, so I see that as a big maybe. So if we can't assure reliability, why would FERC have a problem asking RTOs that operate in capacity markets to bring in filings that give markets and consumers a longer term assurance of reliability?

Mr. BARDEE. Do you mean how long of a contractual commitment—

Mr. JOHNSON. Yes.

Mr. BARDEE [continuing]. Suppliers get in a capacity market?

Mr. JOHNSON. Yes.

Mr. BARDEE. We have allowed the individual markets to develop those rules. Some of them have a 3-year requirement, and some of them treat it as an annual requirement. And—

Mr. JOHNSON. But our legislation asked the RTOs to bring in filings that give markets and consumers a longer term assurance. Am I correct that FERC opposes that language in the legislation?

Mr. BARDEE. We do not think it would be helpful to codify requirements that—

Mr. JOHNSON. Why not?

Mr. BARDEE. Because they would potentially restrict competition from providing—

Mr. JOHNSON. But isn't your job to ensure electric reliability?

Mr. BARDEE. That is one of our responsibilities is to help—

Mr. JOHNSON. One of your responsibilities? You are the director of the Office of Electric Reliability.

Mr. BARDEE. I meant the commission, sir.

Mr. JOHNSON. That should be your primary job, right?

Mr. BARDEE. Me personally, my role is as the director of the Office of Electric Reliability, yes.

Mr. JOHNSON. All right. I am not sure why the FERC would have an issue with that.

Mr. CAULEY, as envisioned by our discussion draft, you stated that NERC would be pleased to coordinate with FERC on reliability assessments of rules that pose real or potential challenges to resource adequacy or the reliability of the bulk power system. Do you feel NERC is well suited for this additional responsibility, and if so, why?

Mr. CAULEY. I think we are equipped today to do that, and we do those kinds of assessments on a regular basis. The only challenge might be resourcing based on volume and the timing.

One suggestion I had to help with the language is, it seems to specifically require those assessments for all rules. It seems there should be on a need basis, you know, the magnitude of the impacts and potential risks. So I think it is an authorization and a capability that should be there, but I don't know that it should be independent separate review for every single rule that might come out.

Mr. JOHNSON. OK. All right.

Mr. Bardee, back to you. Would you agree that all generation does not possess equal reliability attributes?

Mr. BARDEE. I think different resources have different capabilities.

Mr. JOHNSON. OK, that is good. Would you also agree that the current capacity market, let's use PJM as an example, only sets a capacity target, in other words, the capacity market secures only a specific number of megawatts regardless of the reliability attributes, including location of those megawatts? Is that an accurate statement?

Mr. BARDEE. My recollection is they do have some limits on demand resources, and obviously, there is litigation pending about that now. Looking ahead, there is a pending proposal by them to put in place capacity performance requirements which would differentiate between certain resources.

Mr. JOHNSON. Well, do you agree then that capacity doesn't necessarily equal reliability, does it? Those are 2 different things.

Mr. BARDEE. You need to look at whether the resources you have will meet your needs in all appropriate circumstances.

Mr. JOHNSON. That doesn't answer the question. Does capacity equal reliability, in your mind?

Mr. BARDEE. It depends on the kind of capacity you have in mind, sir.

Mr. JOHNSON. I think that answer is no, Mr. Chairman, if I understood it. But I will yield back.

Mr. WHITFIELD. Gentleman yields back.

Now, I believe everyone has had the opportunity to ask questions, so that will conclude the—no, we would take a second round but we have another wonderful panel coming up. Thanks for that suggestion, John.

Listen, I want to thank you all very much for joining us, and we really appreciate your responding to our questions. And we look forward to working with both of you as we move forward, trying to address some of these issues. So you all are dismissed.

And at this time, I would like to call up the second panel of witnesses. And we have 8 witnesses on the second panel, and I am just going to wait until it comes time to each one of you to give your opening statements and I will introduce you at that time.

But our first witness this morning, I am going to call on the gentleman from Mississippi, Mr. Harper, to introduce our first witness. If you would do that, Mr. Harper.

Mr. HARPER. Thank you, Mr. Chairman. And I thank you for the recognition and for the opportunity to introduce our first witness on this panel. Tom Fanning is chairman, president, and CEO of Southern Company, one of America's largest producers of electricity. He has worked for Southern Company for more than 30 years, and was elected president by the Board of Directors in July 2010. Mr. Fanning became president in August 2010, and CEO and chairman in December of 2010. Mississippi Power, a wholly owned subsidiary of Southern Company, provides electricity in my home State of Mississippi, and I am glad Tom could be with us today to share on this important topic. His knowledge will benefit us as we move forward, and I appreciate his willingness to be here. Welcome.

Thank you, Mr. Chairman.

Mr. WHITFIELD. And, Mr. Fanning, we appreciate your being with us, and you are recognized for 5 minutes for an opening statement.

STATEMENTS OF THOMAS A. FANNING, CHAIRMAN, PRESIDENT, AND CHIEF EXECUTIVE OFFICER, SOUTHERN COMPANY; ELINOR HAIDER, VICE PRESIDENT, MARKET DEVELOPMENT, VEOLIA ENERGY NORTH AMERICA, ON BEHALF OF THE ALLIANCE FOR INDUSTRIAL EFFICIENCY; JOSEPH DOMINGUEZ, EXECUTIVE VICE PRESIDENT, GOVERNMENTAL AND REGULATORY AFFAIRS AND PUBLIC POLICY, EXELON CORPORATION; MICHAEL BERGEY, PRESIDENT AND CHIEF EXECUTIVE OFFICER, BERGEY WINDPOWER COMPANY, ON BEHALF OF THE DISTRIBUTED WIND ENERGY ASSOCIATION; JOHN N. MOORE, SENIOR ATTORNEY, NATURAL RESOURCES DEFENSE COUNCIL; JOHN DI STASIO, PRESIDENT, LARGE PUBLIC POWER COUNCIL; EMILY HEITMAN, VICE PRESIDENT AND GENERAL MANAGER, COMMERCIAL OPERATIONS FOR MEDIUM AND LARGE POWER TRANSFORMERS IN NORTH AMERICA, ABB, INC., ON BEHALF OF THE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION; AND ELGIE HOLSTEIN, SENIOR DIRECTOR FOR STRATEGIC PLANNING, ENVIRONMENTAL DEFENSE FUND

STATEMENT OF THOMAS A. FANNING

Mr. FANNING. Thank you, sir, and thank you for that introduction. Chairman Whitfield, Ranking Member Rush, and members of the subcommittee, thank you for inviting me to testify today.

My name is Tom Fanning and I am the chairman, president, and chief executive officer of Southern Company. With 4.5 million customers and approximately 46,000 megawatts of generating capacity, Southern Company is a leading U.S. producer of clean, safe, reliable, and affordable electricity. Providing reliable electric service is Southern Company's core business, and mitigating risks to reliability is vital to keeping the lights on for the customer and for a privilege to serve. I am also a chair of the Electricity Subsector Coordinating Council, or ESCC. The ESCC is the principle liaison between the electric sector and Federal Government for coordinating efforts to prepare for and respond to cyberthreats, physical terrorism, and natural disasters that imperil critical infrastructure.

The ESCC is where the most senior leadership in the industry and Government come together to improve the security, resiliency, and responsiveness of the industry, and by extension, the Nation. In that regard, I would like to thank the American Public Power Association and the NRECA for their collaboration in the ESCC.

While the chair of the ESCC, I am speaking in my capacity as CEO of Southern Company. I am here today to talk primarily about the security, base load protection, and reliability analysis provisions found respectively in Sections 1204, 1207, and 1202 in the committee's recently released discussion draft on the energy reliability and security, part of the committee's architecture of abundance legislation. The committee is demonstrating leadership by proposing the discussion draft language to enhance system security and resiliency, retain the reliability and economic benefits provided by base load generation, and protect electric reliability.

I would like to respectfully offer a few items for the committee's consideration to further secure the effectiveness of this legislation. First, Southern Company supports Section 1204, provisions that

would further facilitate industry-Government coordination and information-sharing as the Nation addresses the emerging and constantly evolving electronic and physical threats to the availability of reliable electricity. Because electricity is critical to the Nation's economy and to the lives of Americans, protecting the grid is a shared responsibility between the industry and Government. Regarding language in the discussion draft providing the Secretary of Energy emergency authority to address grid security emergencies, the electricity sector widely recognizes the risk of imminent threats to the grid and the importance of rapid response. Should Congress feel that granting emergency authority is warranted, we agree that DOE is the appropriate agency to execute that authority. We believe that such emergency authority can most effectively be utilized if, as recognized by Section 1204, the industry is consulted to the extent possible prior to a directive's issuance. Such communication ensures that industry expertise is harnessed and incorporated into the emergency directives to more effectively assess the underlying threat, and develop modes of response. The ESCC is well-positioned to provide a ready conduit to allow for such Government-industry consultations on emergency energy authority, and the ESCC should be added to any legislative list of entities to be consulted with prior to the issuance of emergency orders.

Provisions in the draft language exempting critical electric infrastructure security information from the Freedom of Information Act, and providing—and protecting such information from disclosure will boost the confidence of those like members of the ESCC who participate and collaborate in the sharing of information. Provisions in the draft increasing critical infrastructure sector access to classified information will further increase the operational awareness of those on the front lines of defending the electric grid. These provisions align with the ESCC priorities, and we also encourage ongoing efforts with Congress to pass broad information-sharing legislation that would apply to all critical infrastructure sectors, given their mutual interdependence.

Second, we support Section 1207 as a reasonable first step to promote efforts to ensure that base load generation continues to serve the energy needs of customers for many decades to come. Base load generation is vital to ensuring the continued supply of clean, safe, reliable, and affordable electricity to families and businesses because it provides 24 hours a day, 7 days a week capability to support reliability, and it also helps ensure the affordability and stability of electricity prices.

Third, Section 1202's proposed reliability analysis requirement for new major Federal agency rulemakings will fill a significant regulatory gap. In recent years, the Nation's fleet of electric generation facilities has been affected by the new regulations promulgated by the United States Environmental Protection Agencies that could have the potential to jeopardize the reliability of the bulk electric system. The proposed Section 1202 would ensure that the reliability effects of proposed or new final rule are assessed in a timely manner by the Federal Energy Regulatory Commission in coordination with the Electric Reliability Organization.

I thank the committee for holding this important hearing today, and giving me this opportunity to testify. And, Chairman, and all

members, let me say I so applaud the notion of the architecture of abundance. You know, I speak nationally in many different forums about the notion of policy for the United States. It has been set for decades in the past on the notion of scarcity. We have a singular opportunity today to set policy based on abundance, and that really does change our thinking. When I think about the obligation as CEO of one of the most important energy companies in America, and the obligation that you all have to face a broad constituency and the broad entrance of your constituency, then I think that what we must do is understand this notion that we have the opportunity to restore manufacturing in America, grow jobs, grow personal incomes, and make American lives better. And so this opportunity of clean, safe, reliable, affordable energy provided by nuclear, clean coal, natural gas, renewables, and energy efficiency, is something we can all stand behind. But it goes beyond the blessings of this Nation's resources. It really goes to issues that you all have already talked about. Chairman Whitfield, you referred to it, Congressman Barton referred to it, and it is the notion of market design, because when I think about the excellent design, where I come from, the Southeast, an integrated regulated market design, we are incented to provide the best reliability and the lowest prices, with the best customer service possible. Different deregulated markets are incented actually the opposite way; acting completely rationally in an economic manner, they benefit from a lack of reliability and higher prices and more volatility. We think the work you are doing is really important to the success of the American economy.

Thank you very much.

[The prepared statement of Mr. Fanning follows:]

Discussion Draft Addressing Energy Reliability and Security**Thomas A. Fanning****Chairman, President, and Chief Executive Officer****Southern Company**

The Energy and Power Subcommittee of the House Committee on Energy and Commerce has released discussion draft language, to be included in the committee's Architecture of Abundance energy legislation, which intends to ensure the security, resiliency, and reliability of our nation's energy infrastructure. Southern Company applauds the Committee's leadership in proposing the discussion draft language.

In particular, Southern Company supports Section 1204's facilitation of industry-government coordination and information sharing to address threats to the availability of reliable electricity. Section 1204 also recognizes that such authority is best utilized if the industry is consulted, to the extent possible, prior to a directive's issuance. As the principal liaison between the electric sector and the federal government for coordinating preparation and response to national-level disasters or threats, the Electricity Sub-sector Coordinating Council (ESCC) provides a ready conduit to allow for such consultations, and should be added to any legislative list of entities to be consulted with prior to the issuance of emergency orders.

Southern Company also supports the proposed exemption from disclosure under the Freedom of Information Act for critical electric infrastructure security information, as well as increased critical infrastructure sector access to classified information. Southern Company encourages ongoing Congressional efforts to pass broad information sharing legislation applicable to all critical infrastructure sectors.

Southern Company supports Section 1207 as a reasonable first step to promote efforts to ensure that vital baseload generation continues to serve customers' energy needs for decades to come. Baseload generation is vital to ensuring the continued supply of clean, safe, reliable and affordable electricity to American families and businesses.

Finally, as the nation's generation fleet faces new EPA regulations that could jeopardize the reliability of the bulk electric system, Section 1202's proposed reliability analysis requirement for new rulemakings fills a significant regulatory gap by ensuring that a proposed or new rule's effects are assessed in a timely manner by FERC and the Electric Reliability Organization, or ERO.

Discussion Draft Addressing Energy Reliability and Security

Thomas A. Fanning
Chairman, President, and Chief Executive Officer,
Southern Company

Testimony before the
Subcommittee on Energy and Power
Committee on Energy and Commerce,
United States House of Representatives

May 19, 2015

Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee, thank you for inviting me to testify today. My name is Tom Fanning, and I am the chairman, president, and chief executive officer of Southern Company. With 4.5 million customers and approximately 46,000 megawatts of generating capacity, Southern Company is a leading U.S. producer of clean, safe, reliable, and affordable electricity. Providing reliable electric service is Southern Company's core business, and mitigating risks to reliability is vital to keeping the lights on for the customers we are privileged to serve. I am also a chair of the Electricity Sub-Sector Coordinating Council, or "ESCC." The ESCC is the principal liaison between the electric sector and the federal government for coordinating efforts to prepare for, and respond to, cyber threats, physical terrorism and natural disasters that imperil critical infrastructure. The ESCC is where the most senior leadership in the industry and government come together to improve the security, resiliency, and responsiveness of the industry and by extension, the nation. In that regard, I would like to thank the American Public Power Association and the NRECA for their collaboration in the ESCC.

While a chair of ESCC, I am speaking in my capacity as CEO of Southern Company. I am here today to talk primarily about the security, baseload protection, and reliability analysis provisions found, respectively, at Sections 1204, 1207, and 1202 in the Committee's recently released discussion draft on Energy Reliability and Security, part of the Committee's Architecture of Abundance energy legislation. The Committee is demonstrating leadership by proposing the discussion draft language to enhance system security and resiliency, retain the reliability and economic benefits provided by baseload generation, and protect electric reliability. I would like to respectfully offer a few items for the Committee's consideration to further strengthen the effectiveness of this legislation.

Section 1204. Critical Electric Infrastructure Security

The electric sector is increasingly confronted by emerging and constantly evolving electronic and physical threats to the provision of reliable electric service. Southern Company takes these threats very seriously, just as it has in mitigating many other threats to the grid over the course of more than a century of providing secure, reliable electric service to the Southeast. Our risk mitigation strategy emphasizes a “defense-in-depth” approach that focuses on preparation, prevention, response and recovery, with an emphasis on isolation of, and enhanced protections for, critical assets.

Industry-Government Coordination and Information Sharing

Due to the critical role electricity provides for the nation, protecting the grid is a shared responsibility between the industry and government. Partnering with industry peers and federal agencies allows for the rapid development of defenses to emerging threats and the detection of threats based on the intelligence and experience of peers and the federal intelligence community. The tremendous benefits afforded to security and reliability by such coordination and partnership are being significantly enhanced by the ESCC. As previously discussed, the ESCC is the principal liaison between leadership in the federal government and in the electric power sector, with the mission of coordinating efforts to prepare for national-level disasters or threats to critical infrastructure. The ESCC is the only council with CEO-level engagement and leadership, consisting of a 30-member body made up of utility CEOs and trade association leaders representing all segments of the electricity industry. The ESCC works with a parallel group of government counterparts who are also organized around these goals and are committed to aligning government and industry efforts to secure the grid. These counterparts include senior Administration officials from the White House, Department of Energy (DOE), Department of

Homeland Security, the Federal Energy Regulatory Commission (FERC), the Federal Bureau of Investigation, and other agencies.

The ESCC and its government counterparts have four designated areas of focus: (1) industry-government coordination during crises and in the steady state; (2) leveraging strategic infrastructure investments and R&D for resilience and security-related products; (3) threat information sharing and processes among public and private institutions; and (4) cross-sector coordination to prepare for major incidents, better understand and protect our mutual dependencies, and share information more effectively.

The Administration's National Infrastructure Advisory Council (NIAC) has lauded the electric sector as a model for how critical infrastructure industries can most effectively partner with the government.¹ With regard to the NIAC and ESCC, the NIAC has sent to the White House a report and recommendations calling for greater CEO/senior executive engagement to protect "lifeline" sectors (electricity, water, telecom, transportation and financial services). NIAC recommended a "Strategic Infrastructure Executive Council" of lifeline CEOs should be formed, and that the ESCC should convene this group.

We are encouraged that the Committee's draft language on critical electric infrastructure security largely aligns with the ESCC's priorities. Section 1204 addresses several, fundamental issues with regard to information sharing and industry-government coordination that should be included in any such federal legislation:

- *Industry-Government Consultation Prior to Ordering Emergency Measures:*
Regarding language in Section 1204 of the discussion draft providing the Secretary of

¹ See, e.g., Report, *NIAC Executive Collaboration for the Nation's Strategic Critical Infrastructure: Final Report and Recommendations*, at p. 59 (March 20, 2015) ("The members of the Electricity Sub-Sector have a history of working together because of their dependency on the national electric grid that connects the majority of them together, from generation to transmission to distribution at the local level.").

Energy emergency authority to address grid security emergencies, the electricity sector widely recognizes the risk of imminent threats to the grid and the importance of rapid response. Should Congress feel that granting emergency authority is warranted, we agree that DOE is the appropriate agency to execute that authority. We encourage any directive made under this emergency authority to be accompanied with specific threat information and provide for a range of remediation methods including mitigating controls, asset diversity, redundancy and alternate paths of delivery. We support the language requiring consultation with industry prior to the issuance of an emergency order and providing temporary access to classified information to key personnel within those participating entities to “enable optimum communications” regarding the grid security emergency. Providing for such consultations will inform emergency directives with industry expertise in assessing the underlying threat and developing effective modes of response that reflect the experience of critical infrastructure owner/operators and the specific engineering and design of relevant assets. The ESCC is well positioned to provide a ready conduit to facilitate government-industry consultations on emergency energy directives, and we recommend that the ESCC be included in the list of entities to be consulted with prior to the issuance of emergency orders. Of course, adding the ESCC to the list of consulting entities would not be at the expense of the Electric Reliability Organization’s (ERO) participation but would complement the consultation process with the ERO, affected regional entities and owners, users, and operators of the bulk electric system that is already contemplated in the discussion language.

- *Information Sharing and Protection of Critical Electric Infrastructure Information (CEII)*: The provisions in Section 1204 designed to facilitate voluntary

information sharing and protect critical electric infrastructure information from disclosure are essential complements to the Secretary's emergency authority and would generally facilitate protecting the nation's grid from threats. The related provisions that safeguard CEII from public disclosure will encourage increased coordination between electric critical infrastructure owner/operators and the government. Specifically, the language exempting such information from disclosure under the Freedom of Information Act as well as the protections from disclosure by the Federal Energy Regulatory Commission will support confidence of participants in collaborative efforts like the ESCC.

- *Broader Information Sharing Legislation Would Facilitate Security and Reliability:* Recognizing the electric sector's interdependency with other sectors, we believe that information sharing legislation would be most effective and have a broader impact as a cross-sector bill. We encourage ongoing efforts in Congress to pass broad information sharing legislation that applies to all sectors. Information sharing would be further enhanced by a focus on increasing automated machine-to-machine sharing. Legislation promoting such automated informational sharing between industry peers and the government is also needed. Furthermore, the Electric Sector – Information Sharing and Analysis Center (ES-ISAC), which currently operates as a central source of information sharing between the electricity sector and government, should have an increased role in any information sharing program impacting the electricity sector.
- *DOE to Facilitate the Acquisition of Appropriate Security Clearances:* As indicated previously, Section 1204's directives to increase the sharing of classified information will likewise assist the electric sector mitigation of threats to the grid. Increased awareness of the nature of the threat that is underlying the emergency order

will be particularly useful to the critical infrastructure companies that are on the front lines defending the grid. Security clearances should be expanded in a manner that provides depth and breadth – directed not only to senior management, but also to key members of their staff, as well as appropriate physical security, cybersecurity, and operations personnel. Though not mentioned in the discussion draft, some have proposed limiting the number of security clearances on a per-company basis. We believe such caps would artificially and unnecessarily limit a company’s ability to assess and respond to threats. Other sectors, such as defense, already have broad bases of cleared personnel and extensive information sharing programs. It is becoming increasingly clear that critical infrastructure should as well.

Cost Recovery and Liability Protections

We also support the backstop cost recovery and liability protection provisions in this Section. Establishing a mechanism for ensuring that owners, operators and users of the bulk power system may recover substantial costs incurred in complying with an emergency order and affording liability protections for complying with emergency directives will encourage the appropriate use of facilities to address the emergency request, and likely spread the costs of compliance across the appropriate entities. With regard to the cost-recovery provision, one improvement to the proposed language would be to replace the requirement that costs be “prudently incurred” with a standard allowing for the recovery of costs incurred in “reasonably complying” with such an emergency measure. The concern with a “prudently incurred” standard is that it could result in detractors essentially arguing that the required emergency measures and resulting implementing actions were not “prudent.”

Electromagnetic Pulse (EMP) and Geomagnetic Storms and Disturbances (GMD)

Section 1204 takes an appropriate approach to addressing both EMP and GMD. EMP refers to the weapon-based, very intense pulse of electromagnetic energy that could damage electronics within the impacted area. GMD, on the other hand, is basically a “solar storm” that, if severe, has the potential to affect the operation of the electric grid. Section 1204 represents an appropriate legislative approach to address EMP and GMD in that it does not mandate a one-size-fits-all approach to address any such event. Such a one-size-fits-all approach would not be appropriate to address potential GMD events because the intensity of GMD events varies significantly depending upon a utility’s geographic latitude and would vary depending upon inherent system resiliency. Likewise, the mitigation of EMP incidents is primarily the responsibility of the U.S. military and intelligence agencies, and the actual effect of an EMP event on the bulk power system is unknown. Section 1204 refrains from attempting to establish a broad legislative approach to addressing EMP or GMD but instead defines such events as types of Grid Security Emergencies that would specifically be addressed by DOE, other appropriate agencies, and affected industry participants in any particular instance.

Section 1207. State Consideration of Resiliency and Advanced Energy Analytics Technologies and Baseload Generation.

Families and businesses served by electric utilities in the U.S. depend on a reliable and affordable supply of electricity, which in turn is predicated upon baseload generation and its unmatched reliability and electricity price stabilization effects. Baseload generation has served as the backbone of the electric system for many decades and must remain a key part of the electric system in the future if the U.S. is to continue to reap the economic and energy reliability

benefits it currently enjoys. Section 1207 of the discussion draft of the bill is supportive of baseload generation and is a reasonable, first step to promote efforts to ensure that baseload generation continues to serve the families and businesses of the U.S. for many decades to come.

Baseload generation is vital to ensuring the continued supply of clean, safe, reliable and affordable electricity to families and businesses. Baseload generation provides twenty-four-hours-a-day, seven-days-a-week capability to support reliability, and it also helps ensure the affordability and stability of electricity prices. Baseload generation provides an ongoing, economic supply of energy to customers and not merely generation capability to serve peak load. Generation that is only used to serve peak load (peaking generation) is designed to operate relatively few hours out of the year while baseload generation is designed to operate essentially nonstop. While peaking generation typically has lower capital costs, it typically has higher fuel prices and greater price volatility, which has historically been acceptable because peaking generation is designed to operate relatively few hours during a year and the overall price effects of peaking generation have been muted when combined with the more stable fuel costs of baseload generation that operates around the clock.

The importance of baseload generation to the vibrancy of the wholesale electric market in the Southeast should be recognized. Today, the Southeast has an active and abundant wholesale market that includes substantial amounts of baseload generation resources. The existing wholesale market, which is based upon competitive, market-based rates, provides price visibility for market participants and ensures all forms of capacity are offered in the most efficient manner possible, adding to the liquidity of those wholesale markets. The abundance, diversity, and economic value of baseload generation along with the liquidity and visibility of wholesale prices

in the Southeast have ensured low and stable prices and high reliability to the benefit of not only retail but also wholesale customers across the Southeast.

Baseload generation serves as the backbone of the electric system. Electricity demand in the U.S. varies from hour-to-hour and from day-to-day. However, there is always some demand for electricity. In fact, the hourly minimum demand during a given year is typically on the order of 40% of the hourly maximum demand in a given year. Baseload generation is designed specifically to reliably and economically supply this steady, twenty-four-hours-per-day, seven-days-per-week level of electricity demand throughout the year.

Regardless of whether baseload generation is operating during a period of low or high demand, it provides not only capacity and low cost energy but also essential reliability services, including voltage support and frequency support. Additionally, baseload generation provides all-important mechanical inertia to the system during short circuits that might occur on the high voltage transmission system as a result of severe weather, such as lightning or tornados. During a short circuit and in the subsequent fractions of a second following the time when the short circuit is isolated from the electric system, the large mass of rotating equipment inherent in baseload generators is essential to maintaining the stability and reliability of the electric system as it quickly recovers from the short circuit condition. Without the large rotating mass of the many interconnected, baseload generators on the electric system during short circuit events, the reliability of the system would be compromised. All of these essential reliability services are provided by baseload generation throughout the entire year and are absolutely critical to maintaining a reliable electric system.

In addition to providing essential reliability services, baseload generation further enhances reliability because there is typically an on-site inventory of fuel at baseload generation

facilities. Baseload generation needs are generally met by nuclear, coal or biomass generators. All three of these types of generators typically have many days' worth of fuel inventory stored on-site. At a coal or biomass generating plant, this fuel inventory is typically stored in a fuel pile. For nuclear generation, the reactor core contains fuel rods that can power the reactor and produce electricity on an uninterrupted basis for months at a time. Typically, nuclear power plants shut down for refueling about every 18 to 24 months. However, even when fuel rods are replaced during a refueling at a nuclear power plant, only about one-third of the fuel rods are replaced. If a scheduled nuclear refueling needs to be delayed to ensure reliability of the electric system, a nuclear plant almost universally has more than sufficient fuel reserves to temporarily forego the refueling and continue to operate reliably for a considerable period of time. This fuel inventory at nuclear, coal and biomass generating plants helps to mitigate the possibility of fuel supply disruptions to the generators since they can continue to operate for extended periods of time in the event that their fuel deliveries are disrupted due to unplanned events. Generating units that do not have on-site fuel storage are at risk of fuel supply disruptions and can therefore pose risks to the overall reliability of the electric system.

While other types of generation, such as that powered by natural gas,² wind or solar as well as distributed generation and demand response, all serve important roles in the provision of electric service, their roles are different than that provide by baseload generation. As explained in these comments, the unique attributes of baseload generation must be preserved.

² It should be noted that while natural gas, combined-cycle generation can serve as baseload generation, in order to do so it has to be able to satisfy the 24 hours, seven-days-a-week capabilities required of baseload generation. For any such natural gas-fired generator, this means that it should have the firm fuel transportation commitments and sufficient fuel storage capabilities to allow for the constant production of electricity required to be baseloaded.

Baseload generation has unmatched reliability and electricity price stabilization effects. It has served the families and businesses of this great nation for decades. It is essential that baseload generation remain a part of the generation mix in the future to ensure a continued reliable and affordable supply of electricity. Section 1207 of the discussion draft of the bill is an important step to ensuring that baseload generation continues to be a part of the U.S. generation mix so that the families and businesses served by electric utilities can enjoy a reliable and affordable supply of electricity. The Section's state consideration provisions would provide visibility and emphasis to the importance of baseload generation in the provision of clean, reliable, safe and affordable to industry, households, and the nation.

Section 1202. Reliability Analysis for Certain Rules that Affect Electric Generating Facilities.

In recent years, the nation's fleet of electric generation facilities have been impacted by new regulations promulgated by the U.S. Environmental Protection Agency (EPA) that have the potential to jeopardize the reliability of the bulk electric system on which customers depend for a constant and affordable supply of electricity. This regulatory development demonstrates that there is the very real potential that compliance with a specific rule, such as a new environmental rule, may result in jeopardizing the reliability of the electric system. Reliability might be jeopardized due to factors such as short lead times for compliance with a new rule or the inability to continue to operate one or more generating units during very infrequent and short duration periods of malfunction of required environmental controls. This potential for reliability problems is particularly pronounced should the affected generating unit be critical to maintaining the short-term reliability of the electric system.

The EPA continues to promulgate rules to further lower the environmental impact of electricity generation. Their singular focus is on clean energy. However, utilities, along with their respective state regulators and FERC, are responsible for the more holistic balance of clean, safe, reliable and affordable electricity for all customers. The proposed Section 1202 would ensure that the reliability impacts of a proposed or new final rule are assessed in a timely manner by FERC, in coordination with the ERO/North American Electric Reliability Corporation (NERC). These organizations have both expertise and authority regarding electric system reliability and may properly be relied upon to provide a definitive and unbiased assessment of the reliability impacts of proposed and new final rules issued by another federal agency. The reliability analysis that would result from section 1202 would be made available to the public for review and any needed subsequent action. Section 1202's proposed reliability assessments are greatly needed and takes a reasonable approach to addressing the current gap regarding the significant reliability impacts presented by either proposed or final federal rulemakings today.

Section 1201. Resolving Environmental and Grid Reliability Conflicts.

We support including in the comprehensive bill the proposed Section 1201. If DOE uses its Section 202(c) emergency authority to require a power plant to operate to maintain electric reliability, the plant owner or operator should not be held liable if operating causes an environmental violation. That is not a fair result. If the government requires a utility to run a plant in order to keep the lights on, that utility should be provided an exemption from liability, as the Committee has recognized previously.

I hope the Committee will consider improving the language in the bill in one respect. An emergency is an emergency, and Congress should not complicate DOE's action by making it

determine how an emergency order can be made consistent with federal, state and local environmental law and regulations “to the maximum extent practicable.” That could cause delay and lawsuits. It would be more appropriate to require DOE to take “reasonable” measures to minimize conflict with environmental requirements.

Section 1205. Strategic Transformer Reserve.

Southern Company supports the policy behind the proposed Strategic Transformer Reserve legislation and agrees that the industry should have an inventory of key equipment in the event of high impact but low probability events. In this regard, Southern Company and many others in the electric industry are strong supporters of existing EEI initiatives, such as the Spare Transformer Equipment Program (STEP) program as one example. STEP is a coordinated, industry-wide program designed to increase the electric industry’s inventory of spare transformers in order to ensure that the electric industry has sufficient capability to restore service in the event of coordinated, deliberate destruction of utility stations. In 2006, FERC approved the Spare Transformer Sharing Agreement. This Agreement provides the framework for participating signatories to maintain and acquire a certain number of transformers based upon specified criteria and to sell their spare transformers to another participating utility that suffers a triggering event. To date, more than forty entities have executed the Agreement.

In addition, the industry has also developed the SpareConnect program. SpareConnect provides a mechanism for bulk power system asset owners and operators to network with other SpareConnect participants concerning the possible sharing of transmission and generation step-up (GSU) transmission and related equipment. SpareConnect establishes a confidential, unified

platform for the electric industry to communicate equipment needs in the event of an emergency or other non-routine failure.

While supporting the policy behind the proposed Section 1205 to create a national inventory of large power transformers, we believe that the continued use and expansion of private industry approaches will prove more beneficial in the long run than a top-down, government solution. The industry is currently pursuing the development of a broader, voluntary program that could address a wider range of qualifying events than the terrorist-type attacks contemplated by STEP. Discussions are ongoing to develop a more expanded program that would go beyond just transformers and to more generally encompass key spare equipment reserves. In this regard, the nuclear industry has an established, comparable program, and there are lessons learned from that effort that can be leveraged broadly within the electric industry. In developing this expanded program, DOE, Department of Defense (DOD), FERC, the ERO/NERC and other federal agencies will be engaged and consulted with as that effort goes forward.

One area in which federal legislation could play an important role would be to assist with the funding to set-up and develop such an expanded program. Such an approach is contemplated at subsection (c)(2)(E) of Section 1205 and presumably in the section's appropriations provisions. An industry sponsored self-funded program would better ensure its overall long term sustainability, however Federal support in covering the cost of the initial establishment of the program would be helpful and likely facilitate its quicker adoption.

In conclusion, while supporting the policy behind proposed Section 1205, we believe that the industry, their customers and the nation as a whole will be better served by allowing the

industry to create the structure, cost responsibility and pricing for sparing services as opposed to a top-down government solution.

Section 1206. Cyber Sense.

In Section 1206, the creation of a Cyber Sense program will also support secure and reliable electricity. This innovative program is an approach long supported by Southern Company and the electricity sector at large. Similar to certification by organizations like United Labs, Cyber Sense accreditation would be effective in improving security, reliability and resiliency, as it is focused on the creators of technology rather than that technology's users. As well, implementation of this program should take care not to discourage innovation or require excessive disclosures that would undermine security. Finally, the Cyber Sense program has the potential to play an even great role in the nation's defense if it were expanded to be applicable to technologies provided to all critical infrastructure sectors and not just the electric sector.

Cost Socialization Concerns with FERC Order No. 1000.

While beyond the scope of the discussion draft, FERC's Order No. 1000 concerning Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities raises serious cost socialization concerns that would be appropriate to be addressed in legislation. Order No. 1000 would allow FERC to authorize a transmission developer to impose its transmission costs upon entities that are neither a customer nor have a contractual relationship with the developer and to otherwise broadly socialize the developer's costs. Legislation would be appropriate to avoid such economic distortions and the basic unfairness that would result from such an approach.

Conclusion

New and dangerous threats pose risks to the reliability and resiliency of the grid. Working in effective collaboration with the government through programs like the ESCC and the Electricity Sector Information Sharing and Analysis Center (ES-ISAC), the electricity sector can continue its long tradition of mitigating and responding to threats to provide secure and reliable electricity. Section 1204 of the Committee's discussion draft would facilitate these industry-government partnerships and data exchanges, thereby promoting reliability through enhanced system security and resiliency. Likewise, baseload generation is vital to the provision of clean, safe, reliable, and affordable electricity to consumers, and Section 1207 is a reasonable, first-step to the continued viability of baseload generation. Lastly, new Federal regulations have jeopardized system reliability, and Section 1202 would fill the significant, existing gap of requiring that the potential impacts of any such significant rulemaking be thoroughly analyzed and considered prior to the regulations becoming effective.

I applaud the Committee for proposing the discussion draft language and providing me this opportunity to testify. I look forward to your questions.

Mr. WHITFIELD. Thank you very much. Appreciate that.

And our second witness today is Ms. Elinor Haider, who is vice president, Market Development, at Veolia North America. And she is testifying on behalf of the Alliance for Industrial Efficiency.

Welcome, and you are recognized for 5 minutes.

STATEMENT OF ELINOR HAIDER

Ms. HAIDER. Thank you. Chairman Whitfield, Ranking Member Rush, and of—other members of the subcommittee, thank you for the opportunity to testify.

My testimony will address the role of combined heat and power in enhancing resiliency and reliability. With 180,000 employees worldwide, Veolia has been creating integrated energy infrastructure and environmental solutions for over 160 years. Last year, Veolia supplied 150 million with drinking and wastewater services, produced 52 million megawatt hours of energy, and converted 31 million metric tons of waste into new materials and energy.

In the U.S., our 8,000 employees ensure the reliable, efficient supply of energy with over 500 megawatts of owned or operated combined heat and power, and the largest portfolio of district energy systems. Veolia is a member of the Alliance for Industrial Efficiency, a diverse coalition that includes representatives from the business, environmental, labor, and contractor communities. The alliance is committed to enhancing manufacturing competitiveness, and creating job through industrial energy efficiency, particularly through the use of combined heat and power and waste heat to power. Both Veolia and the alliance are pleased to see the recognition of CHP's grid resiliency benefits in Section 1207 of the committee's discussion draft.

Conventional power generation is inefficient. More than $\frac{2}{3}$ of the fuel inputs are lost from our smokestacks as wasted heat, and never converted to useful energy. Another 7 percent is lost in the transmission and distribution of electric energy over long distances and multiple voltage changes. The energy lost in the U.S. from wasted heat in power generation is greater than the total energy use in all of Japan. This inefficiency costs consumers and businesses, and harms America's competitiveness. By making use of both heat and electricity from a single fuel source located closer to the user, CHP dramatically increases fuel efficiency and eliminates much of this waste. CHP typically uses more than 70 percent of fuel inputs. By producing both heat and electricity on-site and independent of the grid, CHP can run without interruption during an extreme weather event.

As one of the U.S.'s leading owners and operators of CHP systems, Veolia's customers benefit from the energy efficiency and resiliency provided by CHP at universities, hospitals, biotech, R&D, and other critical facilities.

The benefits of this expertise were on stark display during the \$70 billion Superstorm Sandy. While nearly 8 million residents across the Mid-Atlantic lost power, those with resilient CHP systems kept the lights on. There is no more illustrative case than New York University, where Veolia has played a critical role in implementing CHP. NYU has 2 campuses in Manhattan. Ten years ago NYU selected Veolia to serve as owner's representative, to de-

sign and manage expansion of its Washington Square Campus energy plant. The expanded CHP system generates up to 90,000 pounds of steam per hour, and 13 megawatts of electricity, serving 37 buildings. While the majority of Manhattan was without power during Sandy, that campus had electricity, heat, and hot water. It became a place of refuge during the height of the storm. That NYU campus kept the lights on. On the other hand, NYU Langone Medical Center did not have CHP. It lost all power, knocking out its communication systems, and leading to the dangerous forced evacuation of critical care patients on gurneys and in dozens of ambulances.

In response to its experience at the 2 campuses, NYU selected Veolia to support development and operations of a new CHP energy plant for the NYU Langone Medical Center campus. The new plant has 13 megawatts of electric generating capacity, and 165,000 pounds per hour of steam. It will be completely self-sufficient in the event of a utility power interruption. NYU Langone will also keep the lights on. When we consider energy resiliency, the price of inaction, such as the \$540 million in FEMA-funded repair work at Langone, needs to be considered in our cost benefits analysis.

In the aftermath of Superstorm Sandy, New York, New Jersey, Massachusetts, and Connecticut have each adopted policies to support greater use of CHP. Other regions have also long recognized that CHP can help keep critical infrastructure online during extreme weather events. Following Hurricanes Katrina, Rita, and Ike, Texas and Louisiana adopted legislation to encourage CHP deployment in critical facilities. Texas has model legislation that requires critical public facilities to obtain a CHP feasibility study during any renovation or new construction, and has laws that set minimum efficiency and resiliency requirements for CHP systems. By encouraging electric utilities to develop a plan to increase the utilization of resiliency-related technologies, and supporting cost recovery for such systems, the committee's discussion draft takes an important step to help keep the lights on during extreme weather events.

Both Veolia and the Alliance for Industrial Efficiency look forward to working with the committee as it continues to make these recommendations a reality through the architecture of abundance.

Thank you for the opportunity to testify.

[The prepared statement of Ms. Haider follows:]

**Testimony of Elinor Haider
Vice President, Market Development, Veolia Energy North America
On Behalf of the Alliance for Industrial Efficiency
Hearing on "Keeping the Lights On"
House Committee on Energy and Commerce
Subcommittee on Energy and Power**

May 19, 2015

Chairman Upton, Subcommittee Chairman Whitfield, Ranking Member Rush, and other members of the Subcommittee, thank you for the opportunity to testify on this important topic. The focus of my testimony will be on the role of Combined Heat and Power and Waste Heat to Power in enhancing the resilience and reliability of our nation's electricity grid and of critical infrastructure.

With 180,000 employees worldwide, Veolia has been creating integrated energy, infrastructure, and environmental solutions for over 160 years. Last year, Veolia supplied 150-million people with drinking and wastewater services, produced 52-million megawatt hours of energy and converted 31-million metric tons of waste into new materials and energy.

In the US, our 8,000 employees ensure the reliable, efficient supply of energy with over 500 MW of owned or operated Combined Heat and Power and the nation's largest portfolio of district energy systems.

Veolia Energy is a member of the Alliance for Industrial Efficiency, a diverse coalition that includes representatives from the business, environmental, labor and contractor communities. The Alliance is committed to enhancing manufacturing competitiveness, reducing emissions, and creating jobs through industrial energy efficiency, especially through the use of Combined Heat and Power (CHP) and Waste Heat to Power (WHP).

The Alliance and Veolia Energy are very supportive of a number of aspects of the Committee's Architecture of Abundance and we are particularly pleased to see the recognition of the grid resiliency benefits of CHP and WHP in Section 1207 of the Committee's discussion draft.

Conventional power generation is incredibly inefficient. In fact, more than two-thirds (68 percent) of fuel inputs are lost from our smokestacks as wasted heat and never converted to useful energy. The energy lost annually in the United States from wasted heat in the power generation sector is greater than the total energy use of Japan.¹ This inefficiency costs consumers and harms America's competitiveness.

By making use of both heat and electricity from a single fuel source, CHP dramatically increases fuel efficiency and eliminates much of this waste – allowing utilities and companies to effectively "get more with less." CHP can use more than 70 percent of fuel inputs. Savings are even larger with WHP, which captures waste heat that would typically be vented from an industrial facility and uses it to make electricity with no additional combustion and no incremental emissions.

Both CHP and WHP offer excellent opportunities to improve the resiliency of the electric grid and the reliability of critical infrastructure, while simultaneously reducing costs,

creating jobs, and lowering emissions. CHP is a highly efficient distributed generation resource that produces both heat and electricity from a single fuel source. Significantly, because it produces both heat and electricity on site and can be independent of the grid, a properly sized CHP system functions without interruption during an extreme weather event or other disturbance that may compromise the grid.

At sites that can operate independent of the grid, WHP systems provide additional on-site power at a crucial time. As long as waste heat is being produced, WHP systems can generate electricity. At the same time, CHP and WHP save money by making a facility more efficient and lowering its energy costs. This means that these facilities can put more resources into their bottom line – allowing them to manufacture more steel, provide better medical support, or educate students more cost-effectively.

CHP and WHP Systems Keep the Lights on During Extreme Weather Events

As one of the US's leading owners and operators of CHP systems, Veolia's customers benefit from the energy efficiency and resiliency provided by CHP at universities, hospitals, biotech, R&D and other critical facilities. The benefits of this expertise was on stark display during the \$70 billion Superstorm Sandy in October 2012. While nearly eight-million residents across the MidAtlantic lost power, those with resilient CHP systems kept the lights on. There is no more illustrative case than New York University, where Veolia has played a critical role implementing CHP.

NYU has two campuses in Manhattan. Ten years ago, NYU selected Veolia to serve as Owner's Representative to design and manage expansion of its Washington Square campus energy plant. The expanded CHP system generates up to 90,000 pounds of steam per hour and 13 MW of electricity, serving 37 buildings. While the majority of Manhattan was without power during Sandy, that campus had electricity, heat, and hot water. It became a place of refuge during the height of the storm. That NYU campus kept the lights on.

On the other hand, the NYU Langone Medical Center did not have CHP. It lost all power, knocking out its communications systems and leading to the dangerous forced evacuation of critical care patients on gurneys and in dozens of ambulances.

In response to its experience at the two campuses, NYU selected Veolia to support development and operations of a new CHP energy plant for the NYU Langone Medical Center campus. The new plant will have 13 MW of electric generating capacity and 165,000 pounds per hour of steam. It will be completely self-sufficient in the event of a utility power interruption. NYU Langone will also keep the lights on. When we consider energy resiliency, the price of inaction, such as the \$540 million in FEMA-funded repair work at Langone following Superstorm Sandy,¹ needs to be considered in the cost-benefits analysis.

¹ Ginger Adams Otis, July 30, 2014, "NYU's Langone Medical Center to get \$1.1 billion for Hurricane Sandy repairs" (<http://www.nydailynews.com/life-style/health/nyu-langone-medical-center-1-1b-hurricane-sandy-repairs-article-1.1885109>).

Many of these success stories are documented in a 2013 report by DOE's Oak Ridge National Laboratory.² Combined, the region's CHP systems provided nearly 270 megawatts (MW) of uninterrupted electric capacity to critical infrastructure during the storm. (Table 1).

Table 1: CHP Performance during Superstorm Sandy

Application	No. Sites	Capacity (MW)
Hospitals	7	19.31
Universities	6	84.5
Multi-family	6	44.5
District Energy	3	79.9
Data Center	1	0.07
Assisted Living	1	0.08
Manufacturing	1	10.7
WWTP	1	2.8
Government	1	19.3
Total	27	268.6

I'd like to share four Superstorm Sandy case studies, which capture the tremendous range in opportunity and benefits:

1. Co-Op City

Co-Op City, the nation's largest cooperative housing development, spans 330 acres in the Bronx. In 2011, the community installed a 40 MW gas-fired CHP system to provide 95 percent of the community's electric and thermal needs. During Superstorm Sandy, the system provided heat and power to Co-Op city's 60,000 residents – along with their schools, shopping centers, and parking garages. The community finances capital projects, like window replacements and façade repairs, with the money it saves on energy costs. The New York City government estimates that the CHP system is saving residents \$15 million annually, while emitting 40-percent less pollutants than the CHP system it replaced.³ With the help of incentives and supportive policies, including valuing the added resilience CHP and WHP provide, communities like Co-Op City will better be able to afford to install these systems.

2. Princeton University

Princeton University's 15 MW gas-turbine CHP system provided critical services to the University during the storm. Installed in 1995, the system operates at 60 to 80-percent efficiency, depending on the time of year. Since the university's peak energy load is 27 MW (with a 20 MW average), the CHP system is typically supplemented by grid power. The University generally produces its own power during the day (when prices are higher) and

² U.S. Dep't of Energy, Oak Ridge National Laboratory, March 2013, "Combined Heat and Power: Enabling Resilient Energy Infrastructure for Critical Facilities," at 13-31 (http://energy.gov/sites/prod/files/2013/11/f4/chp_critical_facilities.pdf).

³ ORNL 2013, *supra* note 2, at 21.

purchases from the grid in the evening, when prices fall. During the storm, Princeton was able to disconnect from the grid and use the district energy system to power the campus' key functions. By terminating non-critical loads (e.g., administration buildings and some classrooms), the system was able to provide all of the University's remaining energy needs, including uninterrupted steam and chilled-water service and power to critical university facilities, such as research labs, experiments and data that could have been compromised by a loss of power.⁴ Princeton's CHP system not only saves the University money, but also avoids the costs associated with the loss of critical data and priceless experimental materials that would occur if the central power grid goes down, leaving its labs vulnerable.

3. Sikorsky Aircraft

Sikorsky Aircraft installed a 10.7 MW gas-fired CHP system in its two-million square foot helicopter manufacturing facility in Stratford, Connecticut in 2011. The system provides the vast majority (85 percent) of the facility' thermal and electric needs. Not only did the system function as designed during the storm, but Sikorsky was able to provide free helicopter transport service for disaster-relief personnel in New Jersey, New York, and Connecticut along with meals, hot showers, and a place to charge cell phones to its 6,650 full-time employees and their families. The \$26-million system was supported, in part, with a \$4.66-million grant from the state and has a payback of less than four years. In addition to these reliability benefits, lowering energy costs makes Sikorsky more competitive and offers significant environmental benefits – cutting the facility's CO₂ emissions by an estimated 8,900 metric tons annually.⁵

4. South Oaks Hospital

The South Oaks Hospital is a 245-bed healthcare facility, which includes a psychiatric hospital, nursing home, and assisted living center in Long Island, New York. The hospital relies on five 250-kilowatt natural gas reciprocating engines, with on-site boilers providing supplemental steam. During the storm, the hospital continued to provide critical services, relying solely on its CHP system. South Oaks actively admitted patients from other medical institutions and offered critical refrigeration services. Staff and members of the local community were invited to come to the hospital to shower and charge their phones. Similarly, while the surrounding areas had no electricity for 14 hours during the 2003 blackout, South Oaks did not experience any interruption in service. Additionally, the CHP system offers financial benefits to the hospital – during the summer it sells the surplus power to the grid.⁶ Although South Oaks garnered significant resiliency benefits from its CHP system, these benefits are not currently being valued in a way that can be monetized to help reduce the upfront capital costs of installing such systems. The Committee's Discussion Draft helps address this.

⁴ ORNL 2013, *supra* note 2, at 16-17.

⁵ ORNL 2013, *supra* note 2, at 31.

⁶ ORNL 2013, *supra* note 2, at 13.

CHP and WHP systems have provided similar reliability benefits during Gulf Coast hurricanes and large-scale outages. For instance, a 4.2-megawatt gas-fired system at the Mississippi Baptist Medical Center enabled the 624-bed urban hospital to remain fully operational throughout Hurricane Katrina in August 2005 – when the surrounding area was without power for nearly three days.⁷ In contrast, Memorial Herman Baptist Hospital in Beaumont, Texas was forced to shut down for an entire week in 2005 following Hurricane Rita and sustained over \$30 million in damages. The facility did not have an on-site CHP system.⁸

The WHP system at Port Arthur Steam Energy (PASE) in Texas uses kiln exhaust energy that was being wasted (vented to atmosphere) from Oxbow Corporation's petroleum coke calcining operation to generate electricity and steam. Oxbow and PASE use some of the electricity and the rest is sold to the grid. The steam turbine-generator is capable of operating independent of the grid (in "island mode") and has self-supported both the PASE and Oxbow plants on a number of occasions during interruptions of incoming utility power.⁹ This electric reliability prevents the plant from losing money during power outages.

The vast majority of existing CHP installations (87 percent) are in the industrial sector.¹⁰ (Figure 1). Recent analysis, however, confirms that the remaining technical potential is roughly evenly divided between the industrial and commercial/ institutional sectors – with roughly 65 gigawatts of technical potential remaining in the nation's hospitals, universities, wastewater treatment plants, and other critical infrastructure.¹¹ Section 1207 of the Committee's discussion draft includes important language to help states develop plans and consider rate recovery to encourage deployment in these areas.

CHP is particularly well-suited for critical infrastructure, like hospitals and assisted-living facilities.¹² With high thermal needs to heat and cool buildings and to sterilize equipment coupled with round-the-clock electricity demand to support patients, these institutions are prime candidates for CHP and WHP systems. WHP systems can turn waste heat from hospital incinerators, laundries and kitchen into electricity without additional fuel or combustion or emissions. That electricity can be used to support on-site needs.

⁷ U.S. Dep't of Energy, Clean Energy Application Center, June 2012, "Combined Heat and Power: Basics and Texas Outlook" (<http://seco.cpa.state.tx.us/saeag/docs/presentations/CHPBasicsandTexasOutlook.pdf>).

⁸ Gulf Coast CHP Application Center, May 11, 2006, "Resiliency to Hurricanes Through CHP: Fact or Fiction" (slide 20) (<http://files.harc.edu/Sites/GulfCoastCHP/Presentations/ResiliencyHurricanesThroughCHP.pdf>)

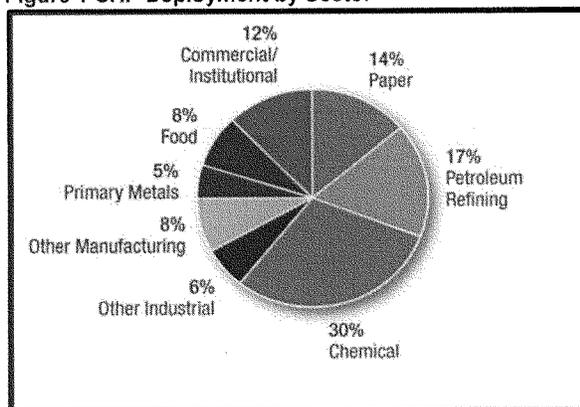
⁹ Heat is Power, Project Profile: Waste Heat to Power from Petroleum Coke Calcining (<http://www.heatispower.org/wp-content/uploads/2014/03/PASE-Project-Profile-FINAL.pdf>).

¹⁰ U.S. Dep't of Energy, U.S. Dep't of Housing and Urban Development, U.S. EPA, Sept. 2013, "Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings," at 5. (<http://portal.hud.gov/hudportal/documents/huddoc?id=CHPSept2013.pdf>).

¹¹ U.S. Dep't of Energy and U.S. EPA, Aug. 2012, "Combined Heat and Power: A Clean Energy Solution" (http://www.epa.gov/chp/documents/clean_energy_solution.pdf).

¹² Critical infrastructure refers to those assets, systems, and networks that, if incapacitated, would have a substantial negative impact on national security, national economic security, or national public health and safety. Patriot Act of 2001 Section 1016 (e). In practice, it refers to hospitals and healthcare centers; wastewater treatment plants; police, fire, and public safety stations; centers of refuge (often schools or universities); military sites; food distribution facilities; and telecommunication or data centers.

Figure 1 CHP Deployment by Sector



CHP Offers Significant Benefits over Emergency Generators

While hospitals typically have emergency back-up generators in the event of a grid failure, CHP is a far superior reliability option. Generators are seldom designed to provide full system coverage, forcing them to scale back operations during emergency events. Even where multiple generators can theoretically replace electricity needs, unlike CHP, generators are incapable of satisfying thermal demand. As such, essential building functions – like heating, cooling and hot water – are often the first services to be eliminated during emergencies. Generators are only tested periodically for performance, whereas CHP systems are used daily. This routine use makes it significantly more likely that any problems with the system will be detected – and repaired - *before* an emergency. Strikingly, during the blackout of 2003, half of New York’s 58 metropolitan hospitals reported failures in their backup generators, often with dramatic consequences. For instance, lack of backup power led to 145-million gallons of raw sewage being released from a Manhattan pumping station.¹³ In contrast, a survey of the city’s 24 CHP systems by the New York State Energy Research and Development Authority (NYSERDA) following Superstorm Sandy found that all of the systems that were designed to operate during a grid outage performed as expected.¹⁴ Critical, life-sustaining facilities like hospitals, are typically required to include generators in their system design – even if they have a CHP unit. This means the emergency generator can operate as “back up to the back up,” further enhancing system reliability.

CHP systems also offer substantial environmental benefits over emergency generators. While generators typically run on diesel, over 70 percent of CHP systems operate on natural gas, which has lower emissions. Finally, as compared to diesel generators, which rely on limited fuel storage, natural-gas-fired CHP systems utilize a hardened, underground fuel-delivery network, meaning that they can continue operations during a sustained outage.

¹³ ORNL 2013, *supra* note 2, at 7.

¹⁴ ORNL 2013, *supra* note 2, at 7 (citing Email communication from Elizabeth Markham, NYSERDA Assistant Project Coordinator on Jan. 14, 2013 to Northeast CEAC Staff, Timothy Banach and Tom Bourgeois).

CHP and WHP Offer Many Additional Benefits

In addition to these on-site reliability benefits, CHP systems also enhance grid reliability. CHP systems can be installed in areas where the local electricity distribution network is constrained or where there are high concentrations of intensive power use and inadequate transmission capability to reliably meet electric demand. By encouraging coordination with electric utilities, the discussion draft ensures that these considerations are incorporated into state resiliency plans.

CHP and WHP benefits in critical infrastructure go beyond reliability and resiliency. The increased energy efficiency can dramatically lower energy costs, providing a hedge against rising electricity prices. According to a report by "Health Care without Harm" and the Boston Green Ribbon Commission, adding a one megawatt CHP system to a hospital can save \$700,000 annually due to increased efficiency.¹⁵ In cases where facilities are able to sell back to the grid, CHP provides a potential source of revenue.

Members of the Alliance for Industrial Efficiency are responsible for producing many of these benefits. For instance, a typical 6-megawatt Recovered Energy Generation facility built by Ormat Technologies on a natural gas pipeline results in:

- 84 new construction jobs,
- 6 new operations jobs,
- \$100,000 in annual property taxes to the local community, and
- 50,000 tons of CO₂ avoided every year.¹⁶

Grid Outages Impose Substantial Economic Costs

Grid outages impose substantial economic costs, which could be avoided with CHP and other reliable distributed generation. Superstorm Sandy precipitated a series of significant economic losses, including a two-day shutdown of the New York Stock Exchange, at an estimated cost of approximately \$7 billion. The economic research firm, Moody's Analytics, estimates an additional \$20 billion from "suspended business activity." Additional losses included the cancellation of thousands of flights and other transportation services.¹⁷ All told, ICF reports \$70 billion in economic losses associated with Superstorm Sandy alone.¹⁸ Multi-billion dollar losses were also incurred during Hurricane Katrina in 2005 (\$40 billion) and the 2003 blackout (\$10 billion). At a recent electric industry meeting, a representative from the Electric Power Research Institute (EPRI) stated that U.S. industries lose over \$150-billion annually due to grid disruptions, and that 500,000 customers are without electricity for a minimum of one hour every day in the US.¹⁹ When properly accounted for, these costs support the capital investment needed to install a CHP or WHP system.

¹⁵ "Report Shows Mass. Hospitals Can Save \$700,000/ Year, Increase Disaster Resilience and Climate Change Preparedness with Combined Heat and Power Systems," Sept. 10, 2013 (<http://www.prweb.com/releases/2013/9/prweb11106862.htm>).

¹⁶ Personal Communication with Ormat Technologies, May 12, 2015.

¹⁷ ORNL 2013, *supra* note 2, at 10-12.

¹⁸ Anne Hampson, ICF, Oct. 2013, "Energy Resiliency: A Study of CHP in Critical Infrastructure" (Power Point slide 3).

¹⁹ ORNL 2013, *supra* note 2, at 11 (reporting annual costs of \$45 to 150 billion from grid outages).

Critical Infrastructure Policies Support Deployment

Recognizing the reliability benefits and the cost of inaction, many jurisdictions have adopted policies to expand CHP deployment. Texas and Louisiana were always national leaders in CHP deployment because of the region's strong industrial base. Following devastating losses during Hurricanes Katrina, Rita and Ike, both states adopted legislation to encourage deployment in critical facilities as well. The storms revealed vulnerabilities in the region's infrastructure – and the potential role of CHP to address these problems.

While Hurricane Katrina left the region without power for nearly three days, facilities like the Mississippi Baptist Medical Center were able to remain fully operational and did not lose power during this time. To encourage similar projects elsewhere, Texas adopted the Energy Security Technologies for Critical Government Facilities Act, which requires all government entities to identify government-owned buildings and facilities that are critical in an emergency situation and to obtain a feasibility study to consider the technical opportunities and economic value of implementing CHP during any renovation or new construction.²⁰ Subsequent law (Texas HB 1864) requires this assessment to consider whether the expected energy savings associated with such a system would exceed the costs of the system. This requirement extends to critical facilities that are operational 6,000 hours per year with a peak electric load exceeding 500 kW. The analysis should be based on a potential CHP system with greater than 60 percent efficiency that can provide 100 percent of a facility's critical electricity needs and sustain emergency operations for at least 14 days.²¹ Louisiana adopted identical legislation.²²

Following the Northeast Blackout in 2003, Superstorm Sandy, and ongoing security threats, states in the Midatlantic and Northeast have likewise recognized the reliability and economic benefits of CHP. Accordingly, Connecticut, Massachusetts, New York, and New Jersey have incorporated CHP commitments into their master plans and launched a variety of incentive programs:

- **Connecticut's** Department of Energy and Environmental Protection (DEEP) instituted a Microgrid Grant and Loan Pilot Program, which awarded \$18 million to nine microgrid projects (including five CHP systems).
- **Massachusetts'** Department of Energy Resources adopted a \$40 million Community Clean Energy Resiliency Initiative, which provided \$7.4 million in grants to six projects (including three CHP projects) in September 2014.
- **New York City** issued "A Stronger, More Resilient New York," which included recommendations for rebuilding the communities impacted by Superstorm Sandy and increasing the resilience of infrastructure and buildings citywide. The state

²⁰ Texas Code § 10-G- 2311 (<http://www.statutes.legis.state.tx.us/Docs/GV/htm/GV.2311.htm>).

²¹ H.R. 1864, 81st Texas State Legislature, Regular Session, May 2013 (enacted), (<http://www.legis.state.tx.us/tlodocs/83R/billtext/pdf/HB01864F.pdf>).

²² SR 171, Louisiana State Legislature, Regular Session, June 2012 (enacted), (<https://legiscan.com/LA/text/SR171/id/649813>).

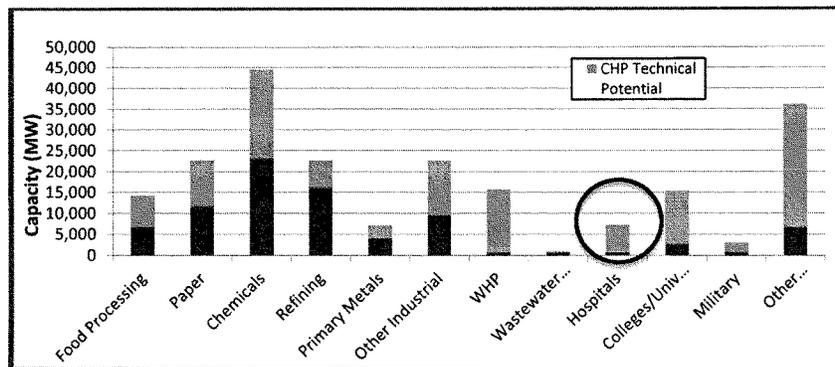
¹⁹ ICF International, May 2013, "The Opportunity for CHP in the United States," (https://www.aga.org/sites/default/files/legacy-assets/Kc/analyses-and-statistics/studies/efficiency_and_environment/Documents/The%20Opportunity%20for%20CHP%20in%20the%20United%20States%20-%20Final%20Report.pdf).

energy office (NYSERDA) has instituted a \$66-million CHP program to fund CHP systems with black-start capability.

- **New Jersey's** Energy Master Plan emphasizes electricity resilience and provides funding to improve grid reliability. The Board of Public Utilities has also launched a \$200-million energy resilience bank.

Such policies are needed because CHP deployment lags far behind its extensive potential. As noted above, the vast majority (87 percent) of existing installations are in the industrial sector, despite roughly equal technical potential in commercial and institutional buildings. As one example, CHP technical potential in hospitals is more than seven times current deployment – with 737 MW deployed to date, compared to 5,722 MW technical potential in this sector.¹⁹ (Figure 2) Because CHP and WHP can more than double a system's efficiency, this means that thousands of critical facilities are needlessly wasting energy – and money.

Figure 2 CHP and WHP Technical Potential



The federal government has likewise recognized the need to support favorable CHP and WHP policies. In August 2013, the Department of Housing and Urban Development's Federal Hurricane Sandy Rebuilding Task Force included distributed generation as a key component of its "Hurricane Sandy Rebuilding Strategy." The Committee's final report included the following recommendations:

- Recommendation 12: "Ensur[e] that Sandy recovery energy investments in critical infrastructure are resilient."
- Recommendation 14: "Encourage Federal and State cooperation to improve electric grid policies and standards."

Conclusion

By encouraging electric utilities to "develop a plan to increase the utilization of resiliency related technologies" and supporting cost recovery for such systems, the Committee's Discussion Draft takes an important step to help keep the lights on during extreme

weather events, improve grid reliability, capture wasted energy, and make our nation more competitive.

Thank you for the opportunity to testify. Both Veolia Energy and the Alliance for Industrial Efficiency look forward to working with the Committee as it continues to develop the Architecture of Abundance.

Mr. WHITFIELD. Thank you.

And our next witness is Mr. Joseph Dominguez, who is the Executive Vice President for Government and Regulatory Affairs and Public Policy with Exelon Corporation.

So welcome, and you are recognized for 5 minutes.

STATEMENT OF JOSEPH DOMINGUEZ

Mr. DOMINGUEZ. Thank you, Mr. Chairman, members of the subcommittee, thank you for the opportunity to be here today.

I work for Exelon. I head public policy for Exelon. We have three major utilities serving about 8 million customers. We are probably well—most well known as being the Nation's largest owner and operator of nuclear facilities. We have about a $\frac{1}{4}$ of the Nation's fleet. We also buy and sell electricity and gas in about 48 different States.

I am going to focus my comments today on Section 1208 of the discussion draft, and I am going to try to reflect some of the questions and answers that have already been rendered here today.

It is universally recognized and very often stated that we are in the midst of this major transformation in the electric sector. In fact, it is so often stated that it is almost a waste of your time to hear it again, except to put it in context. No one believes this transformation is going to occur immediately. It is going to unfold over many decades. The cost of the transformation is yet unknown. It will have reliability impacts. And so we need to focus, while we focus on new technologies, also on the existing steel in the ground. I believe that Section 1208 begins an important discussion of the value of base load assets, but more importantly, of the value of all central assets to maintaining reliability for consumers.

Today's hearing is appropriately timed. Chairman Whitfield talked about the stresses on coal plants across the country. Those stresses are being equally felt on nuclear facilities across the country. About 5 percent of the nuclear assets in the country have announced retirement. Additional units are slated for retirement by 2019. Wall Street analysts and some academics talk frequently about the potential for up to 25 percent of the Nation's fleet to retire.

Ironically, nuclear faces this crisis at a time where its zero carbon attributes and its inherent reliability should be most valued from a policy perspective. Nuclear power offers a host of benefits. It provides over 60 percent of the Nation's zero emission electricity. The units operate at over 90 percent reliability across the country. And the polar vortex and PJM was a good illustration of how valuable these units are for supporting reliability for the 61 million customers in that RTO. And on January 7 of last year, we often talk about almost losing the system across this 13-State region. In point of fact, we did lose the system from the perspective of not having enough contracted resources, contracted capacity to keep the lights on across the region. But for voluntary participation from some demand response Providers, but for the fact that we have some emergency imports from other regions of the country, we would have had to go into load shedding in the teeth of the worst winter. The performance of the units on that particular day was extraordinarily poor. We lost about 47 percent of the natural gas units across PJM,

accounting for something like 20,000 megawatts of electricity. We lost 34 percent of the coal that day. We lost 26 percent of the oil-fired generation. And because the wind wasn't blowing, we didn't get a particularly good performance from renewables. The fact of the matter is that nuclear fleet across PJM was the reason we didn't have an outage. Over 97 percent of the fleet continued to participate, and that, along with hydro, carried the system on its shoulders.

There have been a number of findings as a result of the polar vortex experience. One of those findings is that the capacity products we have in this RTO aren't sufficiently, aren't proportionately, well designed to meet the load requirements in the RTO. This is not a new problem. It was a problem that was understood and addressed by the New England ISO a couple of years in advance of PJM, but it took a crisis in PJM, or a near crisis, to bring it to the attention.

Section 1208 properly drafted could codify some of the lessons learned, and require that other RTOs embrace those lessons learned as we move forward. And I am talking about New York, I am talking about MISO, I am talking about California RTOs. Additional work needs to be done, and it can't be done after a crisis or a near crisis.

So we support the concepts in 1208. It has been talked about today as being anti-distributed generation or anti-renewable. I think the appropriate focus here shouldn't be on the type of technology, but what we want out of that technology. The discussion draft indicates that we want something like 30 days of available fuel on-site, or available to—through contract to support the Nation's needs in the time of an emergency. No one is planning for that. At best, what we are planning for is avoiding a 1-in-10-year crisis, but no one is planning for having a system that would be available, for example, if a terrorist attack or a cyberattack undermined the gas infrastructure in the country, taking out natural gas availability. We don't have a long-term plan for that. I think 1208 begins that discussion, and I think it is a necessary discussion and one that will be helpful to all the RTOs, and properly fashioned, will not exclude any technologies from participation.

[The prepared statement of Mr. Dominguez follows:]

**Summary of Testimony of Joseph Dominguez
Exelon Corporation**

May 19, 2015

The electric utility industry is in the midst of a transformation and it is critical that our public policies keep up with the changes in the industry. Maintaining a diverse supply of reliable, affordable, and clean generation is critically important to American families and businesses. To achieve these objectives, policy makers should focus equal attention on future investments and preserving the existing “steel in the ground” by ensuring that policies value these attributes.

In the last three years, the nation has lost five nuclear units totaling over 4,000 megawatts of capacity. Several additional units have announced plans to prematurely retire by 2019 and Wall Street analysts and academics have published reports concluding that dozens of additional units, totaling as much as 25% of the fleet, are in jeopardy.

Nuclear power plants offer a host of benefits: they are the most reliable source of electric generation in the country, operating over 90 percent of the time; they provide emissions-free power, accounting for more than 60 percent of the nation’s clean energy in 2014; and they provide an important hedge against fuel price volatility because reactors can operate for up to 24 consecutive months on one fuel load.

Organized markets should be reformed to appropriately incent efficient investments in generation infrastructure and fuel procurement to ensure reliability during peak periods. Fuel firmness, fuel diversity and winter firming (through infrastructure investments) are integral to reliable operations, and the markets should support resources that provide firm, reliable service in all operating conditions. PJM is already moving ahead with a Capacity Performance proposal that addresses many of these issues.

PJM’s proposed Capacity Performance product will bring significant benefits to customers by penalizing generators that do not perform when customers need them most. This will improve reliability by giving suppliers the market-based incentives needed to invest in winter-hardening of critical equipment, fuel inventories, and dual-fuel capabilities.

In addition to operating clean, reliable baseload generation, Exelon is investing in the energy system of the future. We are at the beginning stages of an industry-wide transformation, which is being driven by a number of factors, including technology and innovation, intelligent electric network equipment and systems, consumer interest in renewable energy and distributed generation options, and large supplies of relatively low-cost natural gas.

At Exelon, we see the energy system of the future as one in which the current grid and central power generation systems coexist with distributed generation, renewables and energy efficiency, with natural gas playing a growing role in energy production. While we believe in the value of distributed generation systems and continue to invest in them, we recognize that we will also need to find a balanced approach where both can exist without unduly burdening traditional customers.

**Testimony of Joseph Dominguez
Executive Vice President, Government & Regulatory Affairs & Public Policy
Exelon Corporation**

**Committee on Energy and Commerce
Subcommittee on Energy and Power
United States House of Representatives**

May 19, 2015

Mr. Chairman, and members of the subcommittee, thank you for the opportunity to be here today. I'd also like to thank the subcommittee for taking up this important topic.

The electric utility industry is in the midst of a transformation and it is critical that our public policies keep up with the changes in the industry. Maintaining a diverse supply of reliable, affordable, and clean generation is critically important to American families and businesses. To achieve these objectives, policy makers should focus equal attention on future investments as well as preserving the existing "steel in the ground" by ensuring that policies value these attributes.

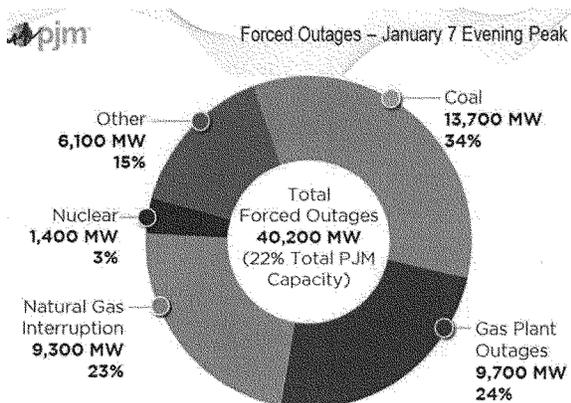
Today's hearing is particularly timely given the challenges to base load generation like nuclear power. In the last three years, the nation has lost five nuclear units totaling over 4,000 megawatts of capacity. Several additional units have announced plans to prematurely retire by 2019 and Wall Street analysts and academics have published reports concluding that dozens of additional units, totaling as much as 25% of the fleet, are in jeopardy.

Nuclear power plants offer a host of benefits: they are the most reliable source of electric generation in the country, operating over 90 percent of the time; they provide emissions-free

power, accounting for more than 60 percent of the nation’s clean energy in 2014; and they provide an important hedge against fuel price volatility because reactors can operate for up to 24 consecutive months on one fuel load. While the reliability of nuclear plants is outstanding throughout the year, plant performance is even more impressive during the hottest summer months and the coldest winter months, where their robust design and firm fuel source allows these units to perform unaffected by weather.

Last year’s polar vortex offers a prime illustration of nuclear power’s importance. On January 7, 2014, PJM experienced an all-time high winter peak of 141,312 megawatts. During the peak load conditions in PJM on that day, natural gas units had a 30 percent forced outage rate; oil units had a 38 percent forced outage rate; coal units had a 19 percent forced outage rate; and wind resources had a 23 percent forced outage rate. In contrast, nuclear resources had a forced outage rate of three percent.

During the Polar Vortex event, physical generation achieved highly variable levels of availability. Nuclear units have consistent availability and secure fuel supply.



Sources: Mike Kormos, EVP Operations PJM, FERC Technical Conference (4/1/2014), PJM Planning Committee Winter Operations Report, 3/6/2014

While the system “weathered the storm” during the less-extreme cold of the past winter, that is because we were lucky, not because the performance of the fleet was materially better. The point is that organized markets should be reformed to appropriately incent efficient investments in generation infrastructure and fuel procurement to ensure reliability during peak periods. Fuel firmness, fuel diversity and winter firming (through infrastructure investments) are integral to reliable operations, and the markets should support resources that provide firm, reliable service in all operating conditions.

Nuclear resources are not being compensated for the unique value they provide to the grid. Currently, firmness of fuel supply and performance reliability is not factored into capacity market prices in most regions of the country. Thus, a gas resource that has gas delivered on a “just in time” basis and that may be subject to gas transportation interruption is nonetheless paid the same per megawatt price in the capacity markets as an oil resource that has a few day’s fuel supply on site, a coal resource that has 30 day’s fuel supply, or a nuclear resource that has 18-24 month’s fuel supply. But many firm-fueled nuclear resources are not recovering their costs in energy and capacity market prices, which are impacted by the production tax credit and state renewable generation mandates, out of market contracts for conventional resources, inadequate transmission in some regions, low gas prices, and inefficiencies in the energy markets.

PJM Capacity Performance Proposal

PJM, the region in which most of Exelon’s nuclear generation is located, is already moving ahead with a Capacity Performance proposal that addresses the issues delineated in the committee draft.

PJM's proposal to introduce a Capacity Performance product will bring significant benefits to customers by penalizing generators that do not perform when customers need them most. This will improve reliability by giving suppliers the market-based incentives needed to invest in winter-hardening of critical equipment, fuel inventories, and dual-fuel capabilities. This is consistent with the storm-hardening benefits that resulted from transmission and distribution system upgrades in the wake of Hurricane Sandy. As the events of January 7, 2014, demonstrated, the current RPM procurement process is not designed to ensure sufficient capacity to meet peak loads during extreme winter weather, with the result that the risk of load shed is in fact higher than the once-in-ten-years planning parameter that RPM is intended to satisfy.

Load shedding imposes enormous costs on customers – economic costs for factories and businesses that must shut down, but also public health and safety impacts, particularly in dangerously cold weather. While estimates of the economic cost to customers of loss of load (known as the “Value of Lost Load” or “VOLL”) vary considerably, they are uniformly very high, typically ranging from \$9,000 per MWh to as much as \$45,000 per MWh. If PJM were forced to shed 20 gigawatts of load, this range of VOLL implies an economic cost to customers of between \$180 and \$900 million for a single hour. When expanded across a multi-hour or even multi-day cold weather event, consumer costs could amount to many billions of dollars.

PJM's proposal will also bring other important benefits to customers. *First*, PJM's proposal will mandate more secure fuel supply arrangements and create incentives for generators to make investments and adopt operating practices that increase generator availability. By doing so, thereby helping to ensure the continued viability of such generators that already exist, PJM's

proposal will effectively add low-cost baseload and intermediate capacity to the energy market by making it more likely that increased aggregate low-cost capacity will be available for dispatch at any particular point in time. This additional low-cost generation will reduce energy production costs by displacing higher-cost resources that would have been dispatched if the lower-cost resources were unavailable. For example, if efforts to comply with PJM's capacity performance program result in increasing the year-round average availability of coal generation by 2%, the program will effectively add about 1 GW of baseload capacity to the market – the equivalent of adding a large new supercritical coal unit. The value of this effect is most pronounced during winter conditions, when gas prices are typically high and the production cost savings from replacing gas with coal or nuclear generation are very large.

Second, PJM's proposal will reduce the volatility of energy prices during the winter and summer peaks by ensuring that sufficient generating capacity can be called upon to minimize the occurrence of scarcity pricing.

Third, and relatedly, by ensuring that winter peak load can be met largely with non-gas or dual-fuel resources or gas resources with a firm gas supply, PJM's proposal will greatly reduce the amount of out-of-market payments that PJM must make to gas facilities (and ultimately charge to customers) to induce the gas facilities to operate when gas supply conditions are tight. Indeed, PJM customers were forced to pay nearly \$600 million in out-of market uplift to compensate gas facilities that lacked robust transportation arrangements for the cost of entering expensive and inflexible short-term gas supply contracts during the extreme weather in January 2014.

Fourth, the PJM proposal will benefit consumers by requiring resources to offer operating parameters consistent with their actual underlying physical capabilities. Currently, PJM allows offers that deviate from physical capabilities due to financial reasons – for example, a unit may offer on a block load basis because it does not want to incur the additional operational and maintenance costs that result from ramping up and down. PJM’s proposal, however, will require resources to offer based on the technical capabilities of the unit. By doing so, proposal will ensure a more flexible aggregate dispatch curve of energy resources, which will enhance PJM’s ability to reliably operate the system under volatile weather or outage conditions and generally produce a more efficient economic dispatch. This will reduce energy production costs.

Finally, PJM’s proposal creates improved long-term price signals with respect to gas infrastructure and should lead to more investment in firm gas delivery capacity (if generators enter into firm gas delivery contracts) or reduced gas usage during winter peak conditions (if generators add dual-fuel backup capability). Either way, PJM’s proposal will reduce the likelihood of extreme winter price stress on gas delivery systems and related spikes in the natural gas market within its footprint, which will reduce energy production costs while also benefiting heating and industrial consumers of natural gas.

The Energy System of the Future

In addition to operating clean, reliable baseload generation, Exelon is investing in the energy system of the future. We are at the beginning stages of an industry-wide transformation, which is being driven by a number of factors, including technology and innovation, intelligent electric network equipment and systems, consumer interest in renewable energy and distributed

generation options, and large supplies of relatively low-cost natural gas. It is also being influenced by environmental concerns, such as the continued need for low-carbon resources to meet the nation's climate change goals and consideration of water resource issues.

At Exelon, we see the energy system of the future over the next decade as one in which the current grid and central power generation systems coexist with distributed generation, renewables and energy efficiency, with natural gas playing a growing role in energy production. With operations across the full energy value chain, Exelon is uniquely positioned to identify, understand and adjust its investment portfolio to capture value as new technologies and opportunities emerge.

At its beginning, the modern electric system utilized large central power plants and a transmission and distribution (T&D) system that was designed to deliver power from power plants to customers. Technical, system and regulatory decisions were focused primarily on maintaining a reliable, diverse and reasonably priced supply of electric power. Over the past twenty years, the system has started to change as a result of technological innovation, industry restructuring and evolving consumer interests.

Today's grid still largely reflects a model where primarily conventional generation resources (coal, nuclear, oil, gas, hydro) produce power that is delivered to end users via the T&D system. This design provides a reliable, one-way flow of power from central plants to end consumers. However, with advances in technology, new distributed generation resources and increased customer interest in energy management, the grid is evolving into a more complex, integrated

structure. Under this new configuration, some customers are becoming suppliers through demand response programs and the deployment of distributed generation. Emerging technologies, such as battery storage, fuel cells and use of electric and natural gas power for alternative transportation will also increase, affecting available supply.

To best manage increases in energy distributed generation sources, many of which provide intermittent generation into the system, as well as increases in stored energy, we will need to update supply and demand models and related policies to ensure that overall system reliability is maintained. For example, when customers deploy distributed generation they spend less on electricity from the grid, but still want grid accessibility as a back-up energy source. In these cases, energy providers must maintain the transmission and distribution infrastructure, but do not receive the same level of revenue to upkeep the grid. This could force others without access to distributed generation systems to pay more.

While we believe in the value of distributed generation systems and continue to invest in them, we recognize that we will also need to find a balanced approach where both can exist without unduly burdening traditional customers. We must also continuously assess the benefits of intelligent networks, including the millions of smart meters deployed by Exelon utilities, to optimize production and distribution. By evaluating new technology and carefully balancing competing demands, we can achieve greater reliability and efficiency, enable consumers to best manage their energy use and continue to improve the overall energy system for generations to come.

The Committee Draft

The committee draft on Energy Reliability and Security addresses many aspects of the challenges our generation, transmission, and distribution system is facing today.

Section 1201 includes language from the Grid Reliability Act authored by Reps. Olson, Green, and Doyle to prevent a conflict in which a utility is ordered by the Department of Energy to run a plant on an emergency basis under Section 202(c) of the Federal Power Act to ensure grid reliability while the operation of the plant would violate environmental statutes. Exelon has long supported resolving this conflict to ensure that reliability is maintained during an emergency situation.

Also important to maintaining reliability are Sections 1207 and 1208.

Section 1207 of the discussion draft amends Section 111(d) of the Public Utility Regulatory Policies Act (PURPA) to include resiliency related technologies like Advanced Metering Infrastructure (AMI), distributed generation, microgrids and energy storage. It also requires states to consider allowing utilities to recover the cost of procuring and deploying these technologies.

Increasingly, customers are demanding a diversity of choice in energy technologies. Some states, like New York and others, are pursuing policies and market designs to incorporate more distributed energy resources and microgrid technologies. In 1978, PURPA was created against the backdrop of the 1970's oil embargo and intended to promote energy independence by

supporting renewables, conservation and energy efficiency projects. The energy landscape today could not be more different. Two-thirds of customers nationally live in regions governed by independent regional transmission organizations, creating competition and choice for customers. Renewable energy, including hydroelectricity, now accounts for 13% of the country's electric output. Customers are demanding new technologies and the competitive marketplace is responding.

Section 1208 of the committee draft directs the Federal Energy Regulatory Commission to require regional transmission organizations and independent system operators to ensure the procurement and availability of sufficient future electric energy resources.

The draft requires the consideration of criteria that include a diverse and flexible generation portfolio, long-term reliability and stable pricing, price adequacy and certainty, and enhanced operational performance assurances during peak-demand periods. The section also promotes the need for reliability attributes that include the ability to generate electricity on a continuous basis for an extended period of time.

While it is essential that action taken under Section 1208 does not undercut the underlying purpose for which these competitive markets were established, it is also important to ensure that markets focus on providing a reliable supply of affordable and clean generation.

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Mr. WHITFIELD. Thank you very much.

Our next witness is Mr. Mike Bergey, who is the president and CEO of Bergey Windpower. He is also board president of the Distributed Wind Energy Association, and is testifying on behalf of the Distributed Wind Energy Association.

So welcome, Mr. Bergey, and you are recognized for 5 minutes.

STATEMENT OF MICHAEL BERGEY

Mr. BERGEY. Thank you, Mr. Chairman. Thank you, Ranking Member Rush, and the subcommittee members for giving me the opportunity to appear before you today.

My name is Mike Bergey. I am president and CEO of Bergey Windpower Company, a 38-year-old Oklahoma family-owned business that manufactures wind turbines. We are currently the world's leading supplier of small wind turbines, and we have supplied turbines in all 50 U.S. States, and over 100 countries around the world.

As you mentioned, I am also president of the Distributed Wind Energy Association, which represents the behind-the-meter distributed generation segment of the wind industry. Not the wind farms. That is the American Wind Energy Association. We have a little over 100 members. They are mostly small businesses.

Last year, 94 percent of the small wind turbines that were installed in America were built here. So we are also part of the renaissance of American manufacturing.

I have commented in my written testimony on all 8 proposed sections, but I would like to confine my comments today to Section 1207, because I believe that it has the largest potential from my perspective of increasing the resiliency of the Nation's electric power grid. It proposes to do so by modifying PURPA. And I have some experience with PURPA because I was involved with the first—when it was passed, and the first implementations at the very State level. I think it is a very powerful tool. I do like 1207's prescription that regulatory agencies and utilities will have to look at various ways to enhance resiliency. I will point out that PURPA, back in 1978, under Section 210, was a critical element in the rise of distributed generation in America, and it sparked the creation of thousands of companies, millions of jobs, and hundreds of billions of dollars in new investments in energy generation technologies. I do see merit, as I said, in requiring the States to take a look at the opportunities. Some States, that will be duplicative; California, New York come to mind, but it will also serve to get other States, like Oklahoma, off the dime on that. So that would be welcome.

That said, I would like to point out some issues that I see in the current draft of 1207 as being somewhat problematic. First, it would seem to cover only regulated utilities, so unregulated utilities, which include many rural co-ops, would seem to get a pass under this. I may not—I may have missed something, but that is my reading.

Secondly, it does not specifically mention renewable distributed generation. It does mention distributed generation, but not renewable. But renewable distributed generation is a fast and growing

segment of the distributed generation market, and one with the greatest application to grid resiliency.

And finally, it provides a counterintuitive emphasis on base load generation. On this last point, I say counterintuitive because, as an engineer, it is my understanding that a fewer number of larger assets is more vulnerable and less resilient than a system with a higher number of smaller assets, particularly if they have greater special and fuel diversity. After you factor-in dependency on functional—on the T&D network for base load plants to serve critical loads, I see the proposed Section 22 as undermining the intent of Section 1207, and potentially nullifying the gains to be made in Section 20(b). It is now well-established that an intermittency is manageable through combinations of complimentary technologies, such as wind power and natural gas-fired combustion turbines. So I see no compelling technical reason to elevate base load plants to a protected status. Reliability is the issue, not the way in which we get there.

The potential for distributed generation to contribute to the modern grid should not be underestimated. We have just done a white paper that shows tremendous potential for distributed wind. The same could be said for distributed solar. And I think emerging storage, there are lots of exciting new additions out on the distribution network that can give us additional grid resiliency.

My primary request of this committee is to bolster Section 1207 to take advantage of the opportunities in emerging distributed renewable energy, storage controls, and other grid-enhancing technologies offered today and tomorrow. If there are legislative opportunities to promote distributed generation beyond the discussion draft, I would encourage the committee to seize those opportunities. Doing so will help build the American economy, while delivering the improvements in energy reliability and security that we all would like to see.

In summary, I believe the discussion draft contains many worthwhile aspects, but I think it can be improved upon. I appreciate that it is a draft, and I look forward to working with the committee and the staff on further improvements.

Thank you for the opportunity.

[The prepared statement of Mr. Bergey follows:]



TESTIMONY OF

MICHAEL BERGEY
PRESIDENT
DISTRIBUTED WIND ENERGY ASSOCIATION

Before the
SUBCOMMITTEE ON ENERGY AND POWER
COMMITTEE ON ENERGY AND COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES

On
"DISCUSSION DRAFT ADDRESSING ENERGY RELIABILITY AND SECURITY"
May 19, 2015

Thank you for the opportunity to appear before the Subcommittee today. A reliable and secure energy supply is a critical foundation for our economy and our quality of life, but it seldom receives the attention it deserves at the Congressional level. This Committee's "Architecture of Abundance" legislative initiative, which spawned the draft we are discussing today, is timely and holds great promise to improve the reliability, resiliency, and affordability of our nation's electrical and fuel supply and distribution system. I am honored to be a part of this discussion.

My name is Mike Bergey, and I am President of the Distributed Wind Energy Association (DWEA). I am also President & CEO of Bergey Windpower Co., an Oklahoma based manufacturer of small wind turbines. We are a 38-year old family-owned small business and we are the world's leading supplier of small wind turbines, with installations in all 50 States and over 100 countries.

DWEA is the trade association representing the industry that supplies wind turbines of all sizes for “behind the meter” on-site generation, both on-grid and off-grid. We have approximately 100 members, almost all of which are small businesses. Our industry is part of the renaissance of American manufacturing. In fact 94% of the small wind turbines installed in America last year were built in America.

Now to my comments on the discussion draft before us today. I believe the draft legislation has many good and valuable aspects, but I also believe it misses significant opportunities to address emerging reliability and security issues and the plethora of new approaches and solutions made possible by technology innovations in the electric power sector. In particular I believe the important role that distributed generation and storage will play in increasing the reliability and resiliency of the power grid deserves more attention.

Section 1201, dealing with environmental and grid reliability conflicts during times of emergency, seems to provide useful clarification that will streamline decision-making during critical periods.

Section 1202, Reliability Analysis for Proposed Major Rules, seems to provide an impact analysis that would be valuable to policymakers. But, I question whether a reliability and resource adequacy analysis that extends to the local level can realistically be completed in 90 or 120 days, so I recommend limiting the scope to the regional level. I would also like to see the mandated analyses recommend ways in which any problems identified might be remedied.

Section 1203, Emergency Preparedness for Disruptions, was surprising to me in that it focuses on oil and gas supply disruptions where I would have expected it to focus on enhancing federal, state, and local capabilities to respond to grid outages. When I think of

energy supply disruptions the events that come to my mind are Hurricane Sandy, the floods in Vermont and Colorado, ice storms in the Northeast, and, because it's in my backyard, wildfires, ice storms, and tornados in Oklahoma; all of which have left homes and businesses without electricity for weeks to months. I don't recall disruptions in oil and natural gas supply beyond those caused by market forces. Section 1205, on spare transformers, addresses grid recovery, and that's a good start, but I think much more could be added to Section 1203 to encourage new approaches to emergency preparedness that would be more impactful to more people. For example, new emergency power delivery possibilities are emerging as grids are modernized, more distributed generation is installed, the design of micro-grids advances, customer-owned storage enters the stage, and back-up fossil-fueled generators and CHP become cleaner and more efficient. I would ask "how can the Energy and Power Subcommittee encourage a convergence that will both improve resiliency and emergency response to lessen the impact of grid outages". I would recommend reviewing the work underway in this area under the New York Public Service Commission's "Reforming the Energy Vision (REV)" initiative.

Section 1204, Critical Electric Infrastructure Security, seems to provide useful clarifications and powers that would enhance our nation's ability to respond to a major grid security emergency.

Section 1205, Strategic Transformer Reserve, seems to be a prudent investment if replacing damaged large power transformers has delayed recovery efforts in the past and vulnerable utilities cannot afford prudent spares holdings. But, I did find it surprising that the costs of new transformer reserve are to be authorized to come out of the Energy Efficiency and Renewable Energy program budget at the Department of Energy. Surely the DOE Office of Electricity Delivery and Energy Reliability would be a better fit technically and budget-wise.

Section 1206, Cyber Sense, seems like a prudent compliment to the existing US-DOE "Cybersecurity of Energy Delivery Systems" program, also at the Office of Electricity Delivery and Energy Reliability, and other similar federal programs.

Section 1207, mandating certain considerations affecting grid resiliency at state regulatory agencies and utilities, is the section of this discussion draft that I think has the greatest potential to enhance energy reliability and security. PURPA Section 210 in 1978 was a critical element in the rise of distributed generation in America and it sparked the creation of thousands of companies, millions of jobs, and hundreds of billions of dollars in new investments in energy generation technologies. I see merit in requiring that states consider requiring plans to increase the utilization of emerging technologies that improve grid resiliency. It will be duplicative in some states, such as California and New York, but it will serve to get other states off the dime, or as a minimum, force them to consider the possibilities.

That said I would like to point out some problems I see in the current draft of Section 1207:

- It would not seem to cover unregulated utilities, such as many rural electric cooperatives
- It does not specifically mention renewable distributed generation, the fastest growing segment of the emerging technologies with application to grid resiliency
- It provides a surprising emphasis on "Advanced Energy Analytics Technology", which I have not seen as one of the emerging technologies with the potential to enhance grid reliability and security, and
- It provides a counter-intuitive emphasis on baseload generation.

On this last point I say counter-intuitive because a system with a fewer number of larger assets is more vulnerable and less resilient than a system with a higher number of smaller

assets, particularly if they have greater spatial and fuel diversity. When you factor in the dependency of a functional T&D network for baseload plants to serve critical loads I see the proposed Subsection 22 as undermining the intent of Section 1207 and potentially nullifying the gains to be made under Subsection 20 (B). It is now well established that intermittency is manageable through combinations of complementary technologies, such as wind power and natural gas fired combustion turbines, so there's no compelling technical reason to elevate baseload plants to an elevated and protected status. States or utilities that want to shut down baseload power plants should be free to do so.

The potential for distributed generation to contribute to the modern grid should not be underestimated. DWEA has just finished a whitepaper on the potential for "behind the meter" wind energy systems and found that the technical potential by 2030 was 1,100 GW, which is on par with the potential for seabed-based offshore wind or the total generating capacity from all sources installed in the U.S. today¹. These are wind systems that can be configured with storage and back-up generation to provide energy during grid emergencies. When combined with solar, which has even greater potential, the future grid could be much more resilient and far less dependent on a relatively few high value bulk power assets and their required T&D network. Mini-grids powering critical loads offers the opportunity for faster and more comprehensive response to grid emergencies, with less sensitivity to fuel logistics.

My primary request to this Committee is to bolster Section 1207 to take better advantage of the opportunities that emerging distributed renewable energy, storage, controls, and other grid-enhancing technologies offer today and tomorrow. If there are legislative opportunities to promote distributed generation beyond this discussion draft I would encourage the

¹ "DWEA Distributed Wind Vision – 2015-2030; Strategies to reach 30 GW of "behind the meter" wind generation by 2030", <http://distributedwind.org/wp-content/uploads/2012/08/DWEA-Distributed-Wind-Vision.pdf>

Committee to seize those opportunities. Doing so will help build the American economy while delivering the improvements in energy reliability and security that we'd all like to see.

Section 1208, requirements for RTO's, seems to elevate baseload power to a special status that would serve to hinder the development of distributed and intermittent resources. Again, I believe that this would reduce resiliency not enhance it.

In summary, I believe the discussion draft contains both good and not so good aspects. I appreciate that it is a draft and look forward to further work and discussions.

Thank you again for the opportunity to appear before you today.

Mr. WHITFIELD. Thank you, Mr. Bergey.

And our next witness is Mr. John Moore, who has been here a few times before, and he is Senior Attorney for—and also involved in the Sustainable FERC Project—from the Natural Resources Defense Council.

Mr. Moore, welcome, and you are recognized for 5 minutes.

STATEMENT OF JOHN N. MOORE

Mr. MOORE. Thank you, Mr. Chairman Whitfield, Ranking Member Rush, and members of the subcommittee.

My name is John Moore, and I am delighted to be here to participate in this hearing today.

I am a senior attorney at the Natural Resources Defense Council. Most of my work at NRDC is for something called the Sustainable FERC Project, which, as the name suggests, is a coalition of environmental and clean energy groups that support cleaner, more reliable, and affordable energy future primarily through reforms to FERC and FERC jurisdictional markets.

Now, I want to make three points today, primarily. One, the grid is a dynamic and always-evolving entity. But that is OK. We have kept calm, we have planned ahead. The grid operators and States are doing their jobs. Second, environmental standards are compatible with reliability. And third, Congress should take care not to do anything that would impede innovation, hamstring grid planners, and prevent economic progress.

So since 2005, our Nation has retired over 90,000 megawatts of older and dirtier power plants, while adding over 200,000 megawatts of newer and cleaner utility-scaled generation, along with many thousands of megawatts of energy efficiency, rooftop solar, small wind, intelligent energy management systems. Already, we are halfway to that 30 percent goal of cutting carbon pollution by 2030. We are already making progress.

Now, speaking of dates, did you know what happened on 20—on April 16 to the grid? I will tell you. Nothing happened, which is a good thing for the grid. That was the initial compliance deadline for the Mercury and Air Toxics Rule, which EPA issued in 2012. Now, remember, many opponents of the MATS worried that when we reached this deadline there would be blackouts and other reliability problems. That did not come to pass. Power companies planned ahead to upgrade or retire power plants and build new resources. The grid adapted and it will continue to adapt thanks to the hard work and ingenuity of our grid planners; 2 of whom we have already heard from.

The same will be true with the Clean Power Plan. This standard offers unparalleled flexibility, more so than any other previous Clean Air Act standard, for States to choose among different compliance solutions, while preserving and even strengthening reliability.

So as you work through this legislation, we encourage you to preserve the flexibility of electricity markets, States, and grid planners to adapt and innovate to always-changing circumstances.

To that point, we are concerned with several provisions in the discussion draft that could conflict with these goals. First, Section 1201. It provides broad amnesty for power plant owners from liabil-

ity under environmental laws. It fails to acknowledge carefully designed environmental standards that were intended to prevent reliability conflicts from arising. The Clean Power Plan is one example of that. It could increase conflicts between reliability and compliance, and threaten human health and the environment.

Second, Section 1202 requires FERC to assess the grid impacts of Federal rules that could affect power plants. This provision is unnecessary because, as FERC points out in its recent letter to EPA, we have already heard about that letter today, FERC jurisdictional grid regions already are required to assess the impacts of the environmental standards on grid operations. So existing processes are the foundation for compliance moving forward.

Finally, we have concerns about the base load elements of Section 1207 and 1208, which we believe unfairly preference expensive base load generation over other resources, specifically, by freezing the grid's evolution in a moment in time now, and creating a one-sized rigid system. At a time when many regions are working to develop the nimble, flexible, and reliable systems that we need to cope with increasingly extreme weather events, these provisions would move us backwards.

So in closing, let's focus on policies that protect reliability while cutting pollution, expanding our economy and saving consumers money.

Thank you.

[The prepared statement of Mr. Moore follows:]

**John N. Moore
Senior Attorney
Natural Resources Defense Council**

**Discussion Draft Addressing Energy Reliability and Security
May 19, 2015**

Thank you for the invitation to appear before the Committee to discuss important energy reliability and security legislation. Several provisions in the discussion draft (including Sections 1203, 1204, and 1205) have the potential to enhance grid security, resiliency, and reliability while preserving the flexibility of the system to adapt and innovate to changing circumstances.

However, other provisions could impede innovation and hamstring our ability to solve evolving grid challenges:

Section 1201 provides broad amnesty for power plant owners from liability under environmental and health laws and citizens suits. It fails to acknowledge carefully designed environmental standards that prevent reliability/compliance conflicts from arising, and is otherwise exceptionally overbroad.

Section 1202 requires FERC to assess various grid impacts of any proposed and final federal agency rules that could affect power plants. This provision is unnecessary because FERC-jurisdictional grid regions already are required to assess the impacts of environmental standards on grid operations. FERC, these grid regions, and other reliability authorities also provide detailed review and analysis to agencies on rulemakings potentially affecting power plants.

Sections 1207 and 1208 are problematic because, by preferencing baseload generation over other resources, they could significantly disrupt markets, planning, and the ability of states, FERC, and grid operators to respond dynamically to changing system conditions over time and integrate more clean energy resources into the grid. These sections also would shoulder consumers with the burden of paying for a rigid, one-size fits-all system.

Testimony of

**John N. Moore
Senior Attorney
Natural Resources Defense Council**

**U. S. House of Representatives
Committee on Energy and Commerce
Subcommittee on Energy and Power Hearing on
“Discussion Draft Addressing Energy Reliability and Security”**

May 19, 2015

Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee, thank you for the opportunity to share the views of the Natural Resources Defense Council (NRDC) on policies and programs that can protect and enhance electric grid reliability while reducing pollution and saving consumers money. My name is John Moore, and I am a Senior Attorney at NRDC.

NRDC is a national, non-profit environmental organization with more than 1.4 million members and activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world’s natural resources, public health, and the environment. NRDC’s top institutional priorities include curbing global warming and creating a clean energy future.

Introduction

NRDC supports a resilient, reliable, and clean power grid. Since 2005 our nation has added 201 gigawatts (GW) of new power plants while retiring 90 GW of older, dirtier, and more expensive power plants,¹ all while not only maintaining but enhancing reliability. During this

¹ SNL Energy, www.snl.com (accessed May 5, 2015).

same period we also have added thousands of megawatts of highly reliable and affordable energy efficiency resources.

In considering the discussion draft, I want to emphasize that fuel prices, technology shifts, the economy, increasing use of demand-side management, and other changes have shaped the power sector far more significantly than have environmental standards. The grid does, however, face reliability challenges due to aging infrastructure, lack of investment, and more frequent weather extremes (attributable in part to carbon emissions from fossil-fuel power plants).

Transitioning to a lower-carbon electric system is an opportunity to reduce air pollution and build a more reliable, modern energy system based on flexible generating technologies, renewable energy resources, smart grid technologies, and more efficient energy use.

Several provisions in the discussion draft have the potential to protect grid security, resiliency, and reliability while preserving the flexibility of the system to adapt and innovate to changing circumstances, including emergency preparedness for supply disruptions (Section 1203), protecting critical energy infrastructure (Section 1204), and a plan to develop a strategic transformer reserve (Section 1205). Although we have not considered all of their implications, including whether they are duplicative of other programs or are appropriately funded, we certainly support them conceptually.²

However, as explained below, other provisions could impede innovation, hamstring our ability to solve evolving grid challenges, and frustrate our nation's continuing progress toward a cleaner and more affordable energy future.

² For example, given FERC's current rules on protecting critical energy infrastructure (18 C.F.R. Part 388), what additional protections does Section 1204 provide and how does it balance security needs with access to information? Also, while the Strategic Transformer Reserve plan appears worthwhile, we disagree with funding it from the Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy appropriations.

We have a more than forty year track record showing that environmental progress and electric reliability are compatible. FERC, NERC, regional grid entities, and states have kept the lights on through every pollution-cutting program. They have done so through an increasingly coordinated system of state, regional, and interregional planning processes.

To continue advancing a more flexible, resilient, and reliable grid, we must:

- ✓ **Support policies like the Clean Power Plan that target a truly serious danger to grid reliability: the damaging effects of unmitigated climate change;**
- ✓ **Support complementary FERC and FERC-jurisdictional entity actions that remove barriers to the access and use of new, reliable clean energy technologies;**
- ✓ **Avoid actions that both constrain state and federal energy policy choices while also potentially undermining reliability.**

Again, I appreciate the opportunity to provide information to the Committee on these important issues and look forward to today's discussion.

The Energy Security and Reliability Discussion Draft

I would first like to thank the Committee for its leadership and interest in supporting legislative enhancements to protect grid reliability and resiliency. Terrorism, natural disasters, human error, and climate change-induced extreme weather events all rate as significant threats to the bulk power system. Some of the provisions in the discussion draft provide useful solutions to combat these threats. Others, however, would impede innovation, hamstring our ability to solve evolving grid challenges, and frustrate our nation's rapidly accelerating clean energy economy. The provisions of concern include:

Section 1201. This provision broadly exempts power plant owners and operators from civil and criminal liability under federal, state, and local environmental and health laws, and citizen suits, when ordered to comply with an order under Section 202(c) of the Federal Power Act (FPA) ("Section 202(c) orders") by producing power or continuing to produce power when the plant would not otherwise operate.

This misguided provision is based on a fundamental misunderstanding of the Clean Power Plan, which provides the flexibility for reliability-critical plants to operate while achieving compliance with the Plan's emission reduction targets.

The foundation of the Clean Power Plan is its compliance flexibility. It allows states and generators to meet the targets using a wide range of resource choices, including state clean energy and energy efficiency standards, shared regional compliance strategies, multi-year averaging, and other options. Under state compliance plans, any individual plant would be able to run whenever needed and make up for its carbon emissions without risking violation by using the Plan's many flexible mechanisms:

- Flexibility over more than a decade (2020 to 2029 interim target) to trade, bank, and borrow allowances or use other approaches to avoid mandating reductions at any individual plant or at any specific period of time;
- Flexibility to use an array of system resources for compliance, including other generation, energy efficiency, demand response, price responsive demand, and energy storage; and
- Flexibility to use multi-state options to meet all or part of the Plan reductions.

These flexibilities allow plants to run for reliability purposes while meeting the Plan's requirements. A plant that needs to run for reliability purposes – including those subject to FPA Section 202(c) orders – can comply with the standards by averaging emissions over time (inherent in annual and multi-year compliance periods), averaging among generation sources, and taking advantage of emissions credits from zero-carbon and efficiency resources.

More generally, recent experience with the Mercury and Air Toxics (MATS) rule demonstrates (again), the continuing compatibility between environmental compliance and grid reliability. The compliance deadline for MATS passed on April 16, 2015, without any problems. No blackouts occurred and nothing else remarkable happened.³ The lights stayed on because

³ Susan Tierney, "Déjà vu: Pushback to U.S. Clean Power Plan Reminiscent of 2011 Mercury Rule," World Resources Institute, May 14, 2015,

power companies, grid operators, states, FERC, and other stakeholders did their jobs and planned ahead.⁴

EPA, with FERC's support, did develop a process for plant owners to seek up to an additional year to comply with MATS through an administrative enforcement agreement with EPA.⁵ To date, only two plants have sought and obtained this relief, demonstrating that virtually all power plant owners and operators were able to comply with MATS' requirements on time.

We also are concerned about the broad grant of amnesty from all federal, state, and local environmental (and related health) laws, including civil, criminal, and administrative laws. Before even considering adoption of such sweeping amnesty from federal, state, and local laws, we urge the Committee to consult with federal, state, and local officials to catalogue the sheer number of laws for which the bill would grant amnesty; the potential health and safety consequences of total amnesty from these civil, criminal, and administrative laws; and the unintended consequences of such amnesty.

Further compounding the broad liability exemption is the fact that the bill fails to provide any enforceable role for the EPA or any other federal, state, or local environmental agency in determining whether the public is protected against pollution or whether mitigation measures should be required. The owner subject to the Section 202(c) order is not required to comply with

<http://www.wri.org/blog/2015/05/d%C3%A9j%C3%A0-vu-pushback-us-clean-power-plan-reminiscent-2011-mercury-rule> (accessed May 18, 2015).

⁴ We also note that the Clean Power Plan's design is fundamentally different from MATS. Because MATS addresses pollutants with local toxicity concerns, it set specific limits for each plant with no opportunity for averaging, trading, or banking. In contrast, carbon pollution is of national concern and, in the Clean Power Plan, EPA contemplates that states will adopt plans that include the flexible compliance methods described above.

⁵ U.S. Environmental Protection Agency, Office of Enforcement and Compliance Assurance, *The Environmental Protection Agency's Enforcement Response Policy For Use Of Clean Air Act Section 113(a) Administrative Orders In Relation To Electric Reliability And The Mercury and Air Toxics Standard*, December 16, 2011, <http://www2.epa.gov/sites/production/files/documents/mats-erp.pdf> (accessed May 18, 2015).

environmental laws and regulations to the fullest extent possible while subject to the order – instead, Section 1201 would absolve the owner of responsibility for any environmental violations that stem from the operation of the facility pursuant to the Section 202(c) order.

Finally, Section 1201 fails to appreciate the value of ongoing FERC-jurisdictional and state planning processes. Through these planning processes, a power producer can notify the FERC-jurisdictional planning entity and affected states of its intention to retire or curtail a plant's operations well in advance of potential non-compliance with environmental standards. The planning entity and states can then take steps to develop transmission, demand-side, and other solutions to address any potential reliability issues.

Section 1202. This provision requires FERC to assess the grid impacts of any proposed and final federal agency rules that could affect power plants, including by closing or interrupting their operation. FERC's broad analysis must address all reliability, resource adequacy, fuel diversity, wholesale markets, and infrastructure issues.

This provision fails to recognize the **required** analysis and planning that FERC, FERC-regulated regions, and state authorities already perform in connection with new environmental and energy standards. After promulgation of a final rule, FERC and regional entities are required to assess under FERC Order 1000 the potential grid impacts through local utility, regional planning, and interregional grid assessments.⁶ Through ongoing, cyclical planning processes and other grid tools, they can address and solve new system needs that could occur.

Critically, these processes occur in tandem with ongoing state resource planning and RTO capacity market developments, which are among the primary drivers of any new resource additions necessary to maintain resource adequacy and reliability. State utility commissions with

⁶ Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, Order No. 1000, 136 FERC ¶ 61,051 at P 203 (2011).

resource adequacy authority also are required to address the impacts, if any, of environmental standards and other factors on state resource adequacy needs.

Also, as shown with the proposed Clean Power Plan, FERC, NERC, and regional planning entities are fully capable of commenting on proposed environmental standards that they believe could affect their grid reliability statutory responsibilities and obligations. Through direct comments to EPA and through four FERC technical conferences in February and March 2015, many of them opined on the potential reliability impacts of the Clean Power Plan.

NERC and regional planning entities also have conducted at least eight national and regional assessments of the proposed Clean Power Plan. Additionally, EPA has discussed the Clean Power Plan with FERC commissioners and FERC staff throughout the proposed rule stage.

A similar process occurred during the MATS rulemaking in 2011. FERC conducted a technical conference on MATS and related issues.⁷ EPA then addressed reliability considerations in the MATS final rule⁸ and through the MATS enforcement response policy discussed above.

We do want to point out that some recent studies by regional grid operators and NERC use outdated assumptions and unrealistically narrow compliance scenarios, which in turn lead to concerns about the credibility of modeling results and higher than necessary estimates of the costs needed to maintain grid reliability. Thus, Section 1202 also is problematic because it could hardwire inaccurate and unrealistic analyses into the regulatory process.

Section 1204. This provision is intended to develop new strategies to prevent terrorist and other attacks on the grid, and minimize the impacts of geomagnetic storms, which collectively

⁷ Federal Energy Regulatory Commission, Reliability Technical Conference, Dkt. No. AD12-1, November 29-30, 2011.

⁸ Mercury and Air Toxics Standard, 77 Fed. Reg. 9304, 9406 (February 16, 2012).

are defined as “grid security emergencies.” While the intent is sound, we are concerned with the narrow definition of “grid security emergency,” which focuses on imminent threats.

We know that the grid has ongoing vulnerabilities beyond imminent dangers, and we should not limit the authority to address those issues solely to “emergencies.” We encourage the Committee to expand the scope of this provision to include other threats, vulnerabilities, and weaknesses that could disrupt the grid – and identify solutions to those threats.

Section 1207. This provision amends the Public Utility Regulatory Policies Act (PURPA) to require state utility commissions to consider adopting new state requirements and programs for “resiliency-related technologies”⁹ and “advanced energy analytics technology.”¹⁰ Section 1207 also requires states to consider ensuring that utility resource plans include sufficient baseload generation to assure reliability over at least a 10-year period.

“Baseload generation” is defined as generation capable of operating continuously for an extended period of time every day over at least 30 days (with on-site fuel, dual fuel, fuel contract certainty, during emergency/severe weather, and capable of providing frequency and voltage support).

We support the on-going development and deployment of resiliency-related technologies and analytics. However, PURPA may not be the right vehicle to accomplish Section 1207’s goals because of the overlapping jurisdictional responsibilities of states and FERC, coupled with geographical differences.

⁹ Section 1207 defines “resiliency-related technologies” to include advanced grid technology, backup generation, microgrids, CHP, waste heat, storage, and other current and future technologies.

¹⁰ Section 1207 defines “advanced energy analytics technology” as “internet-based and cloud based computing solutions and subscription and licensing models, including software as a service, platform as a service, and infrastructure as a service.”

More fundamentally, we are concerned that the focus on baseload generation in both Sections 1207 and 1208 could increase costs and limit development of cleaner energy resources without commensurate reliability benefits. By promoting baseload power as the primary source of reliable power, these provisions essentially freeze the grid, which has continuously evolved since the days of Edison, in its present configuration.

Sections 1207 and 1208 would:

- severely limit state and federal regulatory authorities' ability to respond to changing needs while preserving reliability;
- shoulder consumers with the burden of paying for costly and unnecessary baseload plants; and
- create new roadblocks to zero-carbon, zero-fuel cost, cleaner energy resources.

We do not believe that the Committee intended these consequences and encourage it to rethink its approach to both these sections.

As the proposed definition makes clear, baseload generation historically consists of power plants available to run most of the time and, for technical and/or economic reasons, needing to run at or near full load most of the time (e.g., large coal and nuclear power plants). As the grid continues to evolve with more renewable energy resources, less costly mid-merit generation will become more valuable for integrating renewable energy resources. Mid-merit generation can be dispatched more quickly, accurately, and affordably to changes in electricity demand than baseload, and it need not run near full time. (These are known as "flexibility" attributes.)

Section 1207, however, would limit the development of these more flexible, affordable, and reliable resources, and also create new barriers to other clean energy resources like wind and solar power, which also have capacity value because their output is certain enough to be assigned some value.

Over time, the cost savings of these resources in a system with growing renewable energy levels are considerable. **A more flexible, less baseload-heavy resource mix requires as much as 40% less capital investment to deliver exactly the same level of reliability, with exactly the same level of demand, with exactly the same levels of wind, solar, and other variable renewable energy resources on the system.**¹¹ A more flexible resource mix also will have far higher use rates and require less redundancy (and therefore less investment).

The Committee also should be aware that large baseload power plants actually require more backup power than wind and solar energy facilities. Why? Wind output changes tend to be gradual and predictable, especially when wind turbines are spread over larger areas.¹² In addition, the fact that a wind farm is a collection of many smaller turbines means that the failure of one turbine will have little impact on the farm's total output. In contrast, the electricity output changes from coal and nuclear power plants, though less frequent, are larger, abrupt, and sometimes unpredictable. For these reasons, the nation's major grid operators have found that wind and solar energy can be added to the grid with very little additional backup power:

- The Midcontinent Independent System Operator (MISO), the grid operator for the middle part of the country, needs almost no additional fast-acting power reserves to back up its 10,000-plus MW of wind power on the system.¹³
- ERCOT, the grid operator for most of Texas, needs only about 50 MW on average of fast-acting stand-by reserves to reliably integrate 10,000 MW of wind into the grid.¹⁴

¹¹ M. Hogan, F. Weston, and M. Gottstein, "Power Market Operations and System Reliability in the Transition to a Low-Carbon Power System: A Contribution to the Market Design Debate," The Regulatory Assistance Project, May 2015, at 10, <http://www.raonline.org/document/download/id/7600> (accessed May 18, 2015).

¹² Michael Milligan and Brendan Kirby, "Impact of Balancing Areas Size, Obligation Sharing, and Ramping Capability on Wind Integration, Preprint" (paper, WindPower 2007 Conference & Exhibition, Los Angeles, CA, June 3-6, 2007), www.nrel.gov/docs/fy07osti/41809.pdf (accessed May 18, 2015).

¹³ Nivad Navid, "Reserve Requirement Identification with the Presence of Variable Generation" (presentation, UVIG Spring Technical Meeting, San Diego, CA, April 24-26, 2012), at 2, 4, www.variablegen.org/wp-content/uploads/2012/12/Navid-Reserve_Calculation.pdf (accessed May 18, 2015).

- A study for PJM, the grid operator for the mid-Atlantic and part of the Midwest, found that increasing renewable energy output sevenfold in PJM by adding nearly 114,000 MW of renewable energy would increase the need for fast-acting reserves by only 340 MW.¹⁵ (For comparison, PJM currently holds 3,350 MW of expensive, fast-acting reserves on a continuous basis to ensure that it can keep the lights on in case a large fossil-fuel or nuclear power plant unexpectedly breaks down.)

Ongoing wholesale market design and state resource planning decisions should determine how to maintain grid reliability in the face of many different drivers. Interfering with that process will limit flexibility and needlessly raise the costs of obtaining the same level of reliability that can be achieved with more affordable and dispatchable resources. It also will frustrate the development of wind, solar, and other zero-carbon, zero-fuel cost renewable energy resources.

Section 1208. This provision requires every regional transmission organization (RTO) with a capacity market (or equivalent) to ensure that the market includes specific reliability and performance assurance mechanisms, including mechanisms supporting baseload generation.

Like Section 1207, Section 1208 would significantly disrupt ongoing RTO and FERC actions to respond dynamically to changing system conditions over time, shoulder consumers with the burden of paying for a rigid, one-size fits-all system, and likely undermine grid reliability efforts.

Two unintended consequences of this section could reduce grid reliability. First, by hardwiring specific capacity market design requirements into the Federal Power Act, Section

¹⁴ David Maggio, “Methodology for Calculating Reserves in the ERCOT Market” (presentation, UVIG Spring Technical Conference, San Diego, CA, April 24-26, 2012), at 6, www.variablegen.org/wp-content/uploads/2012/12/Maggio-Reserve_Calculation_Methodology_Discussion.pdf (accessed May 18, 2015). Charts show the average difference between wind and no-wind reserve requirements.

¹⁵ GE Energy Management, “PJM Renewable Integration Study: Final Project Review Revision 07” (presentation, Stakeholder Meeting, March 3, 2014), at 50, 111, <http://www.pjm.com/~media/committees-groups/committees/mic/20140303/20140303-pjm-pris-final-project-review.ashx> (accessed May 18, 2015). Charts show installed capacity and a comparison of 2% “business as usual” with the Low Offshore Best Onshore reserve requirements.

1208 will severely constrain RTO flexibility to address changes in system needs over time, including transitioning capacity markets to another market construct.

Section 1208 also could cause capacity markets to constrain local, state, and national energy policy and market choices intended to promote or level the playing field for renewable energy resources. If comparatively inflexible baseload generation remains the foundation of the grid resource mix, renewable energy resources could face increasing difficulty integrating into the system.

Each RTO's capacity market also reflects its region's unique needs and attributes. FERC explained this well in 2013 when it examined RTO capacity market trends and challenges, noting the region-specific needs and the diverse issues addressed in market design:

The particular market design choices of each region have been different, with each market arriving at its specific approach through stakeholder processes and settlement agreements, evolving over time to address emerging issues. In recent years, refinements have been pursued or discussed to address the impact that broader industry changes have had on the markets, including an evolution in the mix of available resources driven by low natural gas prices, state and federal policies encouraging the entry of renewable resources and other technologies, state policies supporting the development of resources in particular areas or with particular characteristics, the retirement of aging generation resources, and the need to retain certain resources.¹⁶

Section 1208 fails to appreciate the reasons for and value of each region's market designs. For example:

California ISO and the New York ISO's market designs reflect the fact that as system operators in single states, their resource adequacy needs are closely tied to state legislative and regulatory actions. California is committed to a low-carbon, high renewable energy future with a

¹⁶ Federal Energy Regulatory Commission, "Centralized Capacity Market Design Elements: Commission Staff Report," August 23, 2013, at 2, <http://www.ferc.gov/CalendarFiles/20130826142258-Staff%20Paper.pdf> (accessed May 18, 2015) (emphasis added).

complementary need for flexible capacity resources (including the mid-merit resources discussed above, together with energy efficiency, demand response, and storage).

The California ISO does not operate a full capacity market; it recently determined that a full capacity market with the attributes in Section 1208 was unnecessary for reliability, costly for consumers, and could undercut the state's clean energy future.¹⁷ The ISO is instead implementing a flexible resource adequacy market to meet reliability needs while supporting renewable energy integration.

The New York ISO runs a one year forward capacity market, and it also has modified the market design in the last two years to respond to a changing fuel mix, performance issues, and other circumstances. New York state currently is charting a new energy supply course through its "Reforming the Energy Vision" proceedings that likely will affect the future of New York ISO capacity market design.¹⁸

ISO New England¹⁹ and PJM²⁰ operate markets in regions without state integrated resource planning requirements (because most states in those RTOs are restructured/deregulated). Both of these RTOs operate three year-forward capacity markets to ensure resource adequacy, and both

¹⁷ See FERC, Order conditionally accepting California ISO's flexible resource adequacy capacity requirements proposal, 149 FERC ¶ 61,042 (2014), http://www.caiso.com/Documents/Oct16_2014_OrderConditionallyAcceptingTariffRevisions-FRAC-MOO_ER14-2574.pdf (accessed May 18, 2015).

¹⁸ Order Adopting Regulatory Policy Framework and Implementation Plan, Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, State of New York Public Service Commission, Case 14-M-0101, February 26, 2015, <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b0B599D87-445B-4197-9815-24C27623A6A0%7d> (accessed May 18, 2015).

¹⁹ Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, and Vermont. See "Key Grid and Market Stats," ISO New England, <http://www.iso-ne.com/about/what-we-do/key-stats> (accessed May 18, 2015).

²⁰ PJM Interconnection coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. See "Who We Are," PJM Interconnection, <http://pjm.com/about-pjm/who-we-are.aspx> (accessed May 18, 2015).

RTOs already are ahead of Section 1208 in addressing capacity performance needs driven by changing circumstances.

Most recently, both regions faced capacity performance challenges during the 2014 Polar Vortex period, in part because of dysfunctional gas markets²¹ and other cold weather performance issues that hindered mostly natural gas and coal plants. Notably, wind and demand response resources performed well during this period and did not experience any major issues.²² Both of these RTOs have taken steps to reduce unplanned outages from capacity resources, and FERC either has approved or is reviewing these actions.²³

Also, ISO New England is reliant on natural gas as the primary fuel for its capacity supply resources. To respond to that concern, ISO New England proposed, and FERC approved, changes to the ISO's markets to enhance the value of dual fuel resources.²⁴

Imposing Section 1208's requirements on PJM and ISO New England would be counterproductive because each region already has demonstrated its competence to modify capacity markets to address the circumstances that appear to partially motivate Section 1208.

MISO is differently situated than ISO New England and PJM. All of the states in MISO, except Illinois and to some extent Michigan, are regulated states where utilities follow state

²¹ Comments of the Environmental Defense Fund, Conservation Law Foundation, the Sustainable FERC Project, and the Clean Energy Group, Coordination of the Scheduling Processes of Interstate Natural Gas Pipelines and Public Utilities, Dkt. No. RM14-2-000, November 28, 2014, at 1-2.

²²For example, PJM was able to avoid involuntary load curtailments during the Polar Vortex by deploying demand response. About 25% of PJM's registered DR responded voluntarily during the worst of the January 2014 polar vortex, delivering maximum hourly load reductions of 2,379 MW and 1,179 MW on January 7th and 8th respectively. See "PJM Demand Response Activity January 7-8, 2014," March 26, 2014, at 2, 3, <http://www.pjm.com/Media/markets-ops/demand-response/pjm-cold-days-report-for-january-7-8-2014.pdf> (accessed May 18, 2015).

²³ PJM Interconnection, L.L.C., Reforms to the Reliability Pricing and Related Rules in the PJM Open Access Transmission Tariff and Reliability Assurance Agreement Among Load Serving Entities, Dkt. No. ER15-623-000, December 12, 2014; ISO New England, Inc., 147 FERC ¶ 61,172 (2014).

²⁴ ISO New England, Inc., 147 FERC ¶ 61,172 (2014).

commission-approved integrated resource planning or equivalent approaches. For that reason MISO operates a “residual” capacity market to maintain reliability and serve wholesale customers not under retail/state supply agreements. Section 1208 is not necessary in this market, and would drastically increase consumer costs without providing any meaningful reliability benefits.

The Southwest Power Pool (SPP) has no capacity market, since nearly all of the generation resources in SPP either are regulated by state utility commissions or are public power or electric cooperatives. We do not read Section 1208 to apply to SPP.

In short, Section 1208 will, in those areas in which it applies, be disruptive to existing processes, unnecessarily costly, create new barriers to wind and solar energy resources, and quite possibly intrude on state jurisdictional prerogatives for determining state energy needs. As with Section 1207, it would create a one-size-fits-all approach that would limit market design evolution to meet new needs.

Conclusion

I want to again thank the Committee for inviting me to testify today on these important grid reliability and security issues. I encourage the Committee to avoid taking actions that could disrupt the progress underway to maintain and strengthen reliability in many regions, hamstring grid authorities and states, and increase consumer costs without corresponding reliability benefits. We already are well on the course to achieving a more diverse, affordable, and cleaner energy future while maintaining a robust and more reliable grid. Continued progress is imperative so that we can continue to combat climate change.

Mr. WHITFIELD. Thank you, Mr. Moore.

And our next witness is Mr. John Di Stasio, who is the president of the Large Public Power Council.

Welcome, and you are recognized for 5 minutes, Mr. Di Stasio.

STATEMENT OF JOHN DI STASIO

Mr. DI STASIO. Thank you, Chairman Whitfield, Ranking Member Rush, members of the subcommittee, and fellow panelists. Thank you for inviting me to testify today. I am honored to appear on this panel of distinguished witnesses, and appreciate the opportunity to address the important issues facing the electric sector as the country pursues key national priorities.

As was mentioned, my name is John Di Stasio. I am the president of the Large Public Power Council, also known as LPPC. Before I assumed this role earlier this year, I was the CEO of the Sacramento Municipal Utility District, a public power system located in northern California.

So LPPC is an organization of the 25 largest public power utilities, providing electricity to 30 million consumers across 13 States, many that are represented by members on this subcommittee, including Texas, North Carolina, Oklahoma, California, New York, and Florida. LPPC members are also dedicated to protecting the environment and the health and welfare of the communities we serve. About 36 percent of LPPC member-owned supply is carbon-free, including wind, solar, nuclear, and hydro, and this number is expected to grow by 10 percentage points in the next 10 years. Over the same period of time, LPPC members are also projected to purchase an additional 5,000 megawatts of carbon-free power, which will comprise 90 percent of the member supply purchases.

We are clearly in the midst of a transition to a cleaner supply mix and a more dynamic electric system. As members of the subcommittee are vitally aware, a significant aspect of this transition is the need to anticipate a myriad of changes required to meet grid modernization, environmental goals, reliability, resiliency, and physical and cybersecurity goals. The move to different base load generation, resiliency—excuse me, integration of growing intermittent resources and new technologies is technically achievable, but it does require thoughtful planning, implementation, and coordination across systems and regions. Current reliability provisions in the Federal Power Act clearly did not envision a transformation of the U.S. electric power sector, and the—while the current system is robust, it is not infinitely flexible. This transformation will not end in the next 15 years, given the need to deal with other important priorities in the future. So an appropriate, up-front reliability assurance mechanism, right sized to the risk, will serve us well in that long transition.

I have the following points in this regard. LPPC's systems are consumer-owned, so we are directly accountable to the consumers and the communities we serve. They are affected by our actions, so we seek to balance reliability, affordability, and environmental stewardship. All reliability issues can be overcome with enough time and money, but assuring reliability prospectively when major changes are under consideration will present—will prevent unnecessary delays and additional costs for consumers. After-the-fact re-

liability review mechanisms are also vital, but they are triggered by emergencies or unforeseen conditions, as opposed to preventing them in the first place. The members of LPPC are committed to reliability and resiliency, and recognize an increased responsibility in that regard. Given an increasingly digital world and a variety of new and emerging risks, we work closely with Federal Government in a variety of ways to proactively address challenges, and we are committed to do so going forward.

I also want to thank the chairman for the discussion draft released May 7. LPPC's members are reviewing the specific sections and the legislative language in detail, and will be pleased to work with the members of this subcommittee and full committee to provide more specific input as the language is further refined.

With that, again, I want to thank the chairman and members of the subcommittee for their attention, and I would be happy to address any questions that you have for me.

[The prepared statement of Mr. Di Stasio follows:]



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TESTIMONY OF

JOHN DI STASIO
PRESIDENT
LARGE PUBLIC POWER COUNCIL

Before the
SUBCOMMITTEE ON ENERGY AND POWER
COMMITTEE ON ENERGY AND COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES

on
"DISCUSSION DRAFT ADDRESSING ENERGY RELIABILITY AND SECURITY"
MAY 19, 2015

Thank you for inviting me to testify before the Subcommittee/Committee today. I am honored to appear on this panel of distinguished witnesses and appreciate the opportunity to address the important issues facing the electricity sector as the country pursues key national priorities.

My name is John Di Stasio, and I am the President of the Large Public Power Council, also known as "LPPC." Before I assumed this role earlier this year, I was the CEO of the Sacramento Municipal Utility District, which is a public power system located in Northern California.

LPPC is an organization of the twenty-five largest public utilities which provide electricity to 30 million electric consumers across thirteen states, from Washington State to Florida and Arizona to New York, as well as the island of Puerto Rico. By definition, LPPC member companies are not-for-profit entities with a (state or municipal chartered) responsibility to provide reliable, affordable electricity in their service areas.

LPPC members are also dedicated to protecting the environment and the health and welfare of the communities we serve. Currently about 36 percent of LPPC member-owned supply is carbon-free, including wind, solar, nuclear and hydro and this number is expected to grow by 10 percentage points in the next 10 years. Over that same time period, LPPC members are also projected to purchase an additional 5,000 MW of carbon-free power which will comprise 90 percent of members' supply purchases. Additionally, LPPC members have very active energy efficiency programs. Some of our members have the highest levels of end use energy efficiency in the country. We are clearly in the midst of a transition to a cleaner supply mix and a more dynamic electric system.

I commend the Subcommittee/Committee for holding this hearing and I appreciate its focus on critical issues facing the U.S. electricity industry today as we pursue this transition. Electric utilities face a confluence of challenges requiring them to balance needs that have not previously converged, both individually and as part of an interconnected grid. As the utilities work to reduce their carbon emissions or implement other key changes to their electric utility systems, they are seeking ways to do so while maintaining reliability and affordability of electricity for their consumers.

As the Members of the Subcommittee/Committee are vitally aware, a significant aspect of this transition process is the need to anticipate changes that will be required in order to meet environmental, reliability, resiliency and security goals - whether they be state

or federal in origin. As we transition to a very different supply mix, significant changes in power flows across states and regions and an enhanced focus on resiliency it is important to assess reliability prospectively and periodically as the transition progresses. The move to different base load generation and integration of growing intermittent resources is technically achievable, but requires thoughtful planning, implementation, and coordination across systems and regions. Raising the standing of reliability reviews in future federal regulatory proposals will serve to prevent or limit unnecessary risks to the bulk electric system and the unnecessary costs that come with a lack of thoughtful planning.

Current reliability provisions in the Federal Power Act clearly did not envision a transformation of the U.S. electric power sector affecting the entire supply mix and power flows across the bulk electric system. This transformation will not end in the next 15 years given the physical characteristics of the grid. It is likely to be with us for many decades to come as we seek to reduce carbon and deal with other important priorities in the future. An appropriate upfront reliability assurance mechanism will serve us well in that long transition.

Based on my thirty years' experience in the industry, I have no doubt that our electric utility industry will meet these challenges. My central message for the Subcommittee/Committee today is that as a society, we have choices as to how we manage reliability risks and other major challenges during this transitional period. We either get there smoothly, with minimal disruption, and at a reasonable cost to the

consumer through proactive upfront planning -- or we rely on after the fact corrective measures that will likely string out the time involved and unnecessarily increase the cost of getting us to the same place.

I have the following points in this regard:

- LPPC systems are consumer-owned so we are directly accountable to the consumers and communities we serve. They are affected by our actions, so we seek to balance reliability, affordability and environmental stewardship. We are committed to support the quality of life in our communities environmentally and economically.
- All reliability issues can be overcome with time and money, but assuring reliability prospectively, while major changes are under consideration, will prevent unnecessary delays and additional costs for consumers related to stranded investments and re-work after the fact. After-the-fact reliability review mechanisms are also vital, but they are triggered by emergencies or unforeseen conditions as opposed to preventing them in the first place.
- The optimal path forward is a balanced approach focused on a portfolio that enables the reliability, affordability and environmental stewardship. To assure this each element must have appropriate weight in the evaluation for the best overall solution.

- The members of LPPC are committed to reliability and resiliency and recognize an increased responsibility in that regard given a digital world and a variety of emerging risks. We work closely with the federal government in a variety of ways to address proactively these challenges and we are committed to do so going forward.

I also want to thank Chairman Upton for the discussion draft released May 7, 2015. LPPC's members are reviewing the legislative language in detail, and would be pleased to work with Members of the Subcommittee and the full Committee to provide more specific input as the language is further refined. For the moment, I would like to underscore LPPC's support for developing a "reliability assurance mechanism" that incorporates reliability considerations into the agency rulemaking processes without delaying the implementation of the new federal rules. I think the challenge is to find a way to dovetail these policy considerations so as to bring the best aspects of our environmental and electric power policies into harmony. We will be working through this transitional period for some time and now is the right time to put things on sound decisional footing.

With that, I thank the Chairman and Members of the Subcommittee/Committee for their attention, and I would be happy to address any questions you may have for me.

John DiStasio, Large Public Power Council, Summary of Major Points, Subcommittee on Energy and Power, May 19, 2015

LPPC is an organization of the twenty-five largest public utilities which provide electricity to 30 million electric consumers across thirteen states and the island of Puerto Rico. LPPC members are also dedicated to protecting the environment and the health and welfare of the communities we serve.

As the Members of the Subcommittee/Committee are vitally aware, a significant aspect of the nation's transition to a cleaner supply mix and more dynamic electric system is the need to anticipate changes that will be required in order to meet environmental, reliability, resiliency and security goals - whether they be state or federal in origin. As we transition to a different supply mix, significant changes in power flows across states and regions and an enhanced focus on resiliency it is important to assess reliability prospectively and periodically as the transition progresses. Raising the standing of reliability reviews in future federal regulatory proposals will serve to prevent or limit unnecessary risks to the bulk electric system and the unnecessary costs that come with a lack of thoughtful planning.

To that end, I would offer the following key points:

- LPPC systems are consumer-owned so we are directly accountable to the consumers and communities we serve. We seek to balance reliability, affordability and environmental stewardship. We are committed to support the quality of life in our communities environmentally and economically.
- All reliability issues can be overcome with time and money, but assuring reliability prospectively, while major changes are under consideration, will prevent unnecessary delays and additional costs for consumers related to stranded investments and re-work after the fact.
- The optimal path forward is a balanced approach focused on a portfolio that enables the reliability, affordability and environmental stewardship. To assure this each element must have appropriate weight in the evaluation for the best overall solution.
- The members of LPPC are committed to reliability and resiliency and recognize an increased responsibility in that regard given a digital world and a variety of emerging risks. We work closely with the federal government in a variety of ways to address proactively these challenges and we are committed to do so going forward.

Mr. WHITFIELD. Thank you very much, Mr. Di Stasio.

At this time, our next witness is Emily Heitman, who is vice president and General Manager for the Demand Side Organization Power Transformers at ABB, Inc., and she is testifying on behalf of the National Electrical Manufacturers Association.

So you are recognized for 5 minutes.

STATEMENT OF EMILY HEITMAN

Ms. HEITMAN. Good morning, Chairman Whitfield, Ranking Member Rush, and members of the subcommittee. My name is Emily Heitman, I am Vice President and General Manager of Commercial Operations for Power Transformers at ABB. Thank you for inviting me to speak today on behalf of ABB and the National Electrical Manufacturers Association.

I will be walking through the critical nature of large power transformers, the challenges in replacing them, industry and ABB's efforts thus far to mitigate resiliency risks, and what is lacking in those efforts.

ABB is a leading manufacturer of power and automation products, and services for utilities, industry, Government, and transportation. We are the largest supplier of electrical grid systems and large power transformers across the globe.

One of the most essential components of the electrical grid is the large power transformer, otherwise known as the LPT. LPTs either increase the voltage of electricity from generation sources for long-distance transmission, or decrease the voltage of electricity close to the end-user. The failure of a single LPT can cause a power disturbance, however, the concurrent failure of multiple LPTs could lead to a significant widespread outage. While designed to withstand operational risks, such as lightning strikes and power fluctuations, LPTs are still vulnerable to a number of threats, like extreme weather events, intentional criminal attacks, geomagnetic disturbances, and electromagnetic pulse. Furthermore, the U.S. fleet of LPTs is aging, and older units may be more vulnerable to disruption.

While most utilities do own a spare, for each large power transformer design, they are generally placed directly next to the units in use and are subject to the same risks that were just previously mentioned. Replacing a damaged LPT is especially difficult. The time to manufacture a new unit will—which requires both designs, since few LPTs are made to the same specification, and production, can take anywhere from 12 to 24 months. LPTs have unique materials and components associated with their manufacturing, and unfortunately, periodic material and component shortages can also delay their production. Once manufactured, the transportation and delivery of these large, ultra-heavy units also pose challenges. LPTs can weigh more than 400 tons. This size and weight often requires delivery by specialized train cars and trucks, of which there is limited availability in North America. In addition, with many of the existing LPTs having been in place for more than 40 years, the routes of access once available may have since been derated or even removed, leaving some substations and LPTs virtually stranded. Since a large power transformer must be disassembled to ship

and then reassembled on-site, unique knowledge, skills, and equipment are necessary to complete the final installation of an LPT.

Now, industry and Government have both been responsive to these challenges. NEMA has brought together transformer manufacturers to develop industry recommendations. NEMA is not alone. The Edison Electric Institute, the Department of Energy, NERC, FERC, and the Department of Homeland Security have all taken important steps to address grid resiliency. We support and applaud all of these efforts, but we are concerned that gaps still remain. At ABB, we are developing solutions to significantly increase transformer resiliency. These apply to both existing and new transformers. ABB's approach has 5 components: vulnerability assessment, design modifications to harden the transformer, remote monitoring and communications, rapid damage assessment and repair, and rapid deployable transformers. But it is important to recognize that the development of a rapidly deployable transformer will only reduce the time it takes to transport and energize an LPT. The manufacturing of those units still take months. Should an event occur that requires a replacement transformer, utilities would still face a long delay if there is no replacement unit in reserve.

H.R. 2244, authored by Congresswoman Renee Ellmers and Congressman Jerry McNerney, as well as the Energy and Commerce Committee's discussion draft addressing reliability and security, direct the Department of Energy to produce a plan to create a strategic transformer reserve. ABB and NEMA support this legislation. We believe the creation of a strategic transformer reserve will fill a gap in our Nation's capability to respond to the catastrophic loss of several LPTs. Having reserves of LPTs located at strategic points around the country would improve grid resiliency and complement existing industry programs. Given the complexity of the electric system, precisely how a strategic transformer reserve should be designed and operated warrants further analysis. H.R. 2244 and the committee draft direct DOE to undertake the needed review. They offer an appropriate response to a significant vulnerability to our Nation's electric grid and we urge the adoption.

ABB and NEMA would like to once again thank the committee for inviting us to testify on this important topic. Improving the security and resiliency of our energy infrastructure requires ongoing cooperation between Government and industry. ABB and NEMA are fully committed to this effort.

I look forward to answering your questions.

[The prepared statement of Ms. Heitman follows:]

**Statement of Emily Heitman
VP and GM of Commercial Operations for Medium & Large Power Transformers in
North America**

**ABB Inc.
on behalf of the
National Electrical Manufacturers Association (NEMA)**

Discussion Draft Addressing Energy Reliability and Security

**Subcommittee on Energy and Power
Committee on Energy and Commerce**

May 19, 2015

Statement of Emily Heitman
5/19/2015

Statement Summary

- Large power transformers (LPTs) are essential components of the electric grid.
- The failure of a single LPT can cause a power disturbance. However, the concurrent failure of multiple LPTs could magnify the impact and lead to a highly significant outage.
- LPTs are susceptible to risks including extreme weather, criminal or terrorist attack, geomagnetic disturbances and electromagnetic pulse attack.
- LPTs cost millions of dollars and involve production lead times ranging from 12-24 months. Periodic material and component shortages can add to production delays.
- Once manufactured, the transportation and delivery of these large, ultra-heavy units pose challenges to their replacement.
- Industry and government have taken steps to both prevent and detect damage to critical infrastructure such as LPTs, and to aid recovery in the event that damage occurs.
- The National Electrical Manufacturers Association, the Edison Electric Institute, the North American Electric Reliability Corporation, the Federal Energy Regulatory Commission, the Department of Energy, and the Department of Homeland Security have all taken important steps to improve resiliency yet gaps remain.
- Manufacturers are developing new strategies. ABB is developing a five part approach: 1) Vulnerability assessment; 2) Design modifications to “harden” the transformer; 3) Remote monitoring and communication; 4) Ability to deploy rapid damage assessment and repair teams; and 5) Design and supply of replacement transformers that can be rapidly deployed.
- ABB and NEMA support studying the need for and design of a Strategic Transformer Reserve as proposed in the discussion draft and in H.R. 2244. We believe the creation of a Strategic Transformer Reserve would fill a gap in our nation’s capability to respond to the catastrophic loss of several LPTs.
- Improving the security and resiliency of our energy infrastructure requires ongoing cooperation between government and industry.

Statement of Emily Heitman
5/19/2015

Introduction

Good morning Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee. My name is Emily Heitman and I am Vice President and General Manager of Commercial Operations for Medium and Large Power Transformers in North America for ABB.

I would like to thank you for inviting ABB, on behalf of the National Electrical Manufacturers Association (NEMA), to testify regarding the security and resiliency of America's energy infrastructure. The U.S. electric infrastructure fuels our economy. It is critical to our economic growth, global competitiveness, and quality of life. Virtually all industries are reliant upon electric power and dependent on the reliability and security of the grid.

ABB is a Fortune 500 producer of power and automation products and services for utilities, industry, government and transportation. With advanced global research and design and local manufacturing, we employ 147,000 people in over 100 countries including over 20,000 here in the United States. Our U.S. headquarters is located in Cary, North Carolina.

ABB engineers, manufactures, delivers and services the technologies that span our nation's energy infrastructure, so the topic of today's hearing is at the heart of ABB's daily collaboration with our customers.

We supply our utility customers with the technologies that make up the electric grid and our energy intensive industrial customers with a total power solution. We are the world's leading supplier of power grids.

With our motion, control, and process automation technologies, ABB enables our industrial customers—from oil and gas to food and beverage—to run their manufacturing lines and to optimize the productivity and energy use of their industrial processes.

ABB is a leading supplier of large power transformers (LPTs) across the globe, and as such our testimony focuses on the challenges and efforts underway to mitigate the risks associated with the loss of these critical elements of the grid. We enjoy a deep level of application, design and performance engineering expertise, and historically have been and continue to be on the leading edge of transformer technology and development.

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5/19/2015

My testimony today is offered on behalf of the National Electrical Manufacturers Association (NEMA) and the twelve members of the Power Transformer Committee of the NEMA Transformer Section.¹ NEMA represents nearly 400 electrical equipment and medical imaging technology manufacturers. NEMA's combined industries account for more than 400,000 American jobs and more than 7,000 facilities across the U.S. Domestic production exceeds \$117 billion per year. The industry is at the forefront on electrical safety, reliability, resilience, efficiency, and energy security.

Large Power Transformer (LPT) Criticality

The United States transmission grid consists of approximately 390,000 miles of transmission lines, including more than 200,000 miles of high-voltage lines, connecting to more than 6,000 power plants².

Large power transformers (LPTs) are essential components of the electric grid. They control the high-voltage flow of our nation's electricity. Transformers either increase the voltage of electricity from generation sources for long-distance transmission ("step-up") or decrease the voltage of electricity close to the customer for end use ("step-down").

According to the Department of Energy an LPT is defined as a transformer with maximum capacity of 100 megavolt-amperes (MVA) or more³.

The failure of a single LPT can cause a power disturbance. However, the concurrent failure of multiple LPTs could magnify the impact and lead to a highly significant outage.

LPT Risks

LPTs are located throughout the country's electric substations, usually exposed to the elements, and are at-risk from extreme weather events. We have seen devastation in the wake of Hurricanes Katrina and Sandy and other extreme weather events.

¹ ABB, CG Power Systems USA Inc., Eaton, Emerson Electric Co., GE, Kentucky Association of Electric Cooperatives Inc., MGM Transformer Company, Schneider Electric, Siemens, SPX Transformer Solutions Inc., VanTran Industries Inc., and WEG Electric Corp.

² 2013 NERC Electricity Supply & Demand Database, <http://www.nerc.com/pa/RAPA/ESD/Pages/default.aspx>

³ *Large Power Transformers and the U.S. Electric Grid*, U.S. Department of Energy, April 2014.

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Recently, LPTs have received much attention for their vulnerability to criminal or terrorist attack, such as the 2013 rifle assault on a California transmission substation. Geomagnetic disturbances (GMD) caused by solar weather, and electromagnetic pulse (EMP) attack are also of concern.

Further, the U.S. LPT fleet is aging. While LPTs are designed for a 30-year life, the average age of units in the U.S. is between 38-40 years old, with approximately 70 percent of LPTs being 25 years or older. Units approaching 70 years of age are still found in some places and older units may be more vulnerable to disruption.

LPT Challenges – Production, Transportation, & Installation

Production

LPTs cost millions of dollars and involve production lead times ranging from 12-24 months. Periodic material and component shortages can add to production delays.

Specific components to LPTs include bushings; load tap changers; specialized, and mostly imported, electrical steel; uniquely formed copper (no two transformer designs use the same copper wire); and high voltage insulation. When it comes to bushings, most are produced out of porcelain for the external insulator. These are very large and porcelain is no longer manufactured in North America – the porcelain alone can have 26-40 week lead time. Periodic disruptions in the import of electrical steel have also adversely affected production schedules.

Very few LPTs have the same design. In fact, with 70% of the LPTs installed in the U.S. being greater than 25 years old, the designs are outdated for both manufacturing and current technology. Therefore, in a replacement situation, the existing designs cannot be used and as a result the manufacturer replacing the unit must generate a brand new electrical and mechanical design. This time requirement is a minimum of 3-4 months. The electrical design alone can be hundreds of hours, and the mechanical design can take between 1,000-2,000 hours.

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Transportation

Once manufactured, the transportation and delivery of these large, ultra-heavy units pose challenges to their replacement. Depending on power requirements which dictate unit size, LPTs may weigh between 100 and 400 tons, or more. Their size and weight often require delivery by specialized train cars and trucks with exacting site access plans. These specialized train and cars and trucks have limited availability in North America. In addition, with many existing LPTs in place for 40+ years, the routes of access once available to them have since been de-rated or even removed, leaving some substations and LPTs virtually landlocked and inaccessible for replacement.

Installation

Installing a transformer is a major event. Since an LPT must be disassembled to ship and then reassembled on site, specialized knowledge, skills, and equipment are necessary to complete the final installation of an LPT. All units must be wired back to power and a control system. Therefore, the location of the electrical interconnect is critical in placing the new or replacement unit within the substation.

Matching electrical parameters from one transformer to the next is not enough. Physical parameters must also be met in order to fit the unit into its designated location. The layouts of substations are rarely alike. When setting a new transformer in place, there must be adequate room for the cooling configuration on the unit.

Finally, issues involving the structural integrity of the concrete pads supporting older transformers are also common. When pad replacement is required prior to installation of a new transformer unit, further time and complexity is added to the installation.

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A typical order cycle (barring possible delays cited earlier)

Utility specifications	1 month
Request for quote	1 month
Design	3 months
Material procurement	3 months
Manufacture	2 months
Ship	1 month
Commission	1 month
Total	12 months

LPT Hardening and Resiliency – Collaboration Between Industry & Government

Industry and government have taken steps to both prevent and detect damage to critical infrastructure such as LPTs (hardening), and to aid recovery in the event that damage occurs (resiliency). The National Electrical Manufacturers Association (NEMA) has brought together transformer manufacturers to develop joint industry recommendations for how to reduce the time it takes to replace compromised transformers, including submitting recommendations for the Quadrennial Energy Review, participating in industry information-sharing forums, and developing standards to make these critical transformers more resilient to physical attack, natural disasters, and geomagnetically induced currents.

To respond to the request for input on the Quadrennial Energy Review, NEMA convened a working group of transformer manufacturers to develop recommendations for how to best respond in the wake of a transformer failure. NEMA suggested studying the need for a regional reserve program for critical grid equipment, including LPTs. This recommendation was included in the QER as well as in proposed legislation being considered by this Committee.

In March, the U.S. Department of Energy and Natural Resources Canada convened a full-day discussion about the impacts of geomagnetically induced currents on large power transformers. Many NEMA members participated and spoke at length about the efforts they are taking to

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harden their equipment so that they can withstand these low-probability, high-impact events should they occur.

NEMA members are also actively involved in industry efforts to develop standards and best practices for hardening transformers, including an effort at the Institute of Electrical and Electronics Engineers (IEEE) to study the impacts of geomagnetically induced currents that, if large enough, could lead to voltage instability and potentially even blackouts.

Manufacturers are producing hardened LPTs and critical components such as dry bushings as well as fully enclosed substations. Anti-ballistic protection is also an option.

On the resiliency side, smart grid technologies can mitigate the impact of a disabled LPT on its surrounding grid. It is important to note that there has been a significant investment in large power transformer production capacity in the U.S. in recent years to help satisfy domestic demand.

The Edison Electric Institute (EEI) runs the Spare Transformer Equipment Program (STEP), a voluntary program whereby participating utilities are bound by contract to share their spare transformers with any other participating utility that suffers a "Triggering Event." A Triggering Event is defined as an act of terrorism that destroys or disables one or more substations and results in the declared state of emergency by the President of the United States.

Due to the diversity of voltages and impedances on the U.S. electric grid, the program's usefulness relies on the match between the spares available and the system that experiences a failure.

The North American Electric Reliability Corporation's (NERC) Spare Equipment Database is a voluntary and confidential information sharing resource to connect those with an immediate technology need (due to a high-impact, low-frequency event) with potential suppliers of spare equipment.

We support and applaud both programs as important additions to grid resilience.

In November 2014, Federal Energy Regulatory Commission (FERC) through Order 802 approved a physical security reliability standard (CIP-014-1) for critical transmission assets which requires owners and operators to identify their critical assets, evaluate physical security

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threats to and vulnerabilities of these assets, and develop and implement security plans. In June 2014, FERC through Order 797 approved a reliability standard (EOP-010-1) governing how owners and operators respond to geomagnetic disturbances. Both orders further add to grid security.

The U.S. Department of Homeland Security (DHS) Science and Technology Directorate has also added its resources to improving grid security. Working with the Department of Energy, DHS supported the development of a prototype recovery transformer which is lighter, smaller, easier to transport, quicker to install, and compatible with a greater variety of electric systems than a conventional LPT. I will address this in greater detail later in my testimony.

The steps that have been taken by these many stakeholders are valuable, but without a comprehensive strategy, we are concerned that gaps remain. That concern is reflected in recent US Department of Energy (DOE) research and reports including the April 2014 update to its Large Power Transformers and the U.S. Electric Grid report. Further, the recently released Quadrennial Energy Review recommends the creation of a large power transformer reserve program.

LPT Technology and Service Advancements

At ABB we are addressing our utility customers' concerns about the vulnerability of LPT. ABB is in the final stages of developing solutions for our customers to significantly increase transformer resilience and enhance the reliability of the electric power supply. These solutions consider both existing transformers and the design and supply of new transformers.

ABB's approach to increased transformer reliability is five-fold:

- Vulnerability assessment
- Design modifications to "harden" the transformer
- Remote monitoring and communication
- Ability to deploy rapid damage assessment and repair teams
- Design and supply of replacement transformers that can be rapidly deployed

ABB's approach is to provide a menu of products and services that contribute to enhance transformer reliability.

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Vulnerability assessment

With the world's largest installed base, ABB has a comprehensive experience and technical understanding of transformer design. This includes understanding the vulnerability of transformers to various threats, both manmade and natural. We offer assessments of transformer health and vulnerabilities to enable remediation before disaster strikes.

Design modifications to "harden" the transformer

Traditional transformers are designed to optimize power flow on the grid while maintaining optimal reliability. ABB has developed and continues to develop unique design and manufacturing techniques that make the transformer less susceptible to physical damage.

Remote monitoring and communication

Advances made in both sensing diagnostics and communication provide a new automated system that trends normal operating parameters, detects sudden changes, and communicates automatically to remote devices. The use of intelligent devices to monitor and report anomalies on transformer critical characteristics through secure networks has the promise of identifying problems and minimizing transformer damage, significantly speeding up the recovery process.

Ability to deploy rapid repair teams

ABB in North America offers rapid transformer repair. With years of experience supporting customers through natural disasters such as hurricanes, tornadoes, floods and earthquakes, we maintain regional offices with teams who work closely with our customers to develop in advance individualized response and implementation (contingency) plans. A recent notable example in this regard was the support of utilities during Hurricane Sandy. In the case of terrorist activities, ABB would work with the local authorities and would be interested in training our personnel to be certified as first responders to reduce the delay in the assessment and repair effort.

Design and supply of replacement transformers that can rapidly be deployed

The key to quickly restoring service is efficient logistics to deploy and energize a replacement transformer. Unless a damaged LPT is repairable or a matching unit is available on or near-site, the replacement transformer must be small enough to be quickly transported by truck on typical

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Interstate highways instead of rail, and must be universal enough to provide near plug-and-play interoperability.

The Rapid Recovery transformer we designed and built in partnership with the U.S. Department of Homeland Security, the Electric Power Research Institute and CenterPoint is a case in point. Our modular single phase transformer has engineered designs and materials to improve interoperability with the majority of LPTs on the North American grid, and a reduced size and weight that permit rapid deployment and energization.

As part of the DHS rapid recovery transformers demonstration program, three single-phase transformers and the modular components to support them were shipped from our St. Louis factory to Houston, TX and installed and energized in just over 5 days. Because key transformer interfaces were engineered to maximize interoperability, the recovery transformer can provide temporary replacement for many traditional, custom-designed transformers, allowing restoration of power much more quickly.

Note that because the recovery transformer's plug and play design supports interoperability over the custom design needed to optimize transformer efficiency, these units are generally considered interim power solutions pending the availability of a permanent, customized replacement unit.

We believe the rapid recovery design concept is an important advance in our ability to restore power to the grid. These replacement transformers can also be designed with the hardening technology which is currently under development.

Strategic Transformer Reserve

H.R. 2244, authored by Congresswoman Renee Ellmers (R-NC) and Congressman Jerry McNerney (D-CA), as well as the Energy and Commerce Committee's discussion draft addressing reliability and security, direct the Department of Energy to produce a plan to create a Strategic Transformer Reserve.

ABB and NEMA support this legislation as we believe the creation of a Strategic Transformer Reserve would fill a gap in our nation's capability to respond to the catastrophic loss of several LPTs.

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It is important to recognize that even the new generally interoperable and rapidly deployable transformer only reduces the time it takes to transport and energize an LPT. The manufacture of those units still takes months. Should an event occur that requires a replacement transformer, if a replacement unit is not already built, utilities would still face a long delay.

Having appropriate reserves of LPTs, located at strategic points around the country, would fill this challenging gap and complement existing industry programs.

Given the complexities of the electric system--its sheer size, the large number of owners and operators, uneven technical specifications, varying business models, a multitude of regulatory bodies--precisely how such a strategic transformer reserve should be designed and operated is a topic that warrants detailed analysis and close consideration. H.R. 2244 and the committee draft direct DOE to undertake the needed review. They offer an appropriate and measured response to the greatest vulnerability to our nation's electric grid and we urge their adoption.

Conclusion

ABB and NEMA would like to once again thank the Committee for inviting us to testify on this important topic. Improving the security and resiliency of our energy infrastructure requires ongoing cooperation between government and industry. The LPT issue is one further example of the need to continue our work together. ABB and NEMA are committed to fully engaging in that process and look forward to helping this committee, government regulators, and our utility meet the challenges ahead.

I look forward to answering your questions.

Mr. WHITFIELD. Thanks very much, Ms. Heitman.

And then our next witness is Mr. Elgie—is it Hol-steen or Holstine?

Mr. HOLSTEIN. Hol-steen, thank you.

Mr. WHITFIELD. Hol-steen. Mr. Elgie Holstein, who is the Senior Director for Strategic Planning at the Environmental Defense Fund.

We are delighted you are with us today, and you are recognized for 5 minutes.

STATEMENT OF ELGIE HOLSTEIN

Mr. HOLSTEIN. Mr. Chairman, thank you—and members of the subcommittee, thank you for this opportunity to share our thoughts about the draft bill before you today.

Achieving environmental reliability and other goals of grid modernization will be hindered by any measures that straightjacket rather than enhance the grid's increasing agility. That is the risk represented by Section 1202 of the draft, which requires the preparation by FERC and NERC of an independent regulatory analysis for any major proposed environmental rule. Simply stated, this appears to be an overreaction to fears about the rapid changes underway in the electric utility industry, and perhaps to EPA's proposed Clean Power Plan. Those fears are groundless and do not reflect processes in place to assure reliability.

Consider the fact that from 2011 through the end of this year, some 36 gigawatts of base load power will have been retired with no discernable adverse impact on reliability. At the same time, new power plants, more renewable capacity, transmission upgrades, and numerous demand side energy resources will be added to the diversity and reliability of the grid.

This remarkable ability by the electricity sector to adjust to changing market conditions and regulatory expectations demonstrates a fundamental point; that the industry, working together with FERC, State utility regulatory commissions, regional transmission organizations, and independent system operators can meet the Nation's need for reliability.

In a May 15 letter to EPA, the FERC commissioners summarized their role in assuring reliability. They said in part the following, reliability also depends on factors beyond the commission's jurisdiction, such as State authority over local distribution and integrated resource planning. The commission is not seeking to alter this balance.

The commissioners' letter is a reminder that planning for and delivering grid reliability, including the consideration of potential impacts from proposed new environmental rules, is secured through the interaction of multiple parties over time, including those at the regional and State level, and those actively engaged in markets. The problem with Section 1202 is that it upsets this balance of interest by elevating the role of FERC and NERC in major environmental rulemakings. As the FERC commissioners make clear in their letter, a thorough assessment of the impacts of, for example, the proposed Clean Power Plan, requires the ongoing input of diverse perspectives and expertise.

We have a similar concern with elevating the role of NERC in Federal agencies' environmental rulemaking. The fact is that NERC has been overly cautious and consistently pessimistic, also consistently wrong, about the ability of industry and regulators to adjust to changing conditions, including environmental rulemakings. Now, NERC does play an important role by giving voice to a conservative, worst-case outlook as part of a mix of organizations with unique perspectives and responsibilities for reliability, but its views should be considered along with other voices, not granted an elevated role in the environmental rulemaking process. Perhaps a stronger case could be made for Section 1202 if environmental agencies were failing adequately to consider the reliability impacts of their rulemakings, but there is no evidence of that.

I would like to turn now to a brief discussion of the other sections of the draft bill. Section 1201 includes what amounts to an opt-out for parties found to be in violation of any Federal, State, or local environmental law or regulation while operating under an emergency order. Again, there seems to be little, if any, need for such provisions. The Department of Energy has issued fewer than 10 must-run orders, and only once has such an order resulted in a claimed conflict with environmental requirements. That was mentioned earlier today by one of the members of the subcommittee, who noted the Miron Plant, which was the company involved here, but it was later found that the plant had not taken prudent actions that it could have taken to operate in a manner that was in compliance with both DOE's order and EPA's requirements.

Potential hazard inherent in Section 1201 is that it will provide a perverse incentive for utilities to slow their compliance activities. Sections 1204, 1205, and 1206 establish some potentially worthwhile approaches to addressing critical electricity, infrastructure emergencies, and the loss of critically damaged large power transformers, as well as the need to identify cybersecure technologies. Again, we think these provisions are well worth serious consideration by the committee.

Section 1207 usefully directs State commissions to consider requiring electric utilities within their jurisdictions to develop plans to increase the utilization of resiliency-related technologies. Unfortunately, Section 1207 then veers off course. By restricting its focus to base load generation, and listing reliability attributes, the section marginalizes the rapidly grown role of renewable generation, storage, and demand side resources.

And finally, as in Section 1207, the capacity market criteria in Section 1208 create the same bias in favor of traditional base load generation, and against a broader portfolio of resources that are increasingly important to capacity markets and, therefore, to reliability.

Environmental Defense Fund believes that there are some worthwhile elements to the draft, especially regarding planning for emergencies and for physical and cyberattacks on the grid. We look forward to working with you, Mr. Chairman, and members of the subcommittee.

[The prepared statement of Mr. Holstein follows:]

Testimony of Elgie Holstein
Sr. Director for Strategic Planning, Environmental Defense Fund
Before the Energy and Power Subcommittee of the
House Committee on Energy and Commerce
May 19, 2015

Mr. Chairman, members of the subcommittee, the draft bill before you today touches on a number of issues of current concern, including reliability, resilience, security, and the role of renewable energy and demand-side resources in the nation's electricity grid. These are important issues, and they deserve careful, bi-partisan consideration. Accordingly, we appreciate this opportunity to share our thoughts about the draft bill.

The issues you are reviewing today arise against a background of sweeping change in the nation's electricity markets. For example, the retirement of a number of old, (principally coal-fired) generating units; the accelerating pace of new renewable energy generation (the fastest-growing segment of new capacity); the substitution of low-cost and suddenly bountiful supplies of natural gas for coal in electricity generation; and of course the burgeoning emergence of new technologies and capital investment that are enabling electricity storage, micro-grids, efficiency, demand response, and distributed energy resources – all of these are driving enormous change in the nation's electricity system. Most of those changes, it should be emphasized, are being driven by market forces.

At the same time, there are some troubling new challenges confronting the nation's electricity grid, including most notably those from cyber- and physical attacks. Congressional attention to ensure that the system remains secure in the face of these disturbing new threats, and that it embodies maximum resilience in minimizing and recovering from them, is certainly welcome.

The goals of any legislation affecting the electric utility sector should be greater grid security, resilience, reliability, and environmental and customer benefits. All of those goals can be achieved -- provided we encourage further innovation and investment in the grid -- without sacrificing environmental standards.

There is no disagreement that reliability must continue to be an indispensable goal of grid management, but it would be wrong to assume – and to suggest in legislation – that progress on environmental goals cannot be balanced with the need for a reliable grid.

One of the most effective ways to achieve that balance is to build flexibility and diversity into the grid. Conversely, achieving environmental, reliability, and the other goals will be hindered by any measures that straitjacket rather than enhance the grid's increasing agility.

That is the risk represented by section 1202 of the draft requiring the preparation by FERC and NERC of an "independent regulatory analysis" for any proposed rule that "may impact" an electric utility generating unit or units, and the provision of an assessment of electric reliability and resource adequacy as part of the final rule.

Simply stated, this appears to be an over-reaction to fears about the rapid changes underway in the electric utility industry, and to pending new obligations under EPA's Clean Power Plan.

Those fears are groundless.

As EPA Administrator McCarthy has noted, "in the 40-year history of the Clean Air Act, EPA rules have never caused the lights to go out."

Consider that from 2011 through the end of this year, some 36.1 gigawatts of baseload power have been retired, with no discernible adverse impact on reliability. At the same time, new power plants, more renewable capacity, transmission upgrades, and numerous demand-side energy resources have added to the diversity and reliability of the grid.

Meanwhile, over the past five years, more than 2,300 circuit miles of new transmission addition were constructed annually. And the Federal Energy Regulatory Commission (FERC) is predicting a "high probability" of nearly 10,000 circuit miles of new transmission by January 2017.

This remarkable adjustment by the electricity sector to changing market conditions and regulatory expectations demonstrates a fundamental point: that the industry – working together with state commissions, regional transmission organizations and independent system operators – can meet the nation's need for reliability.

Moreover, the role contemplated for FERC appears inconsistent with the way FERC sees its job. In a May 15, 2015 letter from all the commissioners to EPA, the commissioners summarize their role in assuring reliability:

...[I]t is important to note that the Commission's role on reliability is defined by Congress, and generally consists of approving proposed reliability standards for the Bulk Power System, if they meet the statutory criteria, and then enforcing or overseeing enforcement of those standards... But reliability also depends on factors beyond the Commission's jurisdiction, such as state authority over local distribution and integrated resource planning.... The Commission also lacks specific statutory authority to require a public utility to build a new power plant or new transmission line. *The Commission is not seeking to alter this balance...*" [emphasis added]

The commissioners' letter is a reminder that planning for and delivering grid reliability – including the consideration of potential impacts from proposed new environmental rules -- is secured through the interaction of multiple parties, including those at the regional and state level and those actively engaged in markets.

In section 1202, the bill upsets this balance of interests by elevating the role of the Federal Energy Regulatory Commission and the North American Energy Reliability

Corporation (NERC) in major environmental rulemaking. For environmental rulemaking agencies, such as the Environmental Protection Agency (EPA), it is critically important to receive the input of multiple stakeholders about grid reliability. As the FERC commissioners make clear in their letter, a thorough assessment of the impacts of, for example, EPA's proposed Clean Power Plan, requires the input of diverse perspectives and expertise.

We have a similar concern with elevating the role of NERC in federal agencies' environmental rulemaking – an enhanced role for which it is not well-suited.

The fact is that NERC has been overly pessimistic about the ability of industry and regulators to adjust to changing conditions, including environmental rulemakings. For example --

- In 2011, NERC issued its Long-Term Reliability Assessment, which looked at the Mercury and Air Toxics Standards, the Cross State Air Pollution Rule, the Clean Water Act Cooling Water Intake Structures rule, and the Coal Combustion Residuals rule. NERC raised numerous reliability concerns about these protections, which the EPA noted at the time were flawed and exaggerated. None of NERC's concerns have manifested during implementation of these standards.

- In a 2011 companion study, NERC issued its Potential Impacts of Future Environmental Regulations about the Mercury and Air Toxics Standards (MATS) and a number of other regulations. NERC again raised reliability concerns, none of which have occurred in practice.

- In 2000, NERC drafted a review of EPA's nitrogen oxide emissions standards for eastern power plants, known as the NOx SIP Call. Yet again, NERC predicted a number of reliability concerns that did not occur after the rule was implemented.

None of this is to say that NERC is always wrong or that its views should be ignored. To the contrary, NERC plays an important role by giving voice to a conservative, "worst-case" outlook as part of a mix of organizations with unique perspectives and responsibilities on reliability. But its views should be balanced with those of others, not elevated in the rulemaking process.

Perhaps a stronger case could be made for section 1202 if environmental agencies were failing adequately to consider the reliability impacts of their rulemakings, but there is no evidence of that.

For example, in its Mercury and Air Toxics (MATS) rule, which went into effect last month, EPA offered plant operators an opportunity to request an additional year to comply. In fact, the agency offered another year beyond that in situations in which reliability might be adversely affected.

That is precisely the kind of flexibility the FERC commissioners endorsed in their May 15th letter to EPA regarding the Clean Power Plan. It supports environmental

rulemaking in ways that allow industry and regulators time to meet their responsibilities to customers and to the grid. Of course, the Clean Power Plan is vastly more flexible than MATS, with a number of built-in reliability safety valves, and thus specific solutions will likely differ under EPA's final rule.

I would like to turn now to a brief discussion of the other sections of the draft bill.

Section 1201 includes what amounts to an "opt-out" for parties found to be in violation of any federal state, or local environmental law or regulation while operating under an emergency order. Again, there seems to be little, if any, need for such provisions.

DOE has issued fewer than 10 must-run orders and only once has such an order resulted in a claimed conflict with environmental requirements. That instance resulted in a fine for the company -- Mirant -- after the Virginia Department of Environmental Quality found that the plant in question could have operated in a manner that was in compliance with both DOE's order and EPA's requirements.

That example illustrates a potential hazard inherent in Section 1201, namely that it will provide a perverse incentive for utilities to slow their compliance activities, hoping or planning to seek protection via the hold-harmless opportunities the bill would provide.

Sections 1204, 1205 and 1206 establish some potentially worthwhile approaches to addressing critical electric infrastructure emergencies and the loss of critically damaged large power transformers, as well as the need to identify "cyber-secure" technologies.

Section 1207 usefully directs state commissions to consider requiring electric utilities to with their jurisdictions to develop plans to "increase the utilization of resiliency-related technologies. The section provides explicit recognition of the role of advanced grid technologies, distributed resources, and back-up resiliency components and technologies.

It also calls on state commissions to consider authorizing cost recovery for the expanded use of advanced energy analytics technology -- including, laudably, for customer engagement programs "and other benefits to ratepayers."

Unfortunately, Section 1207 then veers off course. It requires state commissions to consider the adoption or modification of policies "to ensure that each such electric utility incorporates sufficient baseload generation into its integrated resource plan to assure the reliable availability of electric energy over a 10-year planning period."

The section goes on to provide potentially damaging guidance and criteria as to how such policies should be designed.

By putting an emphasis on baseload generation, and listing "reliability attributes," the section marginalizes the rapidly growing role of renewable generation, storage, and demand-side resources. For example, it calls for "fuel certainty" "without risk of interruption, and for the possession of "adequate fuel onsite," generation during

emergencies and severe weather, as well as “essential reliability services -- all for at least 30 days.

It is hard to imagine any baseload generating asset that cannot, at one time or another, be rendered unable to produce electricity, even if it meets a number of these criteria.

If the goal of the section is to prod state commissions into doing better planning for emergencies and for severe weather, why not include in such planning activities all potential generating assets, as well as renewable energy infrastructure and demand-side measures? Why distort the state plans in favor of an increasingly outdated and narrow view of the resources that are ever-more available on the grid? This section can be beneficial if it is changed to reflect a broader view of the tools that emergency planners at the state level can bring to bear.

Section 1208 makes a similar mistake. It directs FERC to direct every RTO and ISO that operates a capacity (or similar) market to demonstrate and certify that their markets meet specific structural criteria. Those criteria echo some of the same themes as those in Section 1207.

One especially troubling provision in Section 1208 is the capacity market design feature linking several criteria (such as on-site fuel, multiple fuel sources, etc.) to a burdensome reliability requirement: that generation must be available “on a continuous basis for an extended period of time for each day over a period of not less than 30 days.” Such a requirement is likely to discourage competition and innovation, while putting ratepayers at risk of higher costs.

As in Section 1207, these criteria suffer from the same bias in favor of traditional baseload generation and against a broader set of resources that are increasingly important to capacity markets – and therefore to reliability. Capacity markets should be agile, diverse, and increasingly innovative. Requiring the application of market design criteria that effectively discourage the inclusion of such characteristics in capacity markets is counterproductive to reliability and likely to add more cost to their operations.

Again, Environmental Defense Fund believes that there are some worthwhile elements to this draft, especially regarding planning for emergencies and for physical and cyber-attacks on the grid.

We also believe that modifying the draft to remove the unneeded and counterproductive role defined for FERC and NERC in Section 1202 would be a major improvement as well. Similarly, we urge modifications to Sections 1201 and 1208 to address the concerns identified above. Lastly, we would urge the subcommittee to think about state planning in ways that embrace all the resources that can support reliability, not just those associated with traditional baseload assets and approaches.

Thank you again for this opportunity to appear before you today to discuss these important issues.

Mr. WHITFIELD. Thank you, Mr. Holstein.

And thank all of you very much for your patience and staying here with us today. We appreciate your testimony.

You know, these hearings are so enlightening because it is always good to hear divergent views on these key issues. And we have heard the broad spectrum of views on this discussion draft, and it is quite obvious to everyone that the very key to this is base load electricity. And some people want to move away from that, some people want to protect it.

But the question that I would ask is—I will ask you, Mr. Fanning and Mr. Dominguez, to comment on it. Why is—well, let me back up a minute. We have heard a lot of discussion about there is really should not be a concern about reliability, and maybe we could agree with that, but I would also point out at this time renewables minus hydro is producing only 6 percent of the electricity in the country. So the fact that there hasn't been a reliability problem to this point is encouraging, but with the mad rush for more renewables, I don't think that we can emphatically say that there won't be a reliability problem in the future. But why is base load electricity still important, Mr. Fanning?

Mr. FANNING. Yes, thank you, Chairman. As I mentioned before, as CEO of a major company representing 4½ million customers, and let's remember, of the families we are privileged to serve in my area of the United States, fully 46 percent of those families make less than \$40,000 a year. And they are making tough kitchen table economic decisions every day. And while there are awfully laudable outcomes from efforts to improve our air and water and other things, I must be accountable to those families by providing a balance of clean, safe, reliable, and affordable energy. We can't let any one of those attributes essentially subvert the other. And when I think about the value of base load electricity, it provides us an avenue to essentially play offense against all the economic and other challenges this great Nation faces right now. And I think when we are able to provide for a sure supply of electricity at reasonable prices that will not be volatile, remember, when we think about in finance or in business—

Mr. WHITFIELD. Is that one of the definitions of base load; not volatile?

Mr. FANNING. Yes, generally. When you think about nuclear and coal and some others, it is—biomass, for example, they have a much more reliable stream of energy profile over time, as compared to the high volatility of natural gas and the intermittency of renewables. So it is really important to balance clean, safe, reliable, affordable.

Mr. WHITFIELD. And one of the things that you point out in your testimony, Mr. Dominguez, that on January 7, 2014, you went through a litany of outages—forced outages. Is that what you were referring to on base load—the importance of base load?

Mr. DOMINGUEZ. Yes. I think we get caught up in the use of the word base load. Let's substitute the word base load for generation that has 3 attributes. It doesn't depend on the weather to work. That would be one criterion in the definition. The second criterion is it has on-site fuel. For a period of time, we don't have to worry about an interstate system to bring fuel to it for its just-in-time op-

eration. And the third attribute I would say is it provides fuel diversity. Most technologies provide fuel diversity and are important, but the 2 things that base load, the way we have defined it, does is it provides certainty that it is going to be here on August 7 of this year, January 7 of next year, regardless of the weather condition, regardless of whether it is snow or wind or whatever. And it doesn't depend on external sources for fuel. For example, for nuclear, we have 24 months of fuel loaded in the core. That lets the grid operators sleep easy that no fuel interruption—

Mr. WHITFIELD. Um-hum.

Mr. DOMINGUEZ [continuing]. Is going to cause an outage.

Mr. WHITFIELD. Well, was it the consensus among professionals in the electric generating business that, in the latest polar vortex, that without the base load, as you described it, that we would not have been able to meet our obligations?

Mr. DOMINGUEZ. Unquestionably true. And I can tell you in polar vortex 1 and 2, we saved our customers over \$125 million by being able to shift fuels from one to another. So the diversity—the value of the portfolio is enormous.

Mr. WHITFIELD. OK. My time is already running out, but I read all of your testimony. I didn't—there was a couple of them that came in late last night, I didn't get to finish reading those, but I read yours, Mr. Moore, and, Mr. Fanning, I know you also addressed Order 1,000, and we would like to continue some discussions about Order 1,000 and some of the issues that that provides as well.

So at this time, I would like to recognize the gentleman from Illinois, Mr. Rush, for 5 minutes.

Mr. RUSH. Thank you, Mr. Chairman.

Mr. Dominguez, I want to thank you for your testimony today, and especially your comments regarding the nuclear fleet's contribution as carbon-free base load power.

My State of Illinois is—almost $\frac{1}{2}$ of the State's electricity comes from nuclear power. And Exelon recently said that it may have to prematurely retire up to 3 nuclear power plants in the State of Illinois. And maybe you could take a moment or so to explain or to share with me the effects that—to the ratepayers in my State if this would happen, and if you could also speak to the environmental impact that closing these plants would have on my State.

Mr. DOMINGUEZ. Sure. Well, I don't think we need to look further than the State reports themselves. In 2014, the Illinois House asked State agencies to consider the economic environmental reliability and cost impacts of losing 3 of the State's 11 nuclear facilities. The conclusions were that, from an economic standpoint, we would lose approximately \$1.8 billion in economic activity associated with the employees at the plant, and other economic effects.

The Illinois Commerce Commission commissioned PJM and MISO and also other independent experts to analyze the cost of power increases associated with losing the plants in a supply and demand market. They concluded that the cost on an annual basis would be something like \$500 million to \$1.2 billion a year.

And then lastly, the Illinois EPA was tasked with asking the question about compliance with upcoming rules around carbon that EPA is working on 111(d). And conclusion was that without the

plants, the cost of compliance to Illinois customers could be \$18 billion higher over a 10-year period.

So in sum total, they concluded that the cost was about \$3 billion a year in terms of customer and economic impacts associated with the loss of the plants. When you think about these assets, and there is—I heard some questions this morning about assets that are 25 years old, some of these plants are 25 years old, but that doesn't tell the story. They are designed to run for 60 years. They are designed to run up to 80 years, we believe. So simply pointing out that something is old doesn't provide any information if you don't have context around the design life. And the point I am making, Representative Rush, is that these impacts will be felt each year of that remaining design life where the assets are no longer available, because once they are shut down, they don't get turned back on.

Mr. RUSH. I want to thank—

Mr. DOMINGUEZ. And we are looking at tens of billions of dollars.

Mr. RUSH. Yes, I am running out of time here.

Mr. Moore, Mr. Holstein, from your experiences, in the more than 40 years that EPA has been implementing the Clean Air Act, has compliance with air pollution standards ever resulted in reliability problems?

Mr. MOORE. The answer is no, Mr. Rush. The answer is no, it has not. The EPA regulations have worked in coordination with grid operators, reliability authorities, States and others. Order 1,000, as you mentioned earlier, really worth a lot more discussion probably than we have time here for today, but that order really helps create new forums and processes for States and FERC and FERC jurisdictional regions to work together, and help resolve some of those thorny jurisdictional issues. So that is helping now.

Mr. RUSH. Mr. Holstein, do you agree with the approach taken in Section 1202 that makes it unclear if FERC has the legal authority to delay or block EPA rules if the commission was not able to complete its reliability analysis by the deadlines mandated in this draft?

Mr. HOLSTEIN. Mr. Rush, as I stated in my testimony, I have many reservations about Section 1202 mostly because, even though it is clearly intended to help ensure reliability, I believe it actually does the reverse because it elevates the views of parties, specifically FERC and NERC, who admittedly have an important—very important role in the reliability—maintenance of reliability. But they don't have the only role, and as they indicated in their letter to EPA, they stress themselves that a balance must be struck in considering—in providing input to rulemaking agencies such as EPA, and that balance means let's involve actual market participants and the regulators that they work with at the State level. And I think it would be a shame if we elevated FERC and NERC's role to the detriment of the other entities that play such an important role in reliability.

Mr. RUSH. Thank you both.

I yield back, Mr. Chairman.

Mr. WHITFIELD. The Chair recognizes Mr. Olson of Texas for 5 minutes.

Mr. OLSON. I thank the Chair.

In using a term from college basketball, welcome to the elite eight, all of you.

My first question is for our friends at ABB, Ms. Heitman. I appreciate your support for this bill's strategic transformer reserve. I agree this is worth considering. One question I had for you though is on hardening new transformers. You mention in your testimony, and I don't want you to say anything that can be used against those trade secrets, but I would like to ask about that. What are some things that the next generation of large transformers should be defended against? EMPs, cyberattacks, men with rifles like California, what keeps you up at night, Ms. Heitman?

Ms. HEITMAN. Thank you, Congressman Olson.

We are absolutely committed to developing technology to respond to the resiliency concerns on all four counts that I mentioned; the criminal attacks, extreme weather, GMD, EMP. Some of the things that we are doing that I can share with you today, we are in the final stages of development of a ballistic protection for the transformer itself, as well as shielding and fortifying the critical components and valves of the transformer. We have technology available today for dry bushings. Why dry bushings are so important today, the majority of transformers installed have oil-filled bushings. In a failure mode of any type, which could occur from any of the mentioned threats, an oil-filled bushing actually drops down into the tank and can cause a failure of the transformer itself. Dry bushings on the other hand, we have many videos that you can shoot at a—at the dry bushings, no failure occurs at all, and most importantly, it does not drop down into the tank.

And finally, with remote cooling, we have this technology available to be able to place the cooling at a—in a remote location away from the transformer, and potentially in a secure location.

Mr. OLSON. And these are all cost-effective steps, correct? They will be supported by the economy, they are not overburdensome, is that fair to assume?

Ms. HEITMAN. The dry bushings have already been adopted by many utilities—

Mr. OLSON. Yes.

Ms. HEITMAN [continuing]. And remote cooling was actually adopted by CenterPoint in the recent example of the recovery transformer shipped.

Mr. OLSON. There we go, the market speaks.

Mr. Fanning, for you, I appreciate your testimony and the conversation about information-sharing. It sounds like the ESCC is doing a good job, and I would like to delve into where we are in keeping an open line of communication between industry and Government. What kind of information is being shared today from company to company, and between companies and Government?

Mr. FANNING. Yes, thank you very much for that question. In fact, there was a report given to the administration, the President, from the National Infrastructure Advisory Council that called out the ESCC as kind of the benchmark for all other coordinating councils to follow. I think there are a number of different reasons why that is, including CEO participation and the fact that in the electricity industry, our genetic material is all about reliability and

keeping the lights on, and that really drives the United States' economy.

With respect to the threats, we have put in place standard technologies, software, and information-sharing regimes across our companies, and run them through—you had Gerry Cauley on earlier, this ES-ISAC, where we have now processes in place to assess before the problems occur and take action. And so that has been critically important. Aligning ourselves has been a great step forward. The next challenge will be aligning our other interdependent organizations, including telecom, transportation, water, and the financial systems. It is an enormous effort and it is something we are working on right now.

Mr. OLSON. A lot of work for this committee, obviously.

Mr. Dominguez, care to comment on that, sir? I am sorry, the EEO—what is the acronym here? ESCC.

Mr. DOMINGUEZ. We also are participating. I think Tom framed it exactly right, I think there is a lot of good work going on and we welcome the conversation going forward.

Mr. OLSON. We are out of time. The final fun question. I talked about basketball, the elite eight, to open this line of questioning. Ms. Heitman, you are from Houston, Texas; Clutch City, USA. Who will win the basketball tonight out there in Oakland, the Houston Rockets or the Golden State Warriors?

Ms. HEITMAN. I think ABB has no response on that.

Mr. OLSON. Yield back.

Mr. WHITFIELD. I also want to thank Mr. Olson for raising the issue of dry bushings.

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

Mr. MCNERNEY. Well, I have a projected answer for Mr. Olson's question. I think the Warriors are going to do pretty good tonight. So, you know, actually—

Mr. OLSON. Fear the bear.

Mr. MCNERNEY. All the testimony was really good. I would love to ask every single one of you specific questions, so thank you for coming out and talking.

I have repeatedly asked my republican colleagues to embrace carbon sequestration because climate change is coming, it is here, and we need to start doing things about it. If we don't, some of the coal-generating facilities are going to be seeing more problems.

Mr. Fanning, you have a project going at Kemper. Could you just give us a rundown on where you are on that?

Mr. KEMPER. Yes. Real quickly, you know, people do a lot of rhetoric. There is one company in America doing all the above, and it is Southern Company. Leading the United States in new nuclear, we are building 21st Century Coal, that is the one you are talking about. We have made a huge shift in natural gas, one of the leading owners of solar, and big in energy efficiency.

With respect to 21st Century Coal, we have developed our own technology, we are the only company doing robust, proprietary research and development in our industry. We developed a technology along with our partner, Kellogg Brown and Root, which will take native Mississippi lignite, we will essentially gasify it, and we will be able to strip out the CO₂ so that we can produce more elec-

tricity with less of a carbon footprint than natural gas. And in this case, the CO2 will not be a waste stream; we will use it to produce more domestic oil production.

Mr. MCNERNEY. Yes, very good. And you are also, as you mentioned, developing nuclear, so you must have done the calculations that that is a positive—

Mr. FANNING. Absolutely.

Mr. MCNERNEY. Very good. I think I heard you say toward the end of your testimony that the—an unregulated utility market would lead to some problems. Was I right in hearing that?

Mr. FANNING. Yes.

Mr. MCNERNEY. OK, good. Could you expand on that little bit?

Mr. FANNING. Yes, easily. I think the only way you can do, and it is one of the reasons why Southern Company is the only company in America doing a full portfolio of solutions, is there are no price signals in existence today to build new nuclear, for example, in a deregulated market. There are no price signals in existence to build and advance the notion of 21st Century Coal in America in any deregulated market. And, in fact, when you think about the incentives, I mean I will just pull Exelon out, Chris Crane and I—the CEO of Exelon and I—agree on this, he is a wonderful friend of mine and all that, but, for example, Exelon would benefit, your bottom line would benefit, from a carbon tax. You produce a lot of your energy from nuclear, which emits no carbon, and that is a good thing. A carbon tax would be bad for America, in my view, because it raises the price of energy, where America has a global competitive advantage.

So what I get at there is, there are incentives in deregulated markets, which reward higher prices. In an integrated regulated market, you are rewarded for lower prices. In a reregulated market, because prices go up during times of scarcity, there are incentives—there are a lack of incentives, anyway, to reduce scarcity.

Mr. MCNERNEY. Right.

Mr. FANNING. In my market, in transmission and distribution, we spend about \$1 billion a year in the wires business.

Mr. MCNERNEY. Thank you. I am going to switch you over to transformers. Ms. Heitman, you gave a list of things that would improve the reliability resilience of transformers. It was kind of quick so I wasn't able to write it down. Do you think those items should be identified in the legislation, or some more general way to discuss those?

Ms. HEITMAN. I think that part of them—most of them actually already are identified as far as the need to both harden the existing—the hardening of the existing units I don't believe are—is in the legislation itself. I think that has got to be finalized in development by the industry at this point, but as far as the ability to respond in an emergency situation, yes, I think that is critical. I think the rapid replacement in the case of a damage of multiple LPTs has—is addressed with the recovery transformer program.

Mr. MCNERNEY. OK, thanks.

Mr. Holstein, you—do you see this Section 1208 affecting grid modernization or new technologies being developed for the grid? In other words, you said that this straightjackets the utilities, could you explain that a little bit please?

Mr. HOLSTEIN. Yes, I think the criteria that are laid out in the section, as I said in my testimony, create a bias in favor of traditional base load generation. And I want to say something about that in just a moment. But at—in so doing, it reduces or marginalizes the role of many of the other tools that are increasingly available to grid planners in order to provide reliability. So I think in that sense, it is counterproductive. But a fundamental point I want to make is that in listening to this discussion, it might be easy to conclude that there is some kind of either/or proposition here; that you are either for base load generation or you are against it. My organization, Environmental Defense Fund, has supported lots of base load generation including license extensions for nuclear plants. So base load is part of it, but we just want to make sure that in legislating for reliability, we don't marginalize the many other tools that are available, including demand side resources, renewables, et cetera, even if you believe that the contributions they make are not as great as the contributions that base load makes. It doesn't matter. What we are after here is a diverse portfolio and, therefore, because there is this connection, a more reliable grid.

Mr. MCNERNEY. Thank you.

Mr. Chairman, I yield.

Mr. WHITFIELD. Gentleman yields back.

At this time, I recognize the gentleman from Pennsylvania, Mr. Pitts, for 5 minutes.

Mr. PITTS. Thank you, Mr. Chairman. Thank you very much for this very informative and interesting testimony.

Mr. Dominguez, some argue that maintaining base load generation is not critical to reliability, and that such generation can be replaced by simple load shedding and other demand side management strategies. What is the problem with overreliance on load shedding as strategy for mainlining reliability?

Mr. DOMINGUEZ. Well, I—you know, I think it almost answers itself. When we are asking or customers to give up the use of electricity to preserve the reliability of the system, that is OK if it is done on a voluntary basis and the customers can preplan, but if we are literally putting our system in a place where, in order to maintain reliability, we have to involuntarily shut down customers, it is a very dangerous spot for us to be, and on behalf of the 8 million customers we serve, clearly not what they expect from the electric system and the service we provide.

Mr. PITTS. Now, you talk about the need to balance reliability and affordability and clean energy, and a lot has been made of the push for more renewables in Europe, and I Germany in particular, how have those policy decisions affected reliability and affordability of electricity?

Mr. DOMINGUEZ. Well, I think the affordability question has been answered, unfortunately, for German consumers at least. The reliability question still remains. Presently, the rate for electricity in Germany is about 50 cents U.S. per kilowatt hour. That is about three times or better the rate in the Philadelphia area that we serve, Baltimore or Chicago. Many have begun to talk about electricity in Germany as a luxury product. And I think the lesson from Germany was that it moved very quickly into these tech-

nologies without fully understanding the impact on cost for the average consumer. Mr. Fanning talked about the economic issues that face his customers. Our customers face the very same issues. 300 percent increase in rates would be a problem. At the same time the country made a decision to begin shutting down its nuclear assets, which has meant that not only prices increased, but emissions have also not followed the trajectory one would assume through the increase of renewable energy.

So I think there are a lot of takeaways from the European experience. This is a transition that could be managed, but we need to manage it carefully. We need to pay attention to the resources that keep prices low, that keep electricity reliable, and that are working today and could work, and are designed to work, for decades into the future.

Mr. PITTS. One thing we learned recently is that in Portugal, which has invested in a lot of renewables and natural gas, LNG, that the market now has caused them to buy a lot more coal and produce a lot more electricity with coal because it is so cheap. I mean the market force is there. You want to comment on that?

Mr. DOMINGUEZ. Yes, sure. I mean the situation in Europe is different than the U.S. situation in the sense that shale gas availability has not reached the same proportional level of involvement in Europe. It is a really minimal player, so they still depend on natural gas imports from Russia and from other countries. And so what they have found in Europe is that, to offset the variability of renewables, coal steam generation units do a pretty good job of filling the gaps when the renewables don't operate for environmental reasons. So as a consequence to that, they buy more coal, emissions unexpectedly have increased, notwithstanding the substantial and growing contribution of renewables in these markets.

Mr. PITTS. In the minute I have left, you mentioned in your testimony that—the fact that hydro and nuclear power was primarily responsible for keeping a lot of us from losing power during the polar vortex, and that we lost power from natural gas and coal. Why did that occur?

Mr. DOMINGUEZ. Well, a couple of different reasons. For—as Gerry Cauley mentioned when he was here earlier this morning, what we found is that the equipment wasn't robust enough to sustain the very severe weather temperatures. And so that took about ½—of the 47 percent of natural gas that didn't show up, ½ of it was the equipment just didn't work because it got real cold. The other ½ was, it was connected to gas pipelines but there were no molecules in those pipelines.

For coal it was a similar story. We saw coal plants that weren't appropriately ready for the weather conditions. But then in addition to that, you have to recognize that a number of the coal plants in PJM require natural gas to start. So if natural gas isn't available, you can't start the boilers and, therefore, you lost the coal plants. That was kind of the story.

Mr. PITTS. Thank you, Mr. Chairman.

Mr. WHITFIELD. Gentleman yields back.

The Chair recognizes the gentleman from New York for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair. Welcome to our witnesses.

Mr. Bergey, in your testimony you indicated that Section 1207 of the draft provides “a counterintuitive emphasis on base load generation.” Some have suggested that adding more distributed generation to the grid could indeed reduce its reliability because of the integration challenges and the variable nature of renewable power. Do you agree with that sentiment?

Mr. BERGEY. No. I have heard it for 30 years and it hasn’t—wasn’t true then, it is not true now. In fact, over the last 30 years, the power electronics that are used to interface the variable resources with the grid have gotten much more sophisticated, and they have risen to the degree now that we can provide our support, power factor correction, we can even reduce harmonics that come from your home computer power supply, for example.

Thirty years ago we were told, and there were rules passed that require wind systems, solar systems to go offline almost immediately with any grid disturbance. Now, we are coming full circle and being asked to stay on and help support the grid through short-term disturbances because there is a recognition that this can be done safely and cost-effectively with existing technology. And this is technology that is on the move. We are getting cheaper, more capable, more interconnected electronics, and the more that those are spread over with solar, wind, storage, and other resources such as that, the rise of micro grids gives us, I think, tremendous capabilities for the future for adding resiliency.

Mr. TONKO. Well, with that being said, are you concerned that Section 1207, as currently drafted, may discourage further innovation and adoption of renewable generation, energy efficiency, micro grid, and energy storage technologies?

Mr. BERGEY. I do have concerns with the way it is written, if that was the question.

Mr. TONKO. OK. Any recommendations on how to improve that?

Mr. BERGEY. Well, I think, as I said in my testimony, I think elevating base load to a special status is counterproductive; that we should take an all-of-the-above approach. I agree with many of the statements that have been made about the value of base load, and it has an important role. I can’t tell you how the transition of the power grid is going to go over the next 30 years, but I can say that distributed generation for certainly—for sure is going to play an increasing role and give us increasing opportunities. It would be unfortunate if the legislation put a—you know, was more of an anchor than a sail.

Mr. TONKO. Um-hum. Mr. Holstein, in your testimony you stated that the capacity market design feature in Section 1208, requiring generation to be available essentially every day for a period of at least 30 days, may put ratepayers at risk of higher costs. Is this because you believe RTOs and ISOs may encourage overinvestment in that base load power—

Mr. HOLSTEIN. I think—

Mr. TONKO [continuing]. Context?

Mr. HOLSTEIN. Yes, sir. I think—but that is not the only reason. As I indicated in my testimony, if you look at the criteria that are laid out in Section 1208, this is true of Section 1207 as well, but in 1208 with respect to capacity markets, the legislation as it is currently drafted creates a set of criteria, the 30-day limitation, for

example, seems especially capricious and unnecessary, and overall, I think it forces this overreliance on base load, and as I said in my testimony, marginalizes all the other resources that can be brought to bear, not always perfectly, but nonetheless do play a role, and an increasing role, in bringing about the grid reliability that the subcommittee members are so concerned about maintaining, and rightfully so.

Mr. TONKO. And what impact do you think that this would have on energy efficiency and other demand response or management programs?

Mr. HOLSTEIN. I think it would have a chilling effect for the reasons I have said, because of this imbalanced emphasis on base load brought about by this set of criteria that you can see, looking, for example, on page 40, that really puts reliability and capacity market reliability through capacity markets in a box. And I think that is unnecessarily restrictive, and I would hope that the members of this subcommittee would embrace once again the notion that competitive markets work best, and they work best in providing reliability, just as they work best in providing lots of other things.

Mr. TONKO. Mr. Moore, your sense of that? Any comment in that regard?

Mr. MOORE. I think Mr. Holstein is right, and that as we move increasingly to more renewable energy, base load generation isn't as effective as bringing the—integrating the renewable energy into the system as other forms of dispatchable generation like some combined cycle natural gas plants. One of the things I want to bring out is really a groundbreaking study that General Electric did for PJM, which is essentially the Nation's largest grid operator, last year this study found that you could integrate 113,000 megawatts of wind and solar into the PJM grid, that is about 30 percent of total generation, without any additional reliability effects, and with virtually no additional "backup power." So you have those facts, plus the fact that you are burning a lot less coal and natural gas, saving consumers money that way as well and cutting carbon pollution. So you can have an equally reliable grid with a lot more renewable energy in it than we have now.

Mr. TONKO. Thank you.

Mr. Chair, I yield back.

Mr. LATTA [presiding]. Gentleman yields back.

The Chair now recognizes himself for 5 minutes.

Mr. Fanning, if I could ask you. The discussion draft permits owners, operators, and users of bulk power system facilities to recover prudently incurred costs for complying with an emergency order. I assume you support this, and why would that be important?

Mr. FANNING. Absolutely. You know, and the only kind of modification would be this notion of prudent, get to reasonable, but in the time of an emergency, we absolutely need to take the steps necessary to keep the lights on. We don't want to get in an argument about what is required at that moment. Let's get to job one and take care of that.

When I think about the broader, non-emergency conditions in any sort of RTO or ISO, we need to make sure that there are enough mechanisms in place to provide for reliability and balance

the notions of clean, safe, reliable and affordable. We need to make sure all that works well.

Mr. LATTA. Thank you.

Ms.—is it—I want to make sure, is it Haider?

Ms. HAIDER. Haider.

Mr. LATTA. Thank you. Could you describe some of the reliability and security benefits of innovative technologies such as combined heat and power and waste heat to power?

Ms. HAIDER. Sure. I mean, the real benefit of combined heat and power, which by the way, is an energy-efficiency technology, not a renewable technology, is that it generates heat and electricity from a single fuel source. So by capturing the waste heat from the electric generation, you are increasing your fuel efficiency and eliminating some of that waste. So as I stated earlier, CHP can actually use more than 70 percent of its fuel inputs, so there is an incredible amount of efficiency in that power and heat generation simultaneously.

Combined heat and power right now is about 8 percent of U.S. generating capacity, so it is actually a fair amount of capacity; 82 gigawatts of installed capacity.

Mr. LATTA. Thank you very much.

And, Mr. Di Stasio, do you believe that recent and pending environmental initiatives could threatened electric reliability, and if so, are there significant economic trends and factors affecting that grid reliability today that we should be cognizant of?

Mr. DI STASIO. Thank you. So I think that people have been focused, as was on the first panel, with the Clean Power Plan, and I would just say that the only difference is, I would agree with my colleagues that said we haven't had an issue with reliability in 40 years, but there is a cumulative impact over time, and there is also, I would say in the CPP, a much more transformative nature to it because of the significant change in power supply and power flows. That said, our testimony was really intended to be focused generically on the fact that we are trying to seek key Federal environmental action, and at the same time trying to modernize the grid. We are adding more digital devices, we are looking to introduce more renewables. All of these things are worthwhile pursuits, but being able to look at them in a prospective way is what we were advocating.

And so relative to Section 1202, while all of the triggering mechanisms and the time frames for studies may not be exactly right as proposed, the point is is that if we took some time to make sure we got it right the first time, we will make sure that, at the end, consumers won't be exposed to unnecessary reliability risks or unnecessary costs, or for doing things in a retroactive manner.

Mr. LATTA. Well, thank you.

And, Ms. Heitman, if I could ask you just a follow-up from Mr. Olson from Texas, when you were talking about the LPTs and the lifespan of where we are, because I thought it was interesting, in your testimony you say that, you know, we have some of the units out there being 70 years of age. What percent would that be?

Ms. HEITMAN. I am not sure exactly what percentage is greater than 70 years, but the majority of the transformers in the—in-

stalled today, according to the DOE report that exists, is 25-plus years.

Mr. LATTA. OK, so we don't know right off the bat what would be over 70. It is amazing those things are still in operation.

Ms. HEITMAN. No, I couldn't tell you what percentage is over 70 years—

Mr. LATTA. Well, they made them quite—

Ms. HEITMAN [continuing]. Only that they do exist.

Mr. LATTA. They made them quite well.

I am going to yield back the balance of my time.

And recognize the gentleman from Virginia for 5 minutes.

Mr. GRIFFITH. Thank you very much, Mr. Chairman. Appreciate that.

Ms. Heitman, welcome. I want to personally welcome you because, while we don't make the large power transformers in my district, we do make transformers at an ABB plant in Bland, Virginia. So thank you very much for those jobs.

As you were talking about new developments and new products that your company was rolling out, I was seeing jobs coming to an area of my district that can use those jobs in a beautiful county. So we welcome you here today.

You have answered all the questions that I had in your testimony. You have done quite a good job. Is there anything that you wanted to touch on that you didn't feel you had time to cover?

Ms. HEITMAN. I think that we talked a little bit about the rapidly deployable transformer—

Mr. GRIFFITH. Um-hum.

Ms. HEITMAN [continuing]. And one of the interesting things about that is I think it works very well hand-in-hand with the Government programs and with this new technology. Today, ABB's development of this rapidly deployable transformer that was done in conjunction with DOE, DHS, and EPRI actually allows for a modular transformer to be transported very quickly from the factory to the utility, but without a reserve production of transformers, this only—the months of production are still required. So when we looked at that development, it only gets us part of the way there, from what we can tell.

Mr. GRIFFITH. And that is why you favor the strategic plan to have some extra transformers that are out there for emergency situations?

Ms. HEITMAN. Yes, sir.

Mr. GRIFFITH. And you said this earlier but I just wanted to underline it. Your testimony would indicate those have to be spread around the country so you can get them there quickly, because these units are very large and weigh a lot, and so if you had them all stored in one location, it might—and you had a—say you stored them all in Florida and you had a problem in Washington State, it would take you a long time to get them there, isn't that correct?

Ms. HEITMAN. Well, the interesting thing was we—the test that we ran was from St. Louis, Missouri, down to CenterPoint, in Houston. These units were shipped from the back dock of the factor in St. Louis, and installed and energized within 5 days, 10 hours, and 10 minutes. And that was with no overtime. So we would leave it up to the DOE. We won't make a recommendation on where

these should be strategically located, but certainly the closer to the region that they are going to be installed, the faster that could be—but with the design of this deployable transformer, we are talking days and not traditionally weeks of transportation that would have occurred.

Mr. GRIFFITH. Yes, appreciate that. And in your testimony, you have just indicated in a number of situations where different agencies were working together and so forth, and I have to tell you all that I support the 1202 provisions. I think they are important for this bill, and I think they are good. And one criticism that was made was it wasn't clear whether or not they gave the authority to FERC and NERC to slow down or stop the EPA. As I read it, it does not, it just makes it a part of the report, but if my colleagues on the other side of the aisle would like clarity, I would be happy to have an amendment drafted that would make it clear that, in fact, a report—that reliability would be affected from either FERC or NERC could actually stop those regulations, if that is what they want.

Mr. Dominguez, one of the witnesses testified that the mercury rules came into effect on April 16, and nothing dramatic occurred, but your power company doesn't generally have a problem on April 16, it is usually in the heart of winter or the heat of summer, isn't that true?

Mr. DOMINGUEZ. Yes, I think, Representative, it is a little early to declare success. What we do know and hope works is EPA has created some safety valve mechanisms in the rule that will allow units that are needed to stay on, to stay on. But until we are a few years out, after plant retirements and really see how the system performs through the most extreme weather, I think it is premature to say anything like that.

Mr. GRIFFITH. And, Mr. Fanning, your opinion would be the same on that?

Mr. FANNING. Yes. I would just add, I am the Chairman of the Board of the Atlanta Federal Reserve Bank, and I am an Executive of the Committee of the Conference Chair, so the big fed, and I can tell you one of the events that happened between the passage of HAPSMACT, now MATS, in 2016, is an economy that went south in a hurry and demand went way down. And so we have had, if you will, the blessing of a poor economy that has really helped our reliability.

Normally, Southern Company would have added, from a capacity growth standpoint, 900 megawatts a year. Now, we are adding about 400 megawatts a year.

Mr. GRIFFITH. Right.

Mr. FANNING. So the economy had an enormous influence on the outcomes here.

Mr. GRIFFITH. Right. And I do note with some interest that Mr. Dominguez testified that PJM had some significant risks in 2014, and you talked about voluntary versus involuntary requests to stop using power, but in 2015 in my district, there were several occasions when various smaller companies asked their consumers not to consume as much. Is that—and I will ask Mr. Fanning and Mr. Dominguez both, was that your experience in 2015 as well, that there were—while there weren't any dramatic issues, there were

issues in your area? Neither one of your companies serves my district, so I am not criticizing your companies.

Mr. DOMINGUEZ. No, I would say that is consistent. Look, a lot of our customers sign up to voluntarily exercise demand response, which is withdraw load. And so as part of the protocols as we get up to the edges of the system, we start asking people to actually voluntarily curtail, and they get paid for that, works quite well. But, sure, we have seen that in the last winter.

Mr. GRIFFITH. And, Mr. Fanning?

Mr. FANNING. Value is a function of risk and return, and the closer we live to the edge of poor reliability, we way increase the risk to the United States economy. And so if return is growing the United States economy, American commerce cannot stay on that kind of volatility.

Mr. GRIFFITH. Well said.

I yield back.

Mr. WHITFIELD. Gentleman's time has expired.

At this time, recognize the gentlelady from North Carolina, Mrs. Ellmers, for 5 minutes.

Mrs. ELLMERS. Thank you, Mr. Chairman. And I want to thank the panel for being here. This has been a really great discussion.

And, Ms. Heitman, I would like to ask you a few questions. What are some of the steps manufacturers have to take to help address the vulnerability of large power transformers? I know we were discussing a moment ago with Mr. Griffith from Virginia the need to have ready transformers ready to go in an emergency, but what are some of the other things from the manufacturing standpoint that need to be done?

Ms. HEITMAN. Yes, the vulnerability of the transformers, we mentioned the old—older and aging fleet in the—in place today, I think the manufacturers can assess and help assess the vulnerability of the existing fleet that is in existence, and then make recommendations around what repairs may be necessary.

Mrs. ELLMERS. Um-hum.

Ms. HEITMAN. Additionally, there is hardening technology that is under development in order to protect against potential criminal attack in that case. There is modeling that can be done for both GMD and ENP to assess the risk there, as well as putting together programs in conjunction with utilities today in—

Mrs. ELLMERS. Um-hum.

Ms. HEITMAN [continuing]. Rapid repair of a damaged transformer, and also employing the technology that was developed on a recovery transformer to rapidly replace a unit if it is damaged.

Mrs. ELLMERS. Wow, you kind of answered all of my questions that I have for you in one fell—so you are very good. And there again, it is very sobering when we think about the age of these transformers, and I know we were talking a moment ago about the, you know, a number of them being 70 years old. I have 38 to 40 years, but basically, you have indicated that 25 year and above age is commonplace, correct?

Ms. HEITMAN. Very average today, yes.

Mrs. ELLMERS. And, you know, with these—you know, these are implications of needed, you know, resources to be applied, and I can see how that is an issue, and the challenges that exist in rela-

tion to that. Can you just designate maybe one or two things what—that can be done in the design and production of a large power transformer that might play into the age and, you know, for instance, when we are looking at the possibility of new transformers, you know, how long is that process, what can be done, and does it make more sense to really look at those aging transformers and try to revitalize them?

Ms. HEITMAN. I think that—well, I will start with what—why a—why the manufacturing of a transformer is—takes so long. First of all, most of the transformers—large power transformers are customized by utility. So unlike a lot of the other electrical equipment in the substation, which we represent as well as NEMA, the manufacturers that make those, those are more standardized pieces of equipment, as opposed to the LPT—

Mrs. ELLMERS. Um-hum.

Ms. HEITMAN [continuing]. Which is designed to the specification of the utility. So the process is, first, a utility is spending—could spend up to a month to design or write the specifications for the specific transformer, then following that there is a 1-month process of the different manufacturers putting together a—doing a design for the quotation of that transformer, followed by a full-out—once that decision has been made as to who is to manufacture that unit—

Mrs. ELLMERS. Um-hum.

Ms. HEITMAN [continuing]. It is almost 3 months in electrical and mechanical design, 3 months in procuring the specialized materials, 2 months in manufacturing and testing, 1 month in traditional transportation, and then 1 month in the installation and commissioning of the unit itself.

Mrs. ELLMERS. Um-hum. Um-hum.

Ms. HEITMAN. And then what I believe that the manufacturers can be doing to assist in this process is we are willing to assist in technology and also specifications—

Mrs. ELLMERS. Um-hum.

Ms. HEITMAN [continuing]. Of a potential reserve program, and whether there is even potential to standardize across that program.

Mrs. ELLMERS. Um-hum. Thank you so much.

Mr. Fanning, in the discussion draft directing FERC to the study that impacts major rules to make sure we understand the impact of electric reliability, I have a couple of questions in relation to that. In your opinion, who is the best and most unbiased source of information on electric reliability impacts of the rule, and why?

Mr. FANNING. The companies themselves.

Mrs. ELLMERS. Very good. I like that answer. And to that—and, you know, I am just going to move on. You mentioned that the base load provides voltage and frequency support, and we get that, could you explain in more detail what you are referring to, and why base load is so important to it, because I know there has been a discussion that—you know, we have kind of gone back and forth a little bit about reliability and what is available, and in conjunction with the renewables and the increased amount, but why is it so important that we continue to maintain that base load?

Mr. FANNING. Well, I could give a long answer. I want to give a short answer. It is so important to think about the portfolio of

resources, not only nuclear, 21st Century Coal, natural gas, renewables, energy efficiency, each of those has a different cost and energy profile.

Mrs. ELLMERS. Um-hum.

Mr. FANNING. All of those have an important place to play in the whole portfolio. When I think though, you know, we all kind of get wound around the axle in energy policy about clean, safe, reliable, affordable, at the end of the day, we have to support the livelihood of the United States economy and help these families make tough kitchen table economic decisions every day. And one of the things I applaud, Chairman, about the—this notion of architecture of abundance, that is exactly the right point to follow. That is the principle. And when I think about where America is, not in my lifetime or your parents' lifetimes, we have this opportunity where we can promote energy security, that will promote national security, and that will promote economic security, and give America a chance to regain its status as the premiere economy in the world. It is all those reasons why base load energy capacity must play a part in this Nation's energy future.

Mrs. ELLMERS. Thank you so much.

And thank you, Mr. Chairman, for indulging me and my time.

Mr. WHITFIELD. Well, that concludes the questions for this panel. I want to thank all of you once again. We have spent the last 3 ½ hours together. I hope you all had as much fun as we had, but it has been a very important issue that we are dealing with, and we do appreciate the different views and your opinions on this.

And in conclusion, since you have been here—if there is anyone who wants to make additional comment before we adjourn, I will give you the opportunity. OK. OK. That is the end of that.

I would like to ask unanimous consent that the following statements and letters be submitted for the record. You all have seen these, Mr. Rush—

Mr. RUSH. Yes.

Mr. WHITFIELD [continuing]. And you approve of them. A letter on behalf of the American Public Power Association, Edison Electric Institute, and National Rural Electric Cooperative Association, a letter from The Pew Charitable Trusts, and a statement from the American Public Power Association.

Without objection, so ordered.

[The information appears at the conclusion of the hearing.]

Mr. WHITFIELD. So that concludes today's hearing. We look forward to working with all of you. Thank you again very much.

[Whereupon, at 1:30 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

PREPARED STATEMENT OF HON. FRED UPTON

We all know how a power outage can bring our lives to a standstill. It is bad enough for homeowners when the lights go out, but it can be even more difficult for business owners and their employees. Now imagine the damage to our quality of life and the economy if blackouts became more frequent—or, even worse, if the power were to stay out for weeks or possibly even months at a time. Those are the risks we aim to address with this discussion draft, and I look forward to adding these measures to enhance electric reliability and security into our bipartisan energy bill.

In addition to the longstanding reliability threats like downed power lines from storms, we have relatively new threats like terrorists who would like nothing better than to take down our electric grid for an extended period of time.

At the same time, utilities are being asked to comply with a number of challenging new environmental requirements which may have the unintended consequence of putting reliability at increased risk and limiting the ability to respond when things do go wrong.

These and other challenges are made even more serious by the fact that the Nation's electric grid is overdue for a major upgrade. We may have the best electricity system in the world, but it won't stay that way for long without substantial new investments.

The good news is we can address these concerns and ensure a reliable and secure power supply for the new century. But it will take several policy changes that are included in the discussion draft, including measures to promote advanced grid technologies that will help us establish a more modern, flexible, and resilient grid.

Other measures in the discussion draft are designed to protect the grid against outside threats, be they physical or cyber attacks. This includes provisions for Governments and the private sector to work together in anticipating the ways bad actors could sabotage our electricity system and taking action to address and mitigate vulnerabilities.

Other measures seek to head off any potential conflict between environmental measures and reliability. New regulations raise potential reliability issues by reducing the diversity of the power supply, necessitating early retirements of existing base load capacity, introducing more non-base load resources, and adding red tape that limits the flexibility to respond to an emergency. There is no reason we can't have cleaner air and more reliable power, and I welcome NERC and FERC's input on what is needed to ensure that new Federal regulations do not compromise reliability.

The National Academy of Engineering cited electrification as the greatest achievement affecting the quality of life in the 20th century, but it is every bit as important to modernize the grid to face the new and emerging challenges of the 21st century. I look forward to the continued collaboration on reliability and security provisions to better safeguard our power supply for the years ahead.

PREPARED STATEMENT OF HON. FRANK PALLONE, JR.

Thank you, Chairman Whitfield and Ranking Member Rush for holding this hearing on a serious topic that should know no party lines: energy reliability and security. We often take for granted that the lights will go on when we flip a switch and that, even in an emergency, heat and gasoline, will be available.

But extreme weather events are costing us dearly, both in human life and in recovery costs. Our changing climate is exacerbating power outages. The power infrastructure is at higher risk from storm surges and coastal inundation. The costs can be huge—just look at the fallout from Superstorm Sandy. Since 2011, there have been more than 42 extreme weather events in the United States that each cost at least \$1 billion in damages.

These events challenge our confidence in the energy supply, so they should also drive our efforts to move toward a new, more secure, resilient and sustainable system of energy delivery.

The draft before us takes a few steps in the right direction and, in some cases, builds on bipartisan agreements previously approved by our committee. That's a good start, but it's far from perfect. For instance, I would like to understand why the provisions are no longer included in the bipartisan GRID Act to address the vulnerability of our critical electric.

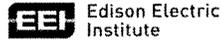
Unfortunately, the bill also takes many steps that are too grounded in the past, particularly with regard to the reliability of the grid. Instead of embracing new distributed and renewable technologies, cutting edge energy storage, and demand response, parts of this draft appear to be designed to tighten our grip on the large, expensive, and inflexible facilities and energy sources of the past. In addition, in addressing electricity capacity markets, the draft doesn't support distributed generation and renewables. That's unfortunate because I think capacity markets are worthy of the committee's careful examination and consideration.

Lastly, I want to outline my concerns with the draft's unprecedented requirement for FERC to complete a "reliability analysis" of major rules that cost over a billion dollars. This section appears to be aimed straight at the Clean Power Plan, something the Chairman had pledged to avoid in this process. FERC certainly has the ability to comment on EPA rules if it so chooses, so at a minimum, I'm not sure

why this provision is needed. But most importantly, it raises the specter of reliability failure where none exist. As EPA recently said: "Over the past 45 years, EPA has never issued a rule that has threatened the delivery of affordable and reliable electricity to American families, and the Clean Power Plan will not change that."

I couldn't agree more. Mr. Chairman, I'm generally pleased to see consensus language on some provisions in this bill. I hope we can build on this draft to ensure the enactment of an energy bill developed in a truly bipartisan fashion.

Thank you, and I look forward to hearing from our witnesses.



May 18, 2015

The Honorable Ed Whitfield
Chairman, Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
Washington, DC 20515

Dear Chairman Whitfield:

On behalf of the American Public Power Association (APPA), the Edison Electric Institute (EEI), and the National Rural Electric Cooperative Association (NRECA), we are writing to express our appreciation to you for including the entirety of H.R. 1558, the "Resolving Environmental and Grid Reliability Conflicts Act of 2015," in Section 1201 of your Reliability and Security Discussion Draft released on May 7, 2015.

H.R. 1558, bipartisan legislation introduced by Representatives Pete Olson (R-TX), Gene Green (D-TX), and Mike Doyle (D-PA), would ensure that electricity generators will no longer be forced to choose between conflicting legal obligations when acting to comply with emergency reliability orders from the Department of Energy (DOE).

In extraordinary circumstances, Section 202(c) of the Federal Power Act (FPA) allows DOE to order emergency operation of an electricity generating facility to protect grid reliability. At the same time, environmental laws and regulations, implemented through permit limitations, may prohibit the same generating facility from full compliance with the DOE order. In such a situation, which has actually occurred more than once in the past, the owner/operator of the generation facility must choose between violating the DOE emergency order and violating environmental limitations, with either choice exposing the company to liability.

Section 1201 would amend the FPA to clarify that electricity generators caught in such a double bind would not be liable for violations of environmental laws or regulations, or subject to civil or criminal liability, or citizen suits, as a result of complying with Section 202(c) emergency orders. Importantly, like H.R. 1558, the Discussion Draft also provides a process for DOE, working with other agencies, to administer emergency orders in a manner that minimizes adverse environmental impacts without jeopardizing reliability.

Thank you again for your continuing leadership in seeking to remedy this conflict in energy and environmental law and, in doing so, helping safeguard the reliability of our nation's electric grid.

Sincerely,



Susan N. Kelly
President and CEO
American Public Power Association



Thomas R. Kuhn
President
Edison Electric Institute



Jo Ann Emerson
CEO
National Rural Electric Cooperative Association



The Honorable Ed Whitfield
 Chairman
 Energy and Power Subcommittee
 House Energy & Commerce Committee
 United States Congress Washington, DC 20515

The Honorable Bobby Rush
 Ranking Member
 Energy and Power Subcommittee
 House Energy & Commerce Committee
 United States Congress Washington, DC 20515

May 18, 2015

Dear Chairman Whitfield and Ranking Member Rush:

I would like to thank the Energy and Commerce subcommittee on Energy and Power for holding a hearing focused on energy reliability and security. The Pew Charitable Trusts is especially pleased to see the recognition of the grid resiliency benefits in Section 1207 of the Committee's discussion draft. We appreciate that it encourages measures which promote greater use of onsite power generation more broadly, such as a requirement for facilities of a certain size to consider a cost-benefit analysis of onsite power generation from systems such as combined heat and power (CHP) technologies. Onsite power generation can provide the important benefits of added energy resiliency while lowering overall energy costs.

Distributed energy generation offers the ability to protect institutions and manufacturers from unexpected electricity power outages caused by natural disasters and other disruptions. With CHP systems, facilities self-generate power and use the grid to fulfill any additional power needs. In times of grid instability, these systems have the ability to "island," or operate without connection to the local electricity infrastructure. Facilities with CHP, therefore, have no need to operate stand-alone emergency generators, which often become stranded assets due to the minimal frequency with which they are used. Being able to use these highly efficient systems at all times including when the grid is down provides certainty – a CHP system owner never wonders if a seldom used generator will start when most needed.

Critical infrastructure benefits from reliable, efficient power

Many lifesaving medical devices require electricity. A reliable source of power, no matter what the weather brings, is of the utmost importance to hospitals, assisted living facilities and other such critical infrastructure. Medical centers with CHP can prevent evacuations due to power outages, saving lives. According to a report from the American Journal of Alzheimer's Disease & Other Dementia, death rates for seniors 30 days after an evacuation rose 218 percent, and after 90 days increased to 158 percent. Moving patients from one location to another can disrupt medical care and routines, leading to higher risk of hospitalization.¹

CHP systems also save money. According to a report by *Health Care Without Harm* and the Boston Green Ribbon Commission, adding a one megawatt combined heat and power system to a hospital can save \$700,000 annually. The immediate economic benefits of reducing fuel consumption and increasing

¹ Senior Housing News, <http://seniorhousingnews.com/2012/11/28/nursing-home-resident-mortality-rates-skyrocket-218-following-evacuation/>.

reliability do not take into account the additional advantage of eliminating lost revenue when the power goes out and systems go down.²

During Hurricane Katrina in August 2005, Mississippi Baptist Medical Center in Jackson, MS maintained power and continued caring for patients while the main grid lost power for 57 hours, thanks to its on-site CHP system. The 646-bed hospital served as a shelter for displaced people and patients from other hospitals, handing out food and clothing during the storm. First responders were even able to use the Medical Center facility as an operations center while their facilities were without power. In fact, it was the only Jackson-area hospital to maintain all operations during the storm. In addition to resiliency benefits, the Medical Center saves \$738,000 on energy costs annually, which are directly invested in core mission operations.³

Already, more than 120 nursing facilities and 180 hospitals nationwide employ combined heat and power to generate electricity with more projects coming online.

Industrial and institutional facilities also benefit from uninterrupted power

More recently, while many buildings including hospitals lost power during Hurricane Sandy in October 2012, CHP systems helped several large energy users — New York University, Long Island's South Oaks Hospital, and Co-op City in the Bronx and New Jersey's Bergen County Utilities Authority — stay warm and lit. These islands of power acted as places of refuge for emergency workers, displaced people, and evacuated patients from medical facilities.⁴

Several manufacturing facilities that installed CHP also kept their lights on and their operations going during the superstorm. Sikorsky Helicopters in Connecticut has been able to offer refuge to emergency responders and employees and their families — all because of the investment they made in 2011 in a CHP system. Still, the resiliency benefits that businesses and hospitals garner from their CHP systems are not being valued in a way which can be monetized to help reduce the upfront capital costs of installing these systems.

By encouraging electric utilities to “develop a plan to increase the utilization of resiliency related technologies” and supporting cost recovery for such systems, the Committee's discussion draft takes an important step to help keep the lights on during extreme weather events, improve grid reliability, capture wasted energy, make our nation more competitive and even reduce pollution.

The Pew Charitable Trusts appreciates the opportunity to comment on the Committee's discussion draft.

Thank you,


Phyllis Cuttino
Director, Clean Energy Initiative

² PR Web, <http://www.prweb.com/releases/2013/9/prweb11106862.htm>.

³ Gulf Cost CHP Program, <http://www.txsecurepower.org/Portals/23/A%20Tale%20of%20two%20Hospitals.pps>

⁴ Department of Housing and Urban Development, http://portal.hud.gov/hudportal/HUD?src=/press/press_releases_media_advisories/2013/HUDNo.13-125.



Statement of the

AMERICAN PUBLIC POWER ASSOCIATION

Submitted to the

HOUSE ENERGY AND COMMERCE SUBCOMMITTEE ON ENERGY AND POWER

For the May 19, 2015 Hearing to Review the

“Discussion Draft Addressing Energy Reliability and Security”

(Submitted May 19, 2015)

The American Public Power Association (APPA) appreciates the opportunity to provide the following statement to the House Subcommittee on Energy and Power on the May 12, 2015, “Discussion Draft Addressing Energy Reliability and Security” (Discussion Draft). APPA is the national service organization for the more than 2,000 not-for-profit, community-owned electric utilities in the U.S. Collectively, these utilities serve more than 48 million Americans in 49 states (all but Hawaii). APPA was created in 1940 as a nonprofit, non-partisan organization to advance the public policy interests of its members and their customers. We assist our members in providing reliable electric service at a reasonable price with appropriate environmental stewardship. Most public power utilities are owned by municipalities, with others owned by counties, public utility districts, and states. APPA members also include joint action agencies (state and regional entities formed by public power utilities to provide them wholesale power supply and other services) and state, regional, and local associations that have purposes similar to APPA. Collectively, public power utilities deliver electricity to one of every seven electricity consumers. We serve some of the nation’s largest cities, including Los Angeles, CA; San Antonio, TX; Austin, TX; Jacksonville, FL; and Memphis, TN. However, most public power utilities serve small communities of 10,000 people or less.

In terms of public power’s generation portfolio, in 2013 these utilities generated 169.6 million megawatt-hours (MWhs) of electricity from coal; 76.9 million MWhs from natural gas; 62.78 million MWhs from nuclear; 69.8 million MWhs from hydropower; and 8 million MWhs from other sources such as non-hydropower renewable energy like wind, solar, and geothermal. It is important to note, however, that public power supplies approximately 15 percent of electricity to end-users in the United States, but it only produces 10 percent of the megawatt-hours generated. To make up the difference, public power utilities purchase power at wholesale from other entities such as investor-owned utilities, independent power

producers, rural electric cooperatives, federal power marketing administrations, and the Tennessee Valley Authority.

This Subcommittee will also hear today from John Di Stasio, President of the Large Public Power Council (LPPC). The members of LPPC are all public power utilities and are also members of APPA. We support his remarks. As Mr. Di Stasio writes in testimony prepared for delivery before this Subcommittee, as more of our life and economy depend on electric power, and as new risks emerge, public power utilities recognize the growing importance of reliability and resiliency.

More detailed comments on the Discussion Draft follow.

Discussion Draft Section 1201—Resolving Environmental and Grid Reliability Conflicts

Background

In extraordinary circumstances, Section 202(c) of the Federal Power Act (FPA) allows the Department of Energy (DOE) to order emergency operation of an electricity generating facility to protect grid reliability. At the same time, environmental laws and regulations, implemented through permit limitations, may prohibit the same generating facility from fully complying with the DOE order. In such a situation, which has actually occurred more than once in the past, the owner/operator of the generation facility must choose between violating the DOE emergency order and violating environmental limitations, with either choice exposing the company to liability.

Discussion Draft Section 1201 incorporates the provisions of H.R. 1558, the Resolving Environmental and Grid Reliability Conflicts Act, sponsored by Representatives Pete Olson (R-TX), Gene Green (D-TX), and Mike Doyle (D-PA). The provision would amend the FPA to clarify that electricity generators caught in such a bind would not be liable for violations of environmental laws or regulations, or subject to civil or criminal liability, or citizen suits, as a result of complying with Section 202(c) emergency orders. The Discussion Draft also provides a process for DOE, working with other agencies, to administer emergency orders in a manner that minimizes adverse environmental impacts without jeopardizing reliability.

APPA Comments

APPA joined with Edison Electric Institute and National Rural Electric Cooperative Association in a May 18, 2015 letter to the Energy and Power Subcommittee supporting the inclusion of the provisions of H.R. 1558 in the discussion draft. The letter states, and APPA believes, that the legislation would ensure that electricity generators will no longer be forced to choose between conflicting legal obligations when complying with emergency reliability orders from the Department of Energy.

Discussion Draft Section 1202—Reliability Analysis for Certain Rules That Affect Electric Generating FacilitiesBackground

The electric utility sector is facing implementation of more than a dozen major environmental regulations between 2011 and 2020. These include the Mercury and Air Toxics Standards (MATS), Cross State Air Pollution Rule, National Pollutant Discharge Elimination System Cooling Water Intake Structure Rule (316(b)), Coal Combustion Residuals Rule, Effluent Guidelines for the Steam Electric Power Generating Point Sources, New Source Performance Standards for New Fossil Fuel-Fired Power Plants, and Emission Guidelines for Existing Fossil Fuel-Fired Power Plants (Clean Power Plan), among others. Collectively, these air, water, and waste regulations represent the largest number of rules ever promulgated in such a short period of time, with the correspondingly largest cost in the history of the electric power sector. In addition to these environmental regulations, the electric utility industry is subject to regulations by other federal agencies, such as the Army Corps of Engineers and Bureau of Land Management. Many of these regulations could have implications for bulk-power system (BPS) reliability.

To date, the Federal Energy Regulatory Commission (FERC), the federal agency Congress has charged with ensuring the reliable operation of the BPS, has had no formal role in examining the potential reliability implications of these rules, (other than advising EPA, case-by-case, on requests for EPA administrative orders allowing generators to operate in noncompliance with the MATS rule).

Discussion Draft Section 1202(b)(1)(A) directs FERC, in coordination with the National Electric Reliability Corporation (NERC), to conduct independent reliability analyses of major proposed or final rules to “[e]valuate the anticipated effects of implementation and enforcement of the rule on national, regional, or local electric reliability and resource adequacy.” NERC is the “Electric Reliability Organization” designated by FERC under section 215 of the Federal Power Act to develop mandatory reliability standards for the BPS, subject to FERC review and approval. FERC and NERC’s reliability jurisdiction is limited to the BPS under section 215 of the Federal Power Act, which specifically excludes local distribution facilities. Likewise, resource adequacy is a matter traditionally entrusted to state and local regulation. However, this provision directs FERC to look at national, regional, and local electric reliability and resource adequacy.

APPA Comments

APPA believes FERC should have a role in examining the potential reliability implications of major rules. APPA is pleased to see the discussion draft includes language to provide the commission with a formal role in analyzing the potential reliability impacts of major future and final federal regulations that impact electric generating units (EGUs).

However, APPA believes the breadth of the proposal is problematic. As discussed above, this language would give FERC a broad, uncertain mandate and treads on traditional state and local authority. Furthermore, the use of the term “electric reliability” in the discussion draft is not the same as BPS reliability as laid out in Section 215 of the Federal Power Act. APPA respectfully requests that the Subcommittee consider changing this language to limit FERC’s role to examining the reliability implications of a major rule on the BPS.

Discussion Draft Section 1204—Critical Electric Infrastructure Security

Background

Public power utilities fully understand the importance of guarding against physical attacks on their infrastructure—their poles, wires, substations, transformers, and generating facilities. We also take seriously the growing threat of a cyberattack, which could cause disruptions in the flow of power. Public power utilities have longstanding programs and protocols designed to protect their utility systems. As the sources of threats have increased over the years, public power utilities have planned, prepared, and responded accordingly.

As noted above, NERC promulgates mandatory and enforceable standards to ensure the reliability of the BPS, including cybersecurity related standards. The electric utility sector is the only critical infrastructure sector besides nuclear power plants (a part of the overall sector) that currently has a mandatory and enforceable federal regulatory regime in place to address cybersecurity vulnerabilities. The industry is currently preparing to implement Version 5 of NERC’s Critical Infrastructure Protection (CIP) standards. In developing and revising its CIP standards, NERC has considered proposals and issued regularly updated reliability standards that would enhance physical security requirements related to access to cyber assets at electric utilities.

On November 20, 2014, FERC approved NERC-submitted physical security reliability standards requiring utilities with critical assets to take steps, or to demonstrate that they have taken steps, to address physical security risks and vulnerabilities related to these assets, to support the reliable operation of BPS.

APPA Comments

APPA supports the goals of section 1204—giving the Secretary of Energy broader authority to address grid security emergencies, while facilitating the protection, and voluntary sharing, of critical electric infrastructure information. This approach allows public power utilities to continue to take the appropriate physical and cyber security measures, gives DOE the flexibility to respond to threats, and promotes an enhanced dialogue between the industry and federal government on physical and cyber security threats and potential remediation. We support granting DOE broader authority in grid security emergencies, providing temporary access to classified information to key personnel of an entity subject to attack or

potential attack, and protections for public power utilities sharing critical electric infrastructure information.

The legislation also hews to the jurisdictional boundaries drawn by the Federal Power Act, avoiding mandates regarding distribution facilities which are regulated by states and localities. However, we continue to review the definitions established under what would be a newly created Federal Power Act (FPA) Section 215A for unforeseen consequences arising from those definitions. We remain very concerned about the cost-recovery provisions under proposed FPA Section 215A(b)(6). APPA believes the cost recovery provision is duplicative and unnecessary, and that the means of implementing the provision is overly broad.

Regarding the latter, Section 215A(b)(6) is aimed at “owners, operators, or users of the bulk-power system,” which is the term for the entities that are subject to NERC mandatory reliability standards under FPA Section 215. That term includes certain public power entities. It is a broader term than the “public utilities” (which in this instance, generally refers to the for-profit, investor-owned utility segment of the industry) subject to FERC rate regulation under FPA Sections 205 and 206. That may seem even-handed and fair, but it actually opens the door to FERC regulation of this narrow category of public power utilities’ rates and charges, that have been governed at the local level for decades. FPA Section 215 does not allow such regulation now. Conforming amendments proposed by Discussion Draft Section 1204(b) to FPA section 201(b)(2) and 201(e) make clear that proposed FPA Section 215A would apply to non-jurisdictional entities like rural electric cooperatives and public power utilities. This clearly indicates that the cost-recovery language applies FERC rate regulation to these entities for this limited purpose.

Proposed FPA Section 215A(b)(6) is not tethered to FERC’s rate-regulatory authority under FPA Sections 205 and 206—rather it stands distinct, with no clear basis in the rest of the statute. Additionally, cost-causation or the beneficiary-pays principles would still apply, but are ignored here. The language of section 215A(b)(6) even allows costs incurred to serve *retail* customers to be recovered from *wholesale* and *transmission* customers. That is, if a state-regulated investor-owned utility (IOU) cannot recover the costs in retail “regulated rates or market prices,” it can recover them under a FERC rate. Cost shifting and cross-subsidization would be allowed, even required. Finally, proposed Section 215A(b)(6) states that FERC: “shall . . . establish a mechanism that permits such owners, operators, or users to recover such costs.” This would require FERC to permit cost recovery. One could presume such recovery would only come from wholesale and transmission customers, but the section does not say that specifically. If the provision would allow FERC to prescribe a retail rate, then APPA is, very concerned and would have to oppose it.

APPA Proposed Changes

Again, while APPA does not believe this provision is necessary, as we have discussed with Committee staff, APPA believes the provision could be amended to resolve these concerns. First, the definition of “defense critical infrastructure” in proposed FPA Section 215A(a)(4) should be amended from:

(4) DEFENSE CRITICAL ELECTRIC INFRASTRUCTURE.—The term ‘defense critical electric infrastructure’ means any infrastructure located in the United States (including the territories) used for the generation, transmission, or distribution of electric energy that—

(A) is not part of the bulk-power system; and

(B) serves a facility designated by the Secretary pursuant to subsection (c), but is not owned or operated by the owner or operator of such facility.

To, instead:

(4) DEFENSE CRITICAL ELECTRIC INFRASTRUCTURE.—The term ‘defense critical electric infrastructure’ means any electric infrastructure located in the United States (including the territories) that serves a facility designated by the Secretary pursuant to subsection (c), but is not owned or operated by the owner or operator of such facility.

Second, the last independent clause of proposed Section 215A(b)(6)(A) should be amended from:

... the Commission shall, after notice and an opportunity for comment, establish a mechanism that permits such owners, operators, or users to recover such costs;

To, instead:

...the Commission may, after notice and an opportunity for comment, prescribe standards for a public utility to seek to recover such costs by filing a rate schedule or tariff pursuant to section 205 of the Act for sales of electric energy or the transmission of electric energy subject to the jurisdiction of the Commission.

Discussion Draft Section 1205—Strategic Transformer Reserve

Background

As noted above, APPA and its members are keenly aware of the importance of electric power grid reliability. This includes preventing outages – whatever the source – in the first place, and speeding recovery from such outages in the second place. To speed recovery, APPA members make investments necessary to reduce and mitigate damage during outages; APPA facilitates, and our members participate, in hundreds of mutual aid agreements with other electric power sector participants; and have an ongoing program via the Electricity Subsector Coordinating Council (ESCC) to work with the Department of Energy, the Department of Homeland Security, and other critical infrastructure sectors to facilitate disaster recovery for large-scale regional or national disasters or attacks.

One key hurdle to recovery from an outage is ensuring that spare equipment is available. While the industry has programs and agreements in place, with a particular emphasis on large-scale transformers, Discussion Draft Section 1205 would require the DOE to submit a plan to Congress evaluating the feasibility of establishing a Strategic Transformer Reserve. Public power utilities would be included in

such an assessment. Such a process was proposed in the Administration's Quadrennial Energy Review as well.

APPA Comments

APPA supports evaluating the feasibility of a Strategic Transformer Reserve. Clear hurdles to such a system include the difficulty in deploying such transformers either by rail or road and the costs of maintaining such a reserve. Including a balanced and thorough discussion of such issues is critical for assessing whether such a program could in fact work, and in designing a program if such a program is determined to be appropriate.

Discussion Draft Section 1206—Cyber Sense

Background

As discussed above, APPA and its members are keenly aware of the threats posed by cyberattacks. They have worked, and will continue to work, to respond to and prevent such threats from damaging their ability to reliably provide electric power. Discussion Draft Section 1206 would authorize DOE to establish, in consultation with FERC and the National Institute of Standards and Technology (NIST), a voluntary program (Cyber Sense) to identify and promote products and technologies that are secure against cyberattack.

APPA Comments

APPA has long supported the creation of a program to give utilities greater ability to discern the security of electronic "smart" devices that they use for a variety of reasons to better manage their systems, but that must be secure when purchased. APPA appreciates the Subcommittee's effort to address this issue, and would gladly work with DOE, FERC, and NIST on such a program's development. APPA would strongly underscore the need for ongoing review of certified products and corrective actions for products found no longer to be secure as provided under Discussion Draft Section 1206(b)(5).

Discussion Draft Section 1207—State Consideration of Resiliency and Advanced Energy Analytics Technologies and Base-load Generation

Background

Discussion Draft Section 1207 would amend Subtitle B of the Public Utility Regulatory Policies Act (PURPA) Title I to create a new "must consider" provision directing state regulatory commissions to consider requiring regulated utilities to increase their use of "resiliency-related technologies" and authorizing such utilities to recover capital and operating expenditures for such investments, plus a

“reasonable rate of return” for such investments. The provisions lists four separate design goals for resiliency technology which must be considered and 16 separate resiliency technology types which must be considered. The provision would directly affect only the limited number of public power utilities that are subject to PURPA Title I Subtitle B and to state regulatory commission authority.

APPA Comments

The Discussion Draft appropriately leaves to state regulatory authorities the decision of what resiliency-related technologies to require and what cost-recovery and rate of return to provide for such investments. However, the provision does expand the list of Subtitle B’s “must consider” provisions (to 20 if the legislation is enacted), requiring state regulatory authorities to consider whether at least 16 different resiliency technologies should be used to achieve any of four separate resiliency goals. State regulatory authorities are already conducting these kinds of analyses. A federal mandate for such analyses may therefore be unnecessary and create further administrative burdens on already resource-constrained state regulatory authorities.

Discussion Draft Section 1208—Reliability and Performance Assurance in Regional Transmission Organizations.

Background

Regional Transmission Organizations (RTOs) operating in certain regions of the country with restructured wholesale electric markets provide for the purchase of the electric capacity needed to meet electricity demand through “capacity markets.” The intent of these “markets” is to ensure that resources will be in place and available when needed (i.e., there will be adequate capacity) to meet the demand for electricity. APPA and others have long had concerns with a specific type of capacity market – namely the mandatory capacity markets that are operated by RTOs in the eastern wholesale markets (the PJM Interconnection, ISO New England and parts of the New York ISO). These administrative constructs account for a substantial share of the total electricity costs paid by consumers and businesses in these regions.

Unfortunately for electric consumers, these mechanisms have not demonstrated that they can achieve a reliable and diverse supply of power and incent the building of new generation where it is most needed. Instead, they have required consumers to pay billions of dollars in costs, with little concomitant benefit. Because these mechanisms to date have not distinguished between technology types or between existing and new units, critical needs are not addressed, including: adequate flexible ramping capability (an operational requirement needed to match the variability of some renewable resources that come online when the sun is shining or wind is blowing, and go offline when they are not); reliability needs created by

new environmental regulations and retiring coal plants; and the coordination of natural gas pipeline infrastructure needs with the increasing electricity generation from natural gas.

These mandatory capacity markets are not actually markets and are certainly not competitive. Instead, they are administrative constructs requiring elaborate rules and processes that have been in a constant state of flux as the RTOs continually tweak these rules. In practice, the constant rule changes have simply increased costs to consumers without addressing the fundamental flaw in the capacity markets -- that new generation generally requires long-term contracts to secure financing, as opposed to short-term, volatile capacity market prices and frequently changing rules. APPA studies have shown that 98 percent of new generation completed in recent years has been built with financing from ownership or long-term contracts. Moreover, in 2013 only 6 percent of new generation was constructed within RTOs with mandatory capacity markets. (There has been a recent increase in planned merchant natural gas plant capacity in the Eastern RTOs, but not all of this has actually been developed and, moreover, this capacity is being planned without consideration of fuel diversity or the impact on already constrained natural gas pipelines and natural gas prices. The speculative nature of these projects also leads to higher financing costs, which may drive up prices in the capacity markets.)

APPA believes that continued reliance on mandatory capacity markets for resource development will not enable the development of needed resources in these regions to assure their energy future, especially in light of EPA's pending 111(d) rule for carbon dioxide emissions, as discussed later in this statement. These constructs persist because owners of existing generation resources have a strong financial interest in maintaining them. In recent years, these generation owners have successfully advocated for rules that reduce competition from new entrants and increase prices to consumers. Unfortunately, FERC has approved many of these rule changes.

Such recent restrictions on new entry and competition are the direct result of actions taken in states located within the Eastern RTOs. These states became frustrated with the lack of new power generation being developed in their states, given the billions of dollars being spent on capacity payments. They sought to take control of their energy resource future and protect their residents from high electricity prices and potential shortages. For example, New Jersey, Maryland, and Connecticut all took steps to establish competitive bidding processes for the procurement of new generation capacity through long-term bilateral contracts. Similarly, the New York Power Authority issued an RFP for new power supplies and subsequently entered into a long-term contract with a new efficient natural gas plant in the New York City area to displace an older, less efficient generation facility.

Fearful of the *lower* prices that would result from the entry of new generation constructed under these state efforts, owners of existing power plants in the New York, New England and PJM RTOs sought to block this new entry through highly problematic new rules, or changes to or reinterpretations of existing rules that were approved by FERC. Such tariff rules involve what is known as the "minimum offer price rule" (MOPR) or "buyer-side mitigation" (BSM). While tariffs regarding MOPR or BSM differ slightly in the details among the three RTOs, the basic concept is to replace lower price offers to sell new capacity

with administratively determined higher price offers, making it more difficult for these new plants to “clear” the capacity auctions. Such rules are based on a largely misguided fear of so-called “buyer-side market power,” – buyers exerting their “power” is what causes prices to come down in competitive markets, which these are decidedly not. Instead, they produce results that have little to do with competitive markets and everything to do with the maintenance of existing seller-side market power.

The BSM rules greatly limit state control over generation resources in their own states and adversely impact not-for-profit public power and cooperative utilities and their millions of utility customers. Because the capacity markets are mandatory, utilities that construct or contract for generation to meet their own customers’ power needs still must offer such self-supply capacity into the annual or sub-annual capacity market auctions. If that capacity does not clear the auction, the utility nevertheless would be required to purchase capacity from the market to meet its capacity obligation—thus paying twice for capacity: once for its own power plant and again for the capacity obtained from the “market.” The original rules of the capacity markets in PJM and ISO-NE contained provisions to ensure that self-supply would clear the auctions, avoiding this double-collection dilemma. But these exceptions for self-supplied generation were undone by FERC in subsequent rule changes. The revised capacity market rules now threaten a cornerstone of the business model for public power and cooperative utilities—their ability to self-supply their own customers.

Public power utilities have spent critical time and resources fighting to restore their self-supply rights. In PJM, lengthy negotiations among merchant generators, industrial customers, and public power and cooperative utilities in 2012 resulted in an agreement providing for, among other things, a MOPR exemption for self-supply resources, but only if such supply meets certain criteria. This exemption was approved by FERC in May 2013, but it is unclear whether it will in fact survive, given further litigation. State-sponsored resources are still not subject to any exemption.

Most recently, on May 8, 2015, the New York Power Authority, New York Public Service Commission, and New York Energy Research and Development Authority filed a joint complaint with FERC requesting that resources used for self-supply or the use of resources to meet an identified reliability be exempted from the MOPR applicable to certain capacity zones in New York. In their complaint, these entities note that “imposing imprecise or misdirected mitigation measures can pervert market outcomes and cause substantial deviations from the competitive equilibrium, much to the detriment of the social welfare.”

Because the BSM rules also adversely impact the ability of states to procure needed generation or to make decisions on the types of resources they might need to meet their energy needs, the implementation of the EPA’s proposed rules under Clean Air Act section 111(d) becomes even more complicated. EPA’s proposed rule of necessity relies on state implementation, but the capacity constructs substantially impede state control of their own resource destinies. It is therefore difficult to see how the affected states will be able to carry out these new obligations. The capacity market rules could well exacerbate reliability problems and price increases as any final rule under section 111(d) is implemented.

Concerns about these constructs were encapsulated in a February 2014 joint letter to FERC from thirty entities, including APPA, publicly and cooperatively owned electric utilities, national consumer and low-income organizations, state public utility commissions, state consumer advocates, investor-owned utilities, industrial customers, and independent power producers. The letter listed the following core principles for capacity market reforms: a recognition that load serving entities (LSEs, which are entities that directly serve end-use customers), states, and local regulatory bodies have policy reasons to support specific types of resources so that barriers should not be erected to thwart resource decisions made by these entities; encouragement and support for long-term contracting and self-supply; and consideration of rate impacts on consumers.

Discussion Draft Section 1208 would require FERC to direct RTOs with an existing capacity market to demonstrate that they meet certain criteria either by filing a new schedule of the rates and charges for the transmission and sale of electricity, or by declaring that the current schedules meet the criteria. Additionally, FERC would be required to consider whether any new schedules filed by an RTO would result in a market meeting those criteria. Criteria include a diverse and flexible generation portfolio, stable pricing for customers, adequate pricing for power generators, and "sufficient supply of reliable electric energy." The provision lists as an attribute of reliability the ability to generate daily for 30 days and during an electric energy emergency or severe weather conditions, and long-term fuel supply and dual-fuel capability. While demand response can currently be bid into capacity markets, it could not qualify as "reliable electric energy" under Discussion Draft Section 1208.

APPA Comments

APPA appreciates the effort to recognize the importance of the mandatory capacity market issue by including legislation regarding this subject in the Discussion Draft. As drafted, however, this provision would not address our concerns and could actually be used as an excuse to expand mandatory capacity markets into RTOs where no mandatory market currently exists. We would oppose its inclusion as drafted in a base energy bill and, so, will endeavor to work with the Committee and Committee members to provide a better alternative.

As noted above, Section 1208 would require RTOs not to explain how their capacity markets provide price stability for customers, but rather how they maintain price adequacy for power generators. The provision ignores the FPA requirement that FERC seek rates that are "just and reasonable" (FPA Sections 205(e) and 206(a)), or to in any other way balance the requirement that this new review ensure that power generators receive an "adequate" price.

Likewise, we are concerned that the strict definition of "reliable electric energy" would needlessly exclude certain forms of capacity, and is contradictory to "a diverse and flexible generation portfolio." The requirement that resources be able to supply generation for at least 30 continuous days would discriminate against certain resources that are part of a diverse fuel supply, including hydropower,

renewable resources and demand response. Moreover, such a strict requirement for capacity resources would create excessive costs to consumers and is not necessary to achieve a reliable supply of power. This provision is similar to a recent and highly problematic capacity performance proposal by the PJM Interconnection. A group of 14 public power utilities and associations, electric cooperatives, large industrial customers, state commissions and consumer advocates distributed a letter to Members of Congress in PJM stating that this proposal “would dramatically increase electric costs without providing meaningful and necessary improvements in system reliability.”

The draft makes no mention of perhaps the single most troublesome aspect of mandatory capacity markets – their interference with a load-serving entity’s ability to self-supply capacity. This omission continues to skew the balance in favor of incumbent generators that benefit financially when new supply resources are impeded from entering the market.

Finally, the requirements would appear to apply to any RTO with a capacity market or other capacity procurement mechanism, not just ones with a mandatory capacity market. Given the market requirements established by the provision, this would result in greater pressure from the merchant generation owners in the footprints of the Midcontinent Independent System Operator (MISO) and the California Independent System Operator (CAISO) to adopt a mandatory capacity market with restrictions on new supply to prop up prices.

APPA has long recommended that these mandatory capacity constructs be phased out and replaced with voluntary, residual capacity markets, with primary resource procurement achieved through a portfolio of long-, medium- and short-term contracts and a diverse resource mix. Such an overhaul may require further inquiry and analysis by Congress and the relevant agencies and commissions. However, APPA believes a narrower near-term fix is already justified by what we know today.

Specifically, APPA would propose that:

- A. RTOs that have not yet implemented a mandatory capacity market should not move to do so without unanimous support by the states in the region.
- B. RTOs that have already adopted a mandatory capacity market should not impair (through rates, or rules, regulations, or practices affecting rates) the ability of a load-serving entity to meet its capacity obligations through a resource it owns, builds, controls, or for which it has a contract for capacity.

APPA believes legislation implementing these two changes would make common sense. A state should not be forced into a mandatory capacity payment mechanism when it wishes to meet its capacity obligations through some other means. Likewise, a load-serving entity should be able to meet its capacity obligations through self-supply. As for whether such an approach might “risk” reliability, APPA members have been providing reliable service to their customers for more than a century. Moreover, load-serving entities would continue to be subject to resource adequacy and reliability obligations. Such an approach

would simply allow our members and other load-serving entities to do so without being forced to pay billions of dollars for capacity they could more affordably supply themselves, and allow them to construct the diverse portfolios they need to protect their customers and better comply with coming EPA regulations.

In sum, APPA's members are absolutely committed to providing reliable electric power. We object, however, to being forced, through mandatory capacity markets, to squander billions of dollars for capacity payments which are not resulting in the building of new generation to meet capacity requirements that our members could better, and more affordably, meet through self-supply. As a result, we appreciate greatly the interest shown by this Subcommittee in this issue. We would hope that in drafting energy legislation this year, the Subcommittee will recognize the impediments to an affordable, reliable and more efficient generation future posed by these mandatory capacity constructs and move to impose needed reforms to those markets, such as those proposed above.

FRED UPTON, MICHIGAN
CHAIRMAN

FRANK PALLONE, JR., NEW JERSEY
RANKING MEMBER

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June 9, 2015

Mr. Gerry W. Cauley
President and CEO
North American Electric Reliability Corporation
3353 Peachtree Road, N.E.
Suite 600 North Tower
Atlanta, GA 30326

Dear Mr. Cauley:

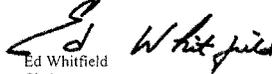
Thank you for appearing before the Subcommittee on Energy and Power on Tuesday, May 19, 2015, to testify at the hearing entitled "Discussion Draft Addressing Energy Reliability and Security."

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.

To facilitate the printing of the hearing record, please respond to these questions with a transmittal letter by the close of business on Tuesday, June 23, 2015. Your responses should be mailed to Will Batson, Legislative Clerk, Committee on Energy and Commerce, 2125 Rayburn House Office Building, Washington, D.C. 20515 and e-mailed to Will.Batson@mail.house.gov.

Thank you again for your time and effort preparing and delivering testimony before the Subcommittee.

Sincerely,


Ed Whitfield
Chairman
Subcommittee on Energy and Power

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy and Power

Attachment



Gerry W. Cauley
President and CEO

June 19, 2015

The Honorable Ed Whitfield
Chairman
Subcommittee on Energy and Power
House Committee on Energy and Commerce
2125 Rayburn House Office Building
Washington, DC 20515-6115

Dear Chairman Whitfield:

Thank you for inviting the North American Electric Reliability Corporation to testify before the subcommittee on May 19, 2015, at the hearing entitled "Discussion Draft Addressing Energy Reliability and Security." We also appreciate the opportunity to respond to additional questions for the record. Our responses are included in the attachment.

Please let us know if we may be of further assistance.

Sincerely,



Gerry Cauley
President and CEO

cc: The Honorable Bobby L. Rush, Ranking Member, Subcommittee on Energy and Power

Attachment

3353 Peachtree Road NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Additional Questions for the Record

Responses to the Honorable Ed Whitfield from Gerry W. Cauley, President and CEO,
North American Electric Reliability Corporation

1. How have NERC assessments of proposed rules helped inform changes incorporated into final rules?

Under the provisions of Section 215(g) of the Federal Power Act, NERC has conducted a wide range of technical assessments focused on evaluating the adequacy and reliability of the bulk power system, as well as identifying the potential reliability implications associated with major proposed environmental rules. These assessments form the foundation of expectations about anticipated changes affecting the bulk power system and are technology neutral, focused solely on the reliability implications and do not advocate a policy position in regard to the environmental objectives of proposed rules. These assessments reflect decades of reliability assessment expertise, performance data, inputs from various subject-matter experts, entity plans, and forecasts to formulate independent, credible findings and recommendations. These assessments help inform stakeholders and policymakers about reliability factors that need to be taken into consideration before a rule is finalized.

NERC recently analyzed the reliability dimensions of EPA proposals governing several potential U.S. environmental regulations, including cooling water intake structures, coal combustion residuals, and mercury and air toxic emissions.^{1,2} These assessments provided EPA, various policy makers, and stakeholders with valuable insights concerning plant retirements, resource adequacy, reliability considerations, and timing challenges.

Changes to proposed rules have reflected the importance of electric reliability. A case example is embedded within EPA's final Mercury and Air Toxics Standard (MATS). NERC's assessment identified "timing" as the number one key finding, noting:

Compliance deadlines will challenge the electric industry's planning horizons, existing planning processes and typical construction schedules. Transmission lines, power plants, and environmental control retrofits are often planned and constructed over a long period of time. Successful implementation of the proposed EPA rules will be highly dependent on the amount of time the industry will be given to comply with future environmental regulations and that tools are in place within a timely manner to support the industry's transition given the large number of units that must be retrofit.

EPA's final rule provided two timing improvements: 1) adoption of a "reliability safety valve" provision to accommodate concerns with building infrastructure and retrofitting existing power plants to address the rule's timing requirements, and 2) EPA granted a nearly automatic one-year extension, and, for due cause, a second year to implement the required changes.

¹ Potential Impacts of Future Environmental Regulations on the Bulk Power System: Extracted from the 2011 Long-Term Reliability Assessment

<http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/EPA%20Section.pdf>

² 2010 Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulations

http://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/EPA_Scenario_Final_v2.pdf

An additional NERC analysis highlighted feasibility concerns with EPA's proposed regulation on cooling water intake structures. Cooling water intake operation and structures are regulated under Section 316(b) of Clean Water Act (CWA). NERC's integrated evaluation, which evaluated four proposed EPA regulations on a composite-basis, identified concerns with meeting the proposed rule due to physical limitations of existing technologies to meet the proposed entrainment and impingement requirements. NERC notes in its assessment:

In its rule development, EPA had assumed this standard could be met by using modified traveling screens. However, some existing power plants that employ EPA's modified traveling screens technology have been unable to meet the proposed fish mortality standard. If the EPA does not include such an alternate technology standard in the final rule, IM compliance options would be severely limited at some plants and may require significant intake structure retrofits to meet the intake velocity of no greater than 0.5 feet per second. Should this not be available to a plant, the EPA-proposed strict fish IM standard may effectively force recirculating cooling water systems options independent of the site specific BTA entrainment standard.

EPA's final rule provided more flexibility. Permitting authorities have discretion on the types of technology used based on site-specific studies. Owners or operators of facilities will also be able to choose one of seven options for meeting best technology available requirements for reducing impingement. State permitting authorities also factor in reliability as one of nine factors in their determination of technology usage. This flexibility allows power plants to remain online and provides market certainty as a long-term resource.

Many stakeholders provide input to EPA on proposed rules reflecting NERC's reliability assessment topics. Overall, NERC's assessments have provided a sound technical baseline for reliability that regulatory and policy stakeholders as well as those entities responsible for associated changes to the resource, transmission, and operations of the bulk power system can depend on. As an independent voice for reliability, NERC's assessments provide helpful guidance to regulators and policymakers to assure reliability is maintained regardless of changes that occur on the bulk power system.

2. In discussing the discussion draft's emergency response section, NERC's standards process has been described by some as too slow. Is this the case?

As noted in my testimony, standards are one piece of NERC's complex, dynamic, and comprehensive approach to grid security and reliability that includes not only standards but a wide range of reliability tools such as alerts, advisories and guidelines that serve to enhance reliability and mitigate risks. NERC's ES-ISAC is our primary information sharing entity that daily provides secure and efficient communication directly to industry about threats and vulnerabilities to the grid. In an emergency, it is unlikely that one would issue a mandatory NERC standard. NERC would utilize the ES-ISAC and other tools to communicate directly and immediately with industry in the case of an emergency.

In response to the general comment that our standards process is too slow, this is outdated information. As the ERO has gained more experience, we have made a number of improvements which have significantly reduced the time it takes to develop a standard. With these improvements, the average time to develop standards has been reduced to less than a year. For example, NERC worked with industry and others to develop a standard to address physical security requirements in less than 90 days, ahead of the deadline set by FERC. FERC's review and approval of this standard took more than 150 days. While there are a few standards that may take longer than a year to finalize, this is due to

their complex technical nature. Considerable input from industry subject matter experts, industry stakeholders, state regulators, consumer representatives and FERC all work together to ensure that mandatory and enforceable standards are effective and properly focused for the more than 1,400 different entities in North America that must comply with these standards.